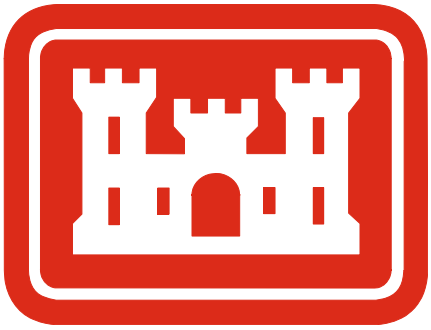
REMEDIAL ACTION WORK PLAN
ON-BASE GROUNDWATER REMEDIATION
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

Prepared For:



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July 2008

DEPARTMENT OF THE AIR FORCE
AIR FORCE REAL PROPERTY AGENCY

July 11, 2008

MEMORANDUM FOR SEE DISTRIBUTION

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SUBJECT: Final Work Plan for On-Base Groundwater Remediation,
Former Griffiss Air Force Base, Rome, New York

1. Enclosed is the Final Work Plan for On-Base Groundwater Remediation dated July 2008. Responses to USEPA comments on the draft Work Plan are also attached.

2. If you have any questions, please contact Cathy Jerrard at (315) 356-0810, Ext. 204.

MICHAEL F. MCDERMOTT
BRAC Environmental Coordinator

Attachment: As Noted

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Date:	ENGINEERING / DOCUMENT REVIEW		
26June08	Griffiss OBGW Project		Document: *Draft RA Workplan*
Comment No	**Reference (Page and Para)**	**Comment**	**Response**
Douglas M. Pocze – General Comments			
1	General	In discussing the different remedial approaches for the Landfill 6, Building 817/Weapons Storage Area (WSA), Building 775 Area, and Nosedocks/Apron 2 Areas, the Draft RAGW Work Plan repeatedly refers to a sampling and monitoring plan which will be developed subsequent to the implementation of the remedial actions. For example, in Section 1.3.1, Enhanced Bioremediation, page 3, of the Draft RAGW Work Plan, it is stated "Following the implementation of the enhanced bioremediation, a monitoring plan will be developed as a separate document to identify the wells requiring sampling for the baseline, performance, and long-term monitoring requirements." In Section 1.3.2, Groundwater Pump and Treat, pages 3 and 4, of the Draft RAGW Work Plan it is stated "Following the implementation of this system, a monitoring plan will be developed as a separate document, to identify the wells requiring sampling for the baseline, performance, and long-term monitoring requirements." The Long-Term Monitoring Plan is discussed in Section 9.9.1 on page 9-7. While it is understood that a properly designed monitoring plan is essential for defining the wells, sampling frequencies, and analytical parameters which will be used to demonstrate compliance with the project remedial goals, it would seem essential that monitoring be conducted prior to the implementation of the remedial actions to develop a baseline condition from which the effectiveness of the remedial technology can be evaluated. For example, a groundwater extraction system cannot be properly evaluated unless the hydraulic gradient of the aquifer prior to system startup is known, and the impact of vegetable oil injections on the geochemical conditions in an aquifer cannot be determined unless the pre-injection oxygen levels, organic carbon concentrations, and oxidation-reduction conditions are known. In order to avoid the perception that no monitoring data currently exist from which a baseline can be established, revise the Draft RAGW Work Plan to discuss existing monitoring data which will be used along with the data derived from the post-remedial action monitoring plans to evaluate the effectiveness of the remedial actions.	As described in the Final Remedial Design Work Plan (e.g. Section 2.4.1) and the 90% Design Drawings (EEEPC, December 2007), baseline sampling has been performed by FPM in November 2006 and results were reported in the Final Monitoring Report, Baseline and PDI2 Sampling, On-Base Groundwater Areas of Concern (FPM, August 2007). The RAWP will be revised to reference the Baseline Monitoring data collected in 2006. A stand alone Injection and Performance Monitoring Work Plan, referred to as Performance Monitoring Work Plan, will be developed by FPM which will be applicable to the injection phase of the remedial action and the performance monitoring period. This Performance Monitoring WP will be based on the monitoring plans described in the Final RD WP (EEEPC, December 2007). The applicable text in Sections 1.3.1, 1.3.2, and 9.9.1 of the draft RA WP will be refined to clarify that "A Performance Monitoring Work Plan will be issued by FPM to document the field sampling and analysis procedures required to collect the data needs identified in the Remedial Design. Performance monitoring will be conducted and a Long-Term Monitoring Work Plan will be developed by FPM."
2	General	The Draft RAGW Work Plan indicates that the recommended remedial action for Landfill 6 is enhanced bioremediation via the injection of vegetable oil. Based on the reported site contaminants of trichloroethene (TCE), cis-1, 2-dichloroethene (DCE), and vinyl chloride (VC) discussed in Draft RAGW Work Plan Section 1.4.1, Site Characteristics of Landfill	Text to be modified to include the following description of previous sampling activities: A Remedial Investigation of Landfill 6 was conducted in 1996 (Law 1996). Six new groundwater monitoring

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		6, page 4, this recommendation appears reasonable. However, the discussion of the site background for Landfill 6 (Section 1.1.1, page 2) indicates that hardfill and general refuse were burned in this area, resulting in a layer of waste and burned residue between five and ten feet thick. This description of the wastes disposed at this unit raises concern whether other potential contaminants, including poly-nuclear aromatic hydrocarbons (PAHs) and dioxins, could be present at the unit, and if so, whether these contaminants would be amenable to bioremediation. To address this concern, it is suggested that Draft RAGW Work Plan sections 1.1.1 and 1.4.1 include a short discussion of the previous sampling activities conducted at the Landfill and an assessment of whether these constituents should be of concern.	wells were installed and then the seven monitoring wells were sampled. Analytical results indicated the presence of four semivolatile organic compounds which were all phthalates. No PAHs were detected. Dioxin and furan show trace levels (low picogram/L) in LF6MW-5. Four other wells sampled for dioxin and furan were ND. A Supplemental Investigation (1997) was performed at LF 6 which included sampling for SVOCs. Again the only SVOCs detected were phthalates. No PAHS were detected. After the 1997 study, all sampling at LF-6 was related to VOCs which were identified as the only contaminants of concern. The LF6 LTM sampling program started in June 2006 and is ongoing. It consists of annual baseline sampling in the summer sampling round and three quarters of routine sampling in the fall, winter and spring sampling rounds. This LTM sampling program at LF6 was implemented as dictated in the ROD and follows the requirements of 6 New York Codes, Rules, and Regulations (NYCRR) Part 360 landfill closure regulations, dated November 26, 1996. The analyte list consists of the following analytes: VOCs (EPA Method SW8260), Metals (EPA Method SW6010B, total and dissolved), Mercury (EPA Method SW7470A, Baseline only), Cyanide (EPA Method SW9010B), Baseline only), Anions (EPA Method SW9056), Nitrogen (TKN) (EPA Method 351.2), Ammonia (EPA Method 350.2), Chemical Oxygen Demand (EPA Method 410.4), Biological Oxygen Demand (EPA Method 405.1), Total Organic Carbon (EPA Method SW9060), Total Dissolved Solids (EPA Method 160.1), Alkalinity (EPA Method 310.1), Phenols (EPA Method SW9066), Hardness (EPA Method 130.2), Color (EPA Method 110.2, Baseline only). and Boron (EPA Method SW6010B, Baseline only).

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3	General	The Draft RAGW Work Plan should include a Construction Quality Assurance Plan. The Draft RAGW Work Plan currently does not allow for the preparation of a Construction Quality Assurance Plan, a standard remedial action work plan component. Revise the Draft RAGW Work Plan to include a Construction Quality Assurance Plan, or allow for the preparation and submittal of one.	A Quality Control Field Plan (QCFP) has been prepared as an appendix to the Contractor Quality Management Plan (CQMP). This QCFP will be submitted for information along with the RTC RAWP. Section 3.3.1 Project Plans text for the QCFP will be added as a bullet item. Section 3.3.1 will be Paragraph 4 refers the QCFP as an Appendix to the CQMP.
4	General	Appendix C, Preliminary Construction Schedule, of the Draft RAGW Work Plan, does not include submission of the Long-Term Monitoring Plan which is discussed in Section 9.9.1 on page 9-7, on the schedule. The RAGW Work Plan should include a schedule for development and submittal of any other required plan. Revise the Preliminary Construction Schedule to include a timeline for preparation and submittal of the Long-Term Monitoring Plan, and a Construction Quality Assurance Plan.	The schedule will be revised to reflect issuance of the Performance Monitoring Work Plan in July 2008 and the LTM WP in approximately 2011. The LTM WP will be developed after one full year of injection monitoring and approximately two full years of performance monitoring (approximately 2011). Depending on site conditions, performance monitoring may transition into LTM sooner.
Douglas M. Pocze – Specific Comments			
1	Section 1.3.2	Section 1.3.2, Groundwater Pump and Treat, Pages 3-4: Draft RAGW Work Plan Section 1.3.2 indicates that a groundwater extraction system will be installed at the Building 775 site with the intention of containing the chlorinated hydrocarbon contaminant plume to the 50 parts per billion (ppb) level. There are several issues that should be addressed in this section of the document; each of these is discussed below:	See below: The RAWP text will be modified to incorporate the following information to further explain the Building 775 remedy. (See response to comments 1A, 1B, 1C).

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1A	Section 1.4.3 and Section 7.4.1	Draft RAGW Work Plan Section 1.4.3, Site Characteristics of Building 775, page 5, indicates that the aquifer is "comprised of silty sands extending from 60 feet bgs to 120 feet bgs, where till is overlying silt. . . Groundwater contaminants were not found in the bedrock." The text does not state the depth or thickness of the saturated zone at this unit, but implies the saturated zone and groundwater contaminant plume could extend through depths ranging from 60 to 120 feet below ground surface (bgs). However, the Draft RAGW Work Plan states in Section 7.4.1, Installation of Extraction Well, page 7-2, that extraction well EW-1 "will be advanced approximately 70 feet bgs with a screen interval between 49 and 69 feet bgs." This text indicates the contaminant plume is anticipated to be present at depths ranging from about 50 bgs to 70 feet bgs. These contradictions in the text raise concern whether the extraction well screen will be placed at the correct depth to intercept the groundwater contaminant plume. Regardless, it appears the extraction well will not be screened across the entire saturated thickness of the aquifer. Given these concerns, the text should be revised to provide justification for the proposed depth intervals for the extraction well screen and how these depths were selected.	The depth of bedrock varies up to a maximum of approximately 120 feet bgs. However, the average depth to bedrock is less. The depth to bedrock at the proposed pumping well location is approximately 95 feet bgs. As indicated in the comment the saturated zone extends from approximately 60 feet to bedrock. The RAWP text describes the approximate extraction well depth based on available data from nearby wells. The RAWP text will be modified to describe that the depth to groundwater and bedrock at EW-1 will be measured in the field as the boring is advanced. The 20 foot screened interval will be adjusted based on these water levels to extend down from 2 feet above the water table so that the approximate upper 18 feet of the saturated zone is screened. The final extraction well depth and screen interval will be provided in the Interim Remedial Action Closure Report following implementation of site activities.

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1B		The Draft RAGW Work Plan does not present a potentiometric map for the Building 775 area showing the hydraulic gradient prior to implementation of the extraction system. Furthermore, it is not clear whether capture zone calculations, or analytical or numerical simulations were conducted to determine the number of extraction wells needed for hydraulic containment, and how the existing hydraulic gradient will influence the anticipated radius of influence induced by the extraction well. Additional information should be presented that indicates how the extraction well was designed given the current hydraulic conditions in this area.	Groundwater elevation maps are provided in the *Baseline and PDI2 Sampling, OBGW AOC, Final Monitoring Report* (FPM Aug 2007). This report was previously submitted to the EPA for information and can be available by request An analysis of the plume and aquifer properties conducted as part of the Feasibility Study demonstrated that an extraction rate of 1.5 gpm would capture the volumetric flow of the plume. This extraction rate was increased to 4.5 gpm for costing purposes. Data obtained from the pre-design investigation reduced the size of the plume. The recent reduction in plume size noted during the pre-design investigation adds further conservatism to the 4.5 gpm extraction rate assumption. The recommended range for the selected pump is 1.5 to 10 gpm. However, the pumping rate and radius of influence will be confirmed during the pump testing performed by the remedial action contractor. The actual pumping rate used and the radius of influence will be provided in the Interim Remedial Action Closure Report following implementation of site activities.

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1C		The Draft RAGW Work Plan does not discuss how the groundwater pumping activities at the Building 775 site will influence the groundwater flow regime at Landfill 6 and the Nosedocks/Apron 2 area, if any.	The anticipated extraction rate at the Building 775 site is less than 10 gallons per minute. At this rate, it is not anticipated that the flow will impact the groundwater flow regimes at the Landfill 6 and Nosedocks/Apron 2 sites. Following installation of the extraction well at Building 775, a pump test will be performed on it to evaluate the radius of influence and potential impact on AP2 and LF6. The actual pumping rate used and the radius of influence will be provided in the Interim Remedial Action Closure Report following implementation of site activities.
2	Section 1.4.2	Section 1.4.2, Site Characteristics of Building 817/WSA, Page 4: The Draft RAGW Work Plan states in Section 1.4.2 that "The TCE/PCE plume does not contain other petroleum-based organics to stimulate reductive dechlorination", however, the text does not indicate if the engineered addition of an organic substrate (e.g., injection of vegetable oil) was considered to enhance the potential for bioremediation. It is suggested the text be revised to discuss whether the potential for enhancing bioremediation was considered, and if so, why this approach was abandoned in favor of Pump and Treat.	The selected remedy for Building 817/WSA is enhanced bioremediation. Building 775 remedy is the groundwater extraction and discharge for off-site treatment.
3	Section 5.3	Section 5.3, Groundwater Monitoring Well Installation, Page 5-2: Draft RAGW Work Plan Section 5.3 indicates that proposed monitoring well LF6MW-39 will be installed "such that the screen interval will be located at 10 to 30 feet bgs." It is not clear how well this screen interval will "evaluate the performance of the enhanced bioremediation application and determine the effectiveness of the remediation of the site groundwater" considering that Draft RAGW Work Plan Section 1.4.1, Site Characteristics of Landfill 6, page 4, indicates the saturated thickness at Landfill 6 extends from 19 feet bgs to 80 feet bgs. It would appear from the forgoing discussion that the proposed well will only provide information on the geochemical conditions in the aquifer within the uppermost 10 feet of the saturated zone. Revise the Draft RAGW Work Plan to provide the rationale for the selected screen interval of this proposed well.	Section 5.3 will be modified to include the following rationale for the selected screen interval. The screen interval for LF6MW-39 was selected based on groundwater cross-sections from the Groundwater Study at Landfill 6 and Building 775 (E & E 2000). The purpose of the monitoring well LF6MW-39 is to monitor potential VOC contamination reaching Three Mile Creek. Installation of the screen at a deeper interval may not be representative of the groundwater that could flow to the creek.

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4	Section 6.4.2	Section 6.4.2, Substrates, Page 6-2: It is noted that the injection fluid composition proposed for the Building 817/WSA site is different from the substrate composition proposed for the Landfill 6 site (discussed in Section 5.4.2, Substrates, page 5-3). For the sake of clarity, the text should discuss the differences between the sites that lead to different fluid injection compositions.	Section 1.3.1 Enhanced Bioremediation text will be modified to indicate the primary difference between Landfill 6 and Building 817 is related to groundwater flow. Groundwater flow at the Landfill 6 hotspot has been interpreted to be very slow or nearly stagnant while the groundwater at Building 817 is likely to be over 900 feet per year based on the results of the substrate injection pilot test and limited hydraulic data. Thus, the substrate mixture to be employed at Landfill 6 contains a significant soluble component (sodium lactate) to improve distribution in this low flow system while the substrate mixture to be used at Building 817 consists entirely of soybean oil in the form of a coarse immobile field emulsion.
5	Section 7.4.1	Section 7.4.1, Installation of Extraction Well, Monitoring Well Seal, Page 7-3: It is suggested that the text in the second paragraph on page 7-3 be revised to read "After the bentonite seal has hydrated for a minimum of 12 hours, a 5% bentonite/cement grout will be installed . . ." Reversing the words cement and bentonite avoids the confusion that the grout composition contains only 5% Portland cement.	The text will be modified to read "After the bentonite seal has hydrated for a minimum of 12 hours, a 5% **bentonite**/cement grout will be installed . . ."
6		Section 10.1.1, Installation, Monitoring Well Seal, Page 10-1: It is suggested that the text in the last paragraph on page 10-1 be revised to read "After the bentonite seal has hydrated for the manufacturers recommended duration, a 5% bentonite/cement grout will be installed . . ." Reversing the words cement and bentonite avoids the confusion that the grout composition contains only 5% Portland cement. In addition, the last sentence in the paragraph should be revised to read "The grout will be placed. . ."	The text will be modified to read "After the bentonite seal has hydrated for the manufacturers recommended duration, a 5% **bentonite**/cement grout will be installed . . ." The last sentence will be revised to read "The grout will be placed. . ."
7		Minor Comment: It should be noted that the page numbering style for Section 1 is different from the remaining sections in the Draft RAGW Work Plan. It is suggested that Section 1 be revised to use the same page numbering scheme as the rest of the document.	Page numbering style will be reviewed to ensure that it is consistent through out the document.

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LIST OF ACRONYMS

AFB	Air Force Base
AFRPA	Air Force Real Property Agency
AMSL	Above mean sea level
AOC	Area of Concern
APP	Accident Prevention Plan
ASTM	American Society of Testing and Materials
bgs	Below ground surface
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CPR	Cardiopulmonary Resuscitation
CQMP	Contractor Quality Management Plan
DCE	Cis-1,2,dichloroethene
DFAS	Defense Finance and Accounting Service
DO	Dissolved Oxygen
DOC	Dissolved Organic Compound
EBS	Environmental Baseline Survey
EEEPC	Ecology and Environment Engineering, P.C.
EW	Extraction Well
FARs	Federal Acquisition Regulations
FFA	Federal Facilities Agreement
FPM	FPM Group, Ltd.
FS	Feasibility Study
GAFB	Griffiss Air Force Base
GLDC	Griffiss Local Development Corporation
gpm	Gallons per minute.
GUSC	Griffiss Utility Service Corporation
HAZWOPER	Hazardous Waste Operations and Emergency Response
HDPE	High Density Polyethylene
hp	Horsepower
HTRW	Hazardous, toxic, and radioactive waste
hz	Hertz
I&T	Information and Technology
ID	Inner-diameter
IDW	Investigation-Derived Waste
lbs	Pounds
LF6	Landfill 6
LTM	Long Term Monitoring
MNA	Monitored Natural Attenuation
MTBE	Methyl Tertiary Butyl Ether
NEMA	National Electrical Manufacturers Association
MSDS	Material Safety Data Sheets

NEADS	Northeastern Air Defense Sector
NTU	Nephelometric Turbidity Unit
NYANG	New York Air National Guard
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
OBGW	On-Base Groundwater
ORP	Oxidation Reduction Potential
OSHA	Occupation Safety and Health Administration
PAHs	Poly-nuclear aromatic hydrocarbons
PCE	Perchloroethene
PHSM	Project Health and Safety Manager
PID	Photo Ionization Detector
PM	Project Manager
PMP	Project Management Plan
PO	Purchase Order
POTW	Publicly Owned Treatment Works
ppb	Parts per billion
PPE	Personal Protective Equipment
ppm	Parts per million
psi	Pounds Per Square Inch
PVC	Polyvinyl chloride
QCFP	Quality Control Field Plan
QASP	Quality Assurance Surveillance Plan
RAWP	Remedial Action Work Plan
RDWP	Remedial Design Work Plan
RI	Remedial Investigation
ROD	Record of Decision
ROI	Radius of Influence
SAC	Strategic Air Command
SHARP	Safety, Health, and Safety Risk Program
SHP	Safety and Health Plan
SI	Supplemental Investigation
SM	Site Manager
SOP	Standard Operating Procedures
SPCC	Spill Prevention, Control, and Countermeasure
SSHO	Site Safety and Health Officer
SSHP	Site-Wide Safety and Health Plan
SVE	Soil Vapor Extraction
SVOCs	Semivolatile organic compounds
SWPPP	Storm Water Pollution Prevention Plan
TAGM	Technical and Administrative Guidance Memorandum
TCCP	Toxicity Leaching Procedure

TCE	Trichloroethene
UIC	Underground Injection Control
USACE	Unites States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VC	Vinyl Chloride
VOC	Volatile organic compound
WPCF	Water Pollution Control Facility
WSA	Weapons Storage Area

SECTION 1

INTRODUCTION

The purpose of this remedial action work plan (RAWP) is to detail the scope of environmental remediation identified in the Remedial Design Work Plan (RDWP) (EEEPC, 2008) and to accomplish the approved remedial actions for Landfill 6 (LF6), Building 817/Weapons Storage Area (WSA), Building 775, and Nosedocks/Apron 2 at the former Griffiss Air Force Base (GAFB) in Rome, New York. The objective of this remedial action work plan is to provide a guide for implementing the selected remedies, which include enhanced bioremediation, groundwater pump and discharge, and monitored natural attenuation. A performance monitoring work plan and a long-term monitoring (LTM) work plan will be developed (under a separate cover) and implemented for each of the four on-base groundwater (OBGW) remediation areas of concern (AOC) described above.

This work plan is organized into fourteen sections and three appendices. The project background, project objectives, innovative technology assessment, and physical characteristics of the site are presented in Section 1. Section 2 provides a summary of previous site activities and investigations. The remediation management plan is provided in Section 3. The required permits and approvals are discussed in Section 4. The LF6 site work plan is described in Section 5. Section 6 presents the Building 817/WSA site work plan. Building 775 site work plan is described in Section 7. Section 8 presents the Nosedocks/Apron 2 site work plan. Section 9 describes the control plans. The remediation procedures and site restoration are detailed in Sections 10 and 11, respectively. The contingency plans are described in Section 12 and the preliminary construction schedule is discussed in Section 13. References are provided in Section 14. Appendix A contains the injection well inventory form. Appendix B contains the standard operating procedure for slug testing. Appendix C contains the preliminary construction schedule.

1.1 PROJECT BACKGROUND

The former GAFB is located in Oneida County, New York, and is approximately two miles northeast of the city of Rome in central New York State. The base property covers approximately 3,540 acres and is situated in the relatively broad valley of the Mohawk River at an elevation of 504 feet above mean sea level (AMSL) (Figure 1-1).

Griffiss Air Force Base, originally named Rome Air Depot was activated on February 1, 1942, with the mission of storage, maintenance, and shipment of material for the U.S. Army Air Corps. Upon creation of the Air Force in 1947, the depot was renamed Griffiss Air Force Base. The base became an electronics center in 1950, with the transfer of Watson Laboratory Complex (later Rome Air Development Center [1951], Rome Laboratory, and then the Air Force Research Laboratory Information Directorate, established with the mission of accomplishing applied research, development, and testing of electronic airground systems). The 49th Fighter Interceptor Squadron was also added. The Headquarters of the Ground Electronics Engineering Installations Agency was added in June 1958 to engineer and install ground communications equipment

throughout the world. 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 in 1993 and 1995, resulting in deactivation of the 416th Bombardment Wing in September 1995. The Air Force Research Laboratory Information Directorate and the Northeast Air Defense Sector (NEADS) will continue to operate at their current locations; 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; and the Defense Finance and Accounting Services (DFAS) has established an operating location at the former Griffiss AFB.

On July 22, 1987, the base was listed on the United States Environmental Protection Agency (USEPA) National Priority List, which brought the installation under the federal facilities provisions of Section 120 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). In August 1990, the Air Force, the USEPA, and the New York State Department of Environmental Conservation (NYSDEC) entered a Federal Facilities Agreement (FFA) for environmental remediation at a number of sites at the former GAFB.

1.1.1 Landfill 6 Background

Landfill 6 is a 15.7-acre area located in the southern portion of the former GAFB between Perimeter Road and Three Mile Creek. The landfill was in operation from 1955 to 1959 and is unlined. Disposal activities were conducted in two areas that are separated by a dirt access road that passes along the southern boundary of the landfill and bisects the northern area of the landfill. The majority of disposal activities occurred on a hillside north and east of the road; between 38,000 and 62,000 cubic yards of hardfill and general refuse were placed on the ground and burned in this area. The layer of waste and burned residue is estimated to be five to 10 feet thick. In the 1980s, fuel-contaminated soils were disposed to a depth of three feet in the central and southern portions of Landfill 6, and in 1986, a clay cap was constructed over this disposal area.

A Remedial Investigation of Landfill 6 was conducted in 1996 (Law 1996). Six new groundwater monitoring wells were installed and then the seven monitoring wells were sampled. Analytical results indicated the presence of four semivolatile organic compounds (SVOCs) which were all phthalates. No poly-nuclear aromatic hydrocarbons (PAHs) were detected. Dioxin and furan show trace levels (low picogram/L) in monitoring well, LF6MW-5. Four other wells sampled for dioxin and furan were non-detect.

A Supplemental Investigation (1997) was performed at LF 6 which included sampling for SVOCs. Again, the only SVOCs detected were phthalates. No PAHS were detected. After the 1997 study, all sampling at Landfill 6 was related to volatile organic compounds (VOCs) which were identified as the only contaminants of concern.

In 2005, landfill cover improvements specified in the Landfill 6 Record of Decision (ROD) (February 2001) and the Landfill 6 Closure Plan (March 2004) included installation of an impermeable cover to reduce the amount of water infiltrating into the landfill. The cover consists of a gas venting layer, a geomembrane cover, and a barrier protection layer over the

entire landfill. Other remedial activities specified in the ROD that were implemented include: maintenance of the impermeable cover, long-term monitoring of the groundwater and stream environment downgradient of the site, institutional controls in the form of deed restrictions to prohibit use of the area and groundwater, and evaluation of site conditions at least once every five years.

The Landfill 6 LTM sampling program started in June 2006 and is ongoing. It consists of annual baseline sampling in the summer sampling round and three quarters of routine sampling in the fall, winter and spring sampling rounds. This LTM sampling program at Landfill 6 was implemented as dictated in the ROD and follows the requirements of 6 New York Codes, Rules, and Regulations (NYCRR) Part 360 landfill closure regulations, dated November 26, 1996. The analyte list consists of the following analytes: VOCs (EPA Method SW8260), Metals (EPA Method SW6010B, total and dissolved), Mercury (EPA Method SW7470A, Baseline only), Cyanide (EPA Method SW9010B), Baseline only), Anions (EPA Method SW9056), Nitrogen (TKN) (EPA Method 351.2), Ammonia (EPA Method 350.2), Chemical Oxygen Demand (EPA Method 410.4), Biological Oxygen Demand (EPA Method 405.1), Total Organic Carbon (EPA Method SW9060), Total Dissolved Solids (EPA Method 160.1), Alkalinity (EPA Method 310.1), Phenols (EPA Method SW9066), Hardness (EPA Method 130.2), Color (EPA Method 110.2, Baseline only), and Boron (EPA Method SW6010B, Baseline only).

1.1.2 Building 817/WSA Background

The Building 817/WSA site is located on the north side of the main runway between Building 817 and the culverted section of Six Mile Creek, south of the former weapons storage area. Building 817 once was used for electronics parts maintenance, and trichloroethene (TCE) and perchloroethene (PCE) were solvents used in small quantities at this location.

1.1.3 Building 775 Background

Building 775 is located in the SAC Hill area in the south-central portion of the former GAFB. The site is situated on a topographic high relative to the runway and flight aprons. Building 775 (Pumphouse 3) was one of four pumphouses located east of Ready Road. Building 774 is located across and to the west of Building 775, and was identified as a TCE storage area housing a 400-gallon TCE vat. The vat has been removed and the area where the drums were stored is currently paved or grass covered. It was originally thought that Building 775 was the origin of a TCE plume, but during the Remedial Investigation (RI) and Supplemental Investigation (SI) investigations, it was determined that the actual source of contamination was the degreasing room/vat in Building 774. This degreasing system utilized a monorail to carry equipment to the degreasing vat for solvent cleaning when the building was used as an armament and electronics shop. Chlorinated solvents that have contributed to the groundwater contamination are suspected to have originated from this area. No evidence of the degreasing system was found during the base wide environmental baseline survey (EBS) site inspection in April 1994.

1.1.4 Nosedocks/Apron 2 Background

Apron 2 was an aircraft storage and refueling area. The Apron 2 fuel system was originally serviced from Pumphouses 1, 2, and 3, located on SAC Hill, south of the apron. In 1992, a Type III fuel system was installed to service Apron 2. It consisted of Building 772 (Pump house)

and Building 8002 (Generator Room) and a system of distribution pipelines used to feed JP-8 fuel to hydrants located on Apron 2. Chlorinated solvent use most likely occurred in all nosedock facilities and multiple small sources could exist along floor drains, sewer lines, and oil water separators.

1.2 PROJECT OBJECTIVES

The objective of this remedial action work plan is to detail remediation activities for the four OBGW AOC, sites at the Former Griffiss Air Force Base: Landfill 6, Building 817/WSA, Building 775, and Nosedocks/Apron 2. This plan will implement the approved selected remedies and initialize the start of performance monitoring and long term monitoring requirements for the sites.

1.3 SELECTED REMEDIES

A number of remedial studies and investigations (See Section 2) have been conducted to assist in identify the appropriate environmental remedy for the areas of concern. Baseline sampling has been performed and results were reported in the Final Monitoring Report, Baseline and PDI2 Sampling, On-Base Groundwater Areas of Concern (FPM, 2007).

1.3.1 Enhanced Bioremediation

The recommended remedy for the Landfill 6 and the Building 817/WSA sites is enhanced bioremediation. This process is intended to increase biodegradation of the groundwater contaminants by injecting a vegetable oil emulsion into the ground. The vegetable oil emulsion increases the natural breakdown of the chemicals, reducing the concentration of contaminants.

The injection fluid that will be deployed at Landfill 6 will consist of a four part emulsion of make-up water, vegetable oil, sodium lactate, and pH buffering product. The injection fluid used at Building 817/WSA site will consist of a three part emulsion of make-up water, vegetable oil and pH buffering product.

The primary difference between the Landfill 6 site and the Building 817/WSA site is related to the groundwater flow. The groundwater flow at the Landfill 6 hotspot has been interpreted to be very slow to nearly stagnant, while the Building 817/WSA hotspot is likely to expand over 900 feet per year based on the results of the substrate injection pilot test and limited hydraulic data. The injection fluid deployed at the Landfill 6 Site contains a significant soluble component (sodium lactate) to improve the distribution in this low flow system. The injection fluid deployed at the Building 817/WSA site consists entirely of soybean oil in the form of a coarse immobile field emulsion.

Following the implementation of the enhanced bioremediation, a monitoring plan will be developed as a separate document to identify the wells requiring sampling for the baseline, performance, and long-term monitoring requirements. A Performance Monitoring Work Plan will be issued by FPM to document the field sampling and analysis procedures required to collect the data needs identified in the RDWP (EEEPC, 2008). Performance monitoring will be conducted and a Long-Term Monitoring Work Plan will be developed by FPM.

1.3.2 Groundwater Extraction and Discharge

A groundwater extraction and discharge system will be implemented at the Building 775 site. The pump and discharge system is designed to contain the contaminated plume (>50 parts per billion (ppb)) and extract the contaminants from the aquifer. Extraction well(s) and a submersible pump(s) will be installed to extract the contaminated groundwater and discharge to the existing sanitary sewer system for treatment at the publicly owned treatment works (POTW).

Following the implementation of the system a Performance Monitoring Work Plan will be issued by FPM to document the field sampling and analysis procedures for the baseline, performance, and long-term monitoring required. Performance monitoring will be conducted and a Long-Term Monitoring Work Plan will be developed by FPM.

1.3.3 Monitored Natural Attenuation

Monitored Natural Attenuation (MNA) uses the ongoing physical, chemical, and/or natural biological process that reduces the contaminants within the aquifer. Based on previous investigations and studies, it has been determined that MNA is evident at the Nosedocks/Apron 2 site. In support of the selected remedy, three additional monitoring wells will be installed and developed to support the sampling that will be conducted in accordance with the Performance Monitoring Work Plan. The plan will be prepared to support the MNA sampling, performance, and long-term monitoring requirements for this selected remedy.

1.4 SITE CHARACTERISTICS

A detailed description of the site characteristics can be found in the *Final Remedial Design Work Plan and 90% Design Drawings, Former Griffiss Air Force Base* (EEEPC, 2007). This design report provides detailed description of the geology, hydrogeology, and current conditions for each OBGW AOC. The subsections below summarize the site characteristics.

1.4.1 Site Characteristics of Landfill 6

The Landfill 6 site is a contaminated aquifer, with contaminants exceeding NYSDEC Class GA groundwater standards. These contaminants are TCE, cis-1, 2-DCE, and VC.

The Landfill 6 site is located down gradient and west of the former Landfill 6 and south of the Building 775 site. The most contaminated portion of the plume is no longer under the former landfill but migrated to the southwest toward Three Mile Creek. The contaminated aquifer is comprised of silty sands with an average saturated thickness extending from 19 feet below ground surface (bgs) to 80 feet bgs, where shale bedrock is encountered.

1.4.2 Site Characteristics of Building 817/WSA

Building 817/WSA is an aquifer with TCE and PCE contaminants exceeding NYSDEC Class GA groundwater standards. Site groundwater flows south under Perimeter Road and toward the culverted section of Six Mile Creek. The contaminated aquifer is composed of relatively uniform fine sands that begin five feet bgs and extend to shale bedrock at approximately 20 to 25 feet bgs. Contamination is not found in the bedrock.

Although there is no indication that the plume has migrated to Six Mile Creek, the level of contamination at monitoring well WSAVMW-17 does indicate the potential for additional migration. The TCE/PCE plume does not contain other petroleum-based organics to stimulate reductive dechlorination. There is no significant cis-1, 2-DCE in the plume, indicating that reductive dechlorination is not occurring.

1.4.3 Site Characteristics of Building 775

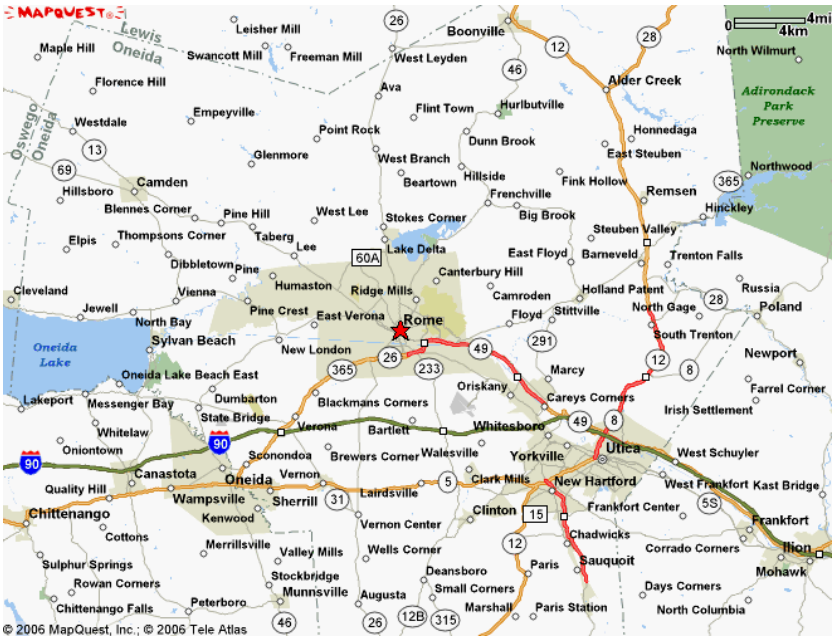
The primary contaminant exceeding NYSDEC Class GA Groundwater Standards is TCE with minor detections of 1, 1, 1-TCA and PCE. Most of the Building 775 plume appears to have migrated south toward Landfill 6. Building 775 site is comprised of silty sands extending from 60 feet bgs to 120 feet bgs, where till is overlying shale bedrock. The depth of bedrock varies up to a maximum of approximately 120 feet bgs, with the average depth to bedrock being less. The depth to bedrock at the proposed extraction well location is approximately 95 feet bgs. Average groundwater velocities are slow and are estimated to be approximately 10 feet per year. Groundwater contaminants were not found in the bedrock.

1.4.4 Site Characteristics of Nosedocks/Apron 2

The chlorinated VOCs contamination associated with the Apron 2 Chlorinated Plume site is present in two plumes known as the southern and northern plumes. There are three primary contaminants exceeding NYSDEC Class GA Groundwater Standards: TCE, and its breakdown products: cis-1, 2 DCE and VC. The southern plume is commingled with several petroleum fuel plumes originating from the Apron 2 fueling system. The level of TCE has been steadily decreasing in both plumes and it appears that no significant source of TCE remains at the site. At many locations, methyl tertiary butyl ether (MTBE) and benzene are also present at levels exceeding NYSDEC Class GA Groundwater Standards. MTBE and benzene plumes are being remediated under a separate contract but both Apron 2 remediation efforts will be closely coordinated. The contaminated aquifer is located at nine to 25 feet bgs with the shallow depth occurring near Six Mile Creek.

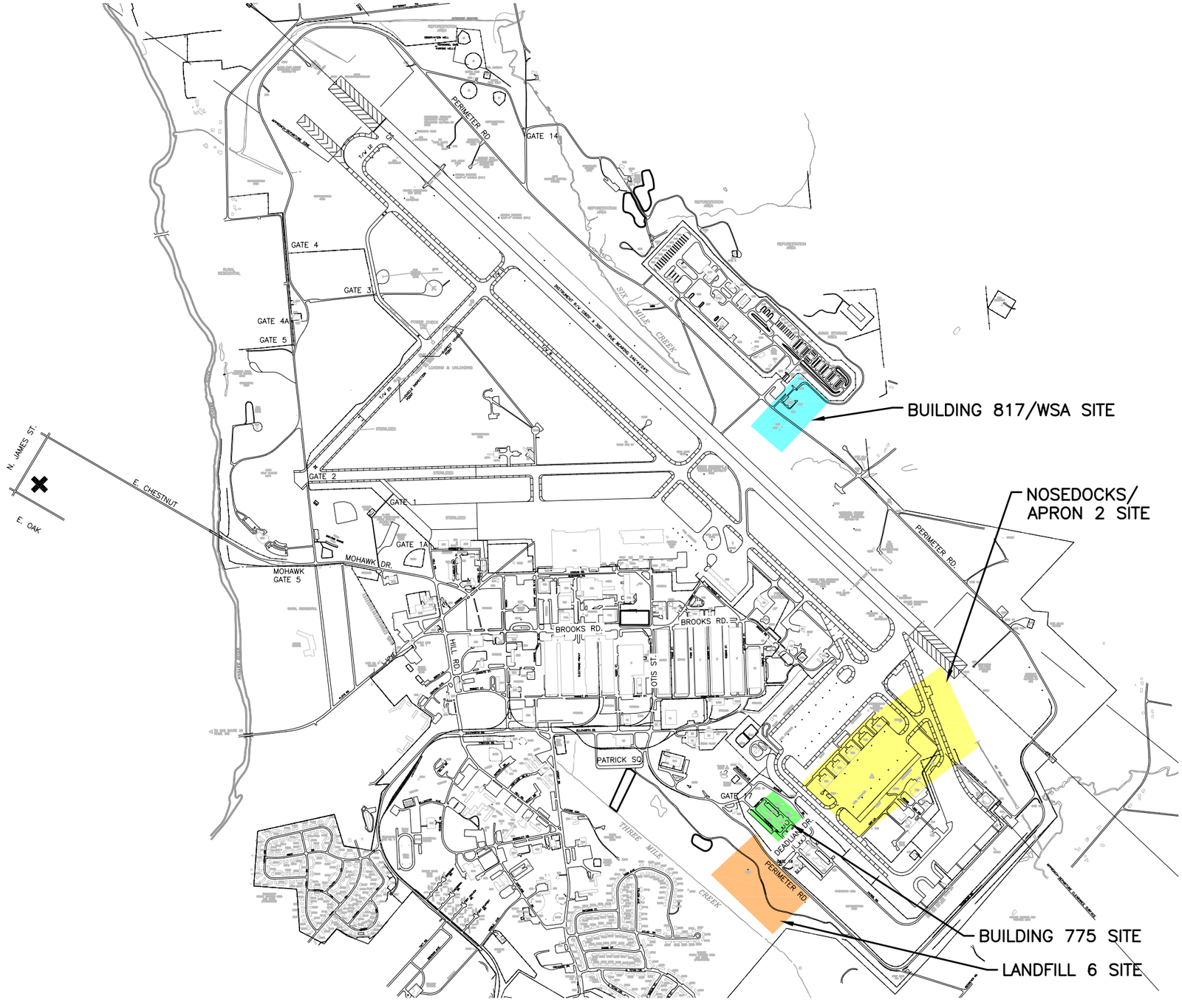
FIGURE 1-1

LOCATION OF ROME, NEW YORK



LOCATION OF THE FORMER GRIFFISS AIR FORCE BASE (PART OF THE GRIFFISS BUSINESS AND TECHNOLOGY PARK)

Maps Copied From www.mapquest.com



1800 900 0 1800 3600

SCALE: 1"=1800'

FIGURE 1–2

FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

ON–BASE GROUNDWATER
REMEDIATION AREAS OF CONCERN

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315–451–9560

No XREFs
P:\745115\CAD\745115C002.dwg, 4/15/08

SECTION 2

SUMMARY OF PREVIOUS REMEDIAL STUDIES/INVESTIGATIONS

2.1 SUMMARY

Numerous studies and investigations under the U.S. Department of Defense Installation Restoration Program have been carried out to locate, assess, and quantify the past toxic and hazardous waste storage, disposal, and spill sites. Prior to 1990, groundwater and soil analyses, record searches, health assessments, hydrology investigations, and site specific investigations were conducted. In 1990, the Air Force entered into a FAA under Section 120 of CERCLA. The purpose of this section it to identify some of the remedial studies and investigations conducted in support of the OBGW remediation efforts.

The table below represents a few of the major activities for the four OBGW AOC sites. A more detailed description of these activities can be found in the *Final Proposed Plan On-Base Groundwater AOC (AFRPA 2007).*

Activity	Landfill 6	Building 775	Building 817/WSA	Nosedocks/ Apron 2
Groundwater Monitoring Well Installation	1981	1989	1992 (part of site investigation)	NA
Remedial Investigation	1994 (included Risk Assessment)	1994 (included Risk Assessment)	1994	1997
Supplemental Investigation	1997	1997	1997 and additional in 2000	1997 and additional in 2002 (included Risk Assessment)
Groundwater Study	2000	2000	NA	2004
Bedrock Groundwater Study	2002	2002	2002	NA
Feasibility Study (FS)	2001/2005/2006	2001/2005/2006	2001/2005/2006	2006
Treatability Studies[1]	2002/2003	2002/2003	2002/2003/2006	NA
Pre-Design Investigation	2006/2007	NA	NA	NA
Additional Activities:	Passive Soil gas Survey (1993)	Leak Detection and Monitoring System Installed (1991)	Expanded Site Investigation (1998)	NA

[1] Treatability Studies included Bench-scale Study, a Field Pilot Study, and an Initial Vegetable Oil Injection Pilot Study dependent on the site location and current conditions.

NA- Not Applicable

SECTION 3

REMEDIATION MANAGEMENT PLAN

3.1 PROJECT MANAGEMENT ORGANIZATION

A team of appropriately trained and qualified professionals from Parsons will conduct this project. Each member of the team has been assigned various duties related to the project. The key project team members are briefly described below in terms of their project responsibilities.

1. **Parsons Project Manager** (PM) - Mr. John Lanier will perform the duties of Project Manager. The PM will be responsible for all project activities. Mr. Lanier will also function as the primary client contact, and ensure that all project and client requirements are met.

2. **The Project Health and Safety Manager** (PHSM) - Mr. Timothy Mustard is responsible for oversight and direction to ensure full compliance with all health and safety requirements at the project site. The PHSM, or his designee will oversee/review all aspects of site safety, including the preparation of the Safety and Health Plan (SHP) (including subcontractors SHPs), performance of the initial site-specific training, and the periodic auditing of site operations to verify Occupational Safety and Health Administration (OSHA), United States Army Corps of Engineers (USACE), and SHP compliance. While the PHSM will not necessarily visit the site, he will ensure that personnel carry out the required activities.

3. **The Site Safety and Health Officer** (SSHO) - Mr. Dale Dolph is responsible for carrying out the provisions of the Accident Prevention Plan (APP) and the Site-Wide Safety and Health Plan (SSHP) with regards to site work, and will ensure that all personnel entering the site understand and adhere to the provisions of the SHPs and that personnel meet the training and medical monitoring requirements of 29 CFR §1910.120. The SSHO will be approved by the PHSM, or designee and should have the following qualifications (unless confirmed acceptable by the PHSM): Current 40-hr (8-hr refresher) Hazardous Waste Operations and Emergency Response (HAZWOPER) training; HAZWOPER Supervisor training; Parsons START/SHARP training; OSHA 10-hr or 30-hr safety training; Current medical monitoring (if applicable); Current first aid/Cardiopulmonary Resuscitation (CPR); Experienced at the highest level of respiratory protection expected at the site; Demonstrated proficiency in air monitoring instrumentation to be used at the site; Demonstrated familiarity with company policies, procedures, and H&S program; and the ability to make decisions. Any changes in the provisions of the APP and SSHP shall be made in writing by the SSHO and shall be approved by the PHSM or Corporate Health and Safety Manager. Any personal protective equipment upgrades or downgrades shall be documented in writing by the SSHO. The SSHO shall have the authority to stop an operation or site work if, in the opinion of the SSHO, the site conditions or the manner in which the work is being conducted, presents a hazard to site personnel, surrounding populations, or the environment. The name and contact information for the SSHO or,

if the SSHO is absent, the name of the acting SSHO, shall be provided in the SSHP and posted on the bulletin board in the field office. The SSHO is responsible for all air monitoring. Additional site-specific information is provided in the SSHP.

4. **Site Manager (SM**)–Mr. Daniel Hoffner, in the absence of the PM at the site, the SM will be responsible for the supervision of Parsons' personnel and subcontractors. The SM will be designated by the PM prior to the initiation of field activities. The SM has the authority to stop work if any operation threatens worker or public safety

5. **Field personnel** will be involved in well installation, sampling, inspections, field monitoring, and decontamination, as specified in the RAWP for each individual site. Site personnel will only perform tasks for which they have received appropriate training.

PARSONS PROJECT TEAM	
Title	**Responsibility**
Program Manager	Mr. Ross Miller Office: 801-572-5999 Cell: 801-721-9243
Parsons Project Manager	Mr. John Lanier Office: 716-541-0751 Cell: 716-998-3485
Project Health and Safety Manager	Mr. Timothy Mustard Office: 303-764-8810 Cell: 303-564-3537 Mr. Bill Bradford (Syracuse H&S Representative) Office: 315-451-9560 Cell: 315-546-5146
Site Manager	Mr. Dan Hoffner Office: 716-541-0748 Cell: 716-807-8432
Site Safety and Health Officer	Mr. Dale Dolph Office: 315-451-9560 Cell: 315-506-3939
Project Quality Control Coordinator	Mr. Norm Hilmar Office: 303-764-8806
Project Quality Control Officer	Ms. Rebecca Absolom Office: 315-451-9560 Cell: 315-569-9467
Field Personnel	Mr. Mark Mondak; Mr. Ronald Prohaske; Mr. Ed Ashton Others To Be Determined as Needed.

3.2 POINTS OF CONTACT

Parsons will take the lead role in planning, organizing, health and safety issues, and overall quality assurance for all work under this task order. The Parsons Team will report to the USACE and the Air Force Real Property Agency (AFRPA) through a single point of contact, Parsons PM, Mr. John Lanier.

Client contact information is presented below:

USACE, KC Project Manager	**AFRPA Project Manager**
Nanci Higginbotham US Army Corps of Engineers Kansas City District 601E. 12th Street Kansas City, MO 64106 Phone: 816-389-3359 Email: nanci.e.higginbotham@nwk02.usace.army.mil	Cathy Jerrard Air Force Real Property Agency 153 Brooks Road Rome, NY 13441 Phone: 315-356-0810 x204 Email: Catherine.jerrard@afrpa.pentagon.af.mil

Contact names and telephone numbers for key Parsons Program personnel are listed below:

Name	Function	Location	Telephone No.
Ross Miller	Program Manager	Salt Lake City, UT	801-572-5999
Ken Stockwell	Environmental Remediation Sector Manager	Norcross, GA	678-969-2351
John Lanier	**Project Manager**	**Syracuse, NY**	**315-451-9560 x 2164 716-998-3485 (cell)**
Tim Mustard	Project Health and Safety Manager	Denver, CO	303-764-8810
Mike Nosbisch	PI&T Project Controls Manager	Pasadena, CA	626-440-2887
Ross Miller	Technical Director	Salt Lake City, UT	801-572-5999
Ramona Dano	Billing Manager	Fairfax, VA	703-934-2306
Michelle Smith	Contract Administrator	Pasadena, CA	626-440-4177
Norm Hilmar	Quality Control Coordinator	Denver, CO	303-764-8806
Kim Ruf	Procurement Manager	Huntsville, AL	256-217-2562
Marty Switzer	Procurement Officer	Syracuse, NY	315-451-9560 x 2142
Bill Bradford	Syracuse PIT Health and Safety Officer	Syracuse, NY	315-451-9560 x 2108
Tim Grady, PE	Ecology & Environment Engineering, PC	Lancaster, NY	716-684-8060
Gaby Atik , PE	FPM Group, Ltd.	Griffiss AFB Rome, NY	315-336-7721

3.3 PROJECT PLANS AND PROCEDURES

3.3.1 Project Plans

Parsons project plans and procedures will be developed and issued for all work activities. Upon completion, these plans and procedures will be placed in the project files. Project procedures that will be used to control project deliverables, services, and activities include the following documents.

- Remedial Action Work Plan (RAWP);
- Remedial Design Work Plan (RDWP) - Bound Separately ;
- Parsons Project Management Plan (PMP) – Bound Separately;
- Contractors Quality Management Plan (CQMP) – Bound Separately;
- Quality Control Field Plan (QCFP) – Bound Separately;
- Quality Assurance Surveillance Plan (QASP) – Bound Separately;
- Accident Prevention Plan (APP) – Bound Separately;
- Performance Monitoring work Plan – Bound Separately; and
- Long Term Monitoring Plan – Bound Separately.

The APP, the CQMP, and the QASP, will be updated to reflect any new changes or revisions in procedures, contact information, health and safety requirements, quality control requirements and additional modifications since initial approval.

The APP, prepared in accordance with the Parsons Safety, Health and Risk Program (SHARP), and the USACE Health and Safety Requirements Manual EM 385-1-1, will be updated prior to the start of remediation construction and will address any conditions that may be encountered during the duration of work. This may include excavation hazards, electrical hazards, chemical hazards, emergency contact information, routes to hospital, and use of personal protection equipment (PPE) for various site activities. Additional site hazards not listed here are described in the APP (bound separately).

The CQMP will be updated and a Quality Control Field Plan will be added as an appendix (bound separately). This QCFP will layout the requirements for field inspection activities and documentation requirements. This plan will be prepared in conjunction with a three phase quality control approach, prior to the start of activities, immediately following the start up of activities and following completion of activities.

3.3.2 Form of Contract

This contract (W912DQ-06-D-0012) has been awarded as a fixed price contract, in which payment is milestone based. The payment structure is tied to core performance standards. These performance standards will be monitored through the use of a QASP (bound separately) which was developed by the USACE following approval of the Parsons technical approach, project work plans, and quality management plans. Additional information can be found in the PMP (Parsons, 2007).

3.4 QUALITY MANAGEMENT

Parsons' quality assurance policy requires that every project has and implements a PMP. The PMP will be updated, as necessary, throughout the project.

Project activities will be performed in accordance with the CQMP and the QASP that support this plan and ensure that the project will conform to the client's requirements. The goal of this plan is to ensure that the requirements of the project are clearly understood by the project team and met the first time, thereby preventing costly rework.

3.4.1 Review

Independent technical and/or peer review of client deliverables will be performed prior to submittal of the documents. Client deliverables that will be reviewed include all technical reports, studies, assessments, work plans, project plans, drawings, specifications, calculations, and procurement/ subcontract technical documents. The PM shall ensure that the appropriate level of document review is conducted in accordance with the CQMP.

3.4.2 Document Control and Records

The PM will establish and implement a system to control the preparation, review, approval, issuance, use, and revision of documents. Document control procedures, including external document control procedures are discussed in the CQMP. The documents, internal and external, involved are those that establish policies, prescribe work, specify requirements, or establish design (e.g., drawings, specifications, calculations, computer codes, procurement documents, vendor supplied documents, procedures, plans, and instructions).

Field log books, daily field reports, verification checklist, and any additional documentation from the site activities will be maintained in the project field trailer or Parsons Syracuse office as appropriate. Following the completion of work, all documentation will be filed accordingly in the Parsons Syracuse office. This documentation will be used in completion of the Interim Remedial Action Completion Report.

3.4.3 Audits

Senior and project management will implement a system of planned and documented audits and/or assessment to verify whether quality activities comply with planned arrangements and to determine the effectiveness of the quality system. The level and extent of this audit and assessment program will be based on the complexity and risk of the system, activity, or project involved. In addition:

- The audit and assessment program will be scheduled based on the status and importance of the activity.
- Audits and follow-up actions will be carried out in accordance with documented procedures.
- The results of audits and assessments will be documented and brought to the attention of personnel having responsibility in the area audited.

- Responsible management personnel will take timely corrective action to noted deficiencies and/or adverse quality conditions.

The PM and QC Coordinator will also periodically review the company and project quality system at appropriate intervals to ensure its continuing suitability and effectiveness.

Safety inspections begin during the project mobilization phase, and continue through the life of the project, with the content and protocol changing based on the phase of work. Findings from the inspection are documented on an inspection form, and all corrective actions will be tracked to completion by the PM or the PHSM. The goal of the safety inspection process is to identify potential process failures and improvement opportunities.

3.5 SUBCONTRACTOR MANAGEMENT

It is Parsons' policy to strictly comply with all applicable requirements of the Federal Acquisition Regulations (FARs) and other Federal, state or local laws and regulations in the procurement of services (subcontracts) or goods (purchase orders) under federally funded contracts. The FARs establishes and defines uniform policies and procedures of acquisition by all federal executive agencies. The FARs is the primary documents governing acquisitions by the federal government. The FARs is supplemented by individual agency regulations, which prescribe additional policies and procedures as necessary to satisfy the specific needs of the agency. The FARs address all phases of procurement by the U.S. government including acquisition planning, contracting methods and types, socioeconomic programs, general and special contracting requirements, contract management, solicitation provisions, and contract clauses and forms. All federal contracts embody the policies and procedures mandated by the FARs, as reflected in the contract terms and conditions.

As discussed in the CQMP, the PM will control and manage subcontractors in accordance with office procurement procedures. Office procedures include full integration of subcontractors into Parsons' delivery order teams, clear and concise statements of work to be performed, designation of subcontractor personnel accountable for the work and clear identification of work products, delivery schedules, and periodic reports.

Subcontractors and suppliers will be used to support the field activities associated with this project. Table 3-1 identifies key subcontractors who will be involved with the implementation of the site remedies.

Table 3-1 Key Subcontractors

SUBCONTRACTORS	POINT OF CONTACT	WORK ACTIVITIES
1. Ecology and Environment Engineering, P.C. (EEEPC)	Mr. Tim Grady, PE 368 Pleasant View Drive Lancaster, New York 14086 Phone: 716-684-8060	RD support, Regulatory Document Preparation, Pre-Design Investigation
2. FPM Group, LTD. (FPM)	Mr. Gaby Atik , PE 153 Brooks Road Rome, NY 13441 Phone: 315-336-7721	Long Term Monitoring/ Long Term Operation, CERCLA 5 Year Review

3. Parratt Wolff, Inc.	Mr. Joel Parratt 5879 Fisher Road, P.O. Box 56, East Syracuse, NY 13057 Phone 315-437-1429 Fax: 315-437-1770	Well Installation
4. Life Sciences Laboratory (LSL)	5000 Brittonfield Parkway Suite 200 East Syracuse, NY 13057 Phone: 315-437-0200	Laboratory Analytical
5. Environmental Products and Services (EPS)	Mr. Mark Watkins 532 State Fair Blvd Syracuse, NY 13204 Phone: 315-451-6666	Transportation and Waste Disposal
6. Chargo Earthworks, Inc.	Mr. Shane Chargo 7107 Stearns Rd Rome, NY 13440	Building 775 Groundwater Extraction and Installation
7. LaFave, White & McGivern L.S., P.C.	Mr. Andy Bailey 105 Main St Boonville, NY 13309	Surveying

The vegetable oil injection activities at the Landfill 6 site and the Building 817/WSA site will be conducted by the Parsons Project team.

Subcontracts and all purchase orders (PO) are managed though the procurement department in the Parsons Huntsville, AL office. Ms. Kim Ruf, Procurement Manager, can be reached at 256-217-2562.

The purchase orders and contracting documents awarded to key subcontractors for this work will be maintained in the project files and available at the site field trailers for reference. These PO's will identify the scope of work, the pricing, terms and conditions expected from the subcontractors and should be used to ensure that all subcontract requirements are fulfilled.

Table 3-2 lists additional small and local business subcontractors and suppliers that have been previously utilized for services at the Former GAFB.

Table 3-2 Additional Subcontractors and Suppliers

Vendor Number	Vendor Name	Vendor Number	Vendor Name
JM489	Ace Hardware Co. of Rome	JM669	Jon's John Portable Toilets
W2046	Adecco USA, Inc.	J3321	Kinequip, Inc.
JM513	All-Star Leasing & Service	JM630	L&L Trailer Storage
JR808	Apex Document Solutions	JM503	L. Hifffa Trucking
J8150	Aqua Bailers, Inc.	J7276	LaFave, White & McGivern L.S.,P.C.
JM296	Arlott Office Products	W6251	MCI
JA682	Atlantic Testing Lab. Limited	J4678	McMaster-Carr Supply Co.
JO301	Bear Construction	JM625	McQuade & Bannigan
JP923	Bills Feed Service	JM670	MS Unlimited, Inc.
J8326	Burns Cascade	JL947	Nations Rent
JQ088	Callannan Industries, Inc.	JM514	Nextel Partners
JQ052	Campione Water Co., LLC	JP134	North Country Landscape& Nursery, Inc.
JQ079	Chargo Earthworks Inc.	JM927	Pacemaker Steel & Piping Co. Inc.
JQ071	CNC Paving	J3865	Pine Environmental Services, Inc.
W2490	Columbia Analytical Services, Inc.	JQ170	PW Laboratories, Inc.
JK949	Courtesy Ford, Inc.	JG735	Qualisys Medical Network Services
JP549	DMEC, Inc.	JM586	Ramsco
JI421	Dun & Bradstreet	JM508	REM Fire Systems, Inc.
Q1168	Dwyer Instruments, Inc.	JT348	Riccelli Enterprises, Inc.
JM591	Earthwatch Waste Systems, Inc.	JP356	Rome Ford Mercury
J2499	Enviro Products	JM675	Rome General Lumber
JJ905	Environmental Products & Services	JM571	Rome Plumbing& Heating Supply Co.
JS409	EOS Remediation, Inc.	JQ263	Rome Power & Hardware Inc.
J2681	FedEx	JQ247	Rome Ready Mix and Block, Inc.
W5812	Fleet Services	J6217	Seneca Blue Print Co.
JQ103	Fleetcor Technologies	JI818	Severn Trent Laboratories, Inc.
JQ441	Florida International University	JP337	Shafer & Sons Storage Sheds
JM617	Fuelman of New York	JM615	Shufelt Citgo Services
JM665	Genuine Parts Company/NAPA	JM672	Syracuse Supply
JP804	Grainger	JM829	Taylor Rental
JM706	Griffiss Utility Service Corp.	JS011	Telcove
JM674	Hastings Fisher Energy Co. Inc.	JM576	The Water Company
JM671	Hastings Fisher Fuel Co.	JJ901	Trimatrix Laboratories, Inc.
J9958	Hertz Equipment Rental	J7106	Upstate Laboratories Inc.
W5015	Home Depot Credit Services	JN889	USA Bluebook
JM647	Human Technologies Group	JQ149	Verizon
JM466	Hummel Office Equipment Co.	JC813	W.W. Grainger, Inc
JM806	Industrial Oil Tank Service	JM717	Waste Management of NY-Utica
JM317	Infolink Screening Services, Inc.	A4444	Wheels, Inc
JD232	JGB Enterprises, Inc.		

SECTION 4

PERMITS AND APPROVALS

Prior to the start of work, the following permits and approval activities will be conducted:

4.1 UNDERGROUND IDENTIFICATION

All underground utilities, including electric lines, gas lines, and communication lines, will be identified prior to initiation of drilling and other subsurface work. This will be accomplished by contacting Dig Safely New York at (800) 962-7962 or the national "Call Before You Dig" phone number 811. A Dig Safely New York representative will mark all buried utility lines in the work area. New York State law requires that Dig Safely New York be notified at least two working days, and not more than ten working days, before subsurface work is conducted. All proposed drilling locations will be marked out in white paint (or equal) prior to utility company coming onsite. In addition, alternate locations will be identified to avoid any additional mark out requirements if original locations impede on subsurface utilities. In addition, site representatives will be contacted to identify any other facility utilities, sewer lines, or other obstructions that may pose a risk to health and safety.

Information that will be required when placing the call:

- The excavator/driller's company name;
- The excavator/driller's address, telephone and fax number;
- The caller's name;
- Who the work is being done for, when appropriate;
- A Parsons representative and telephone number that member utilities can call with questions about the request;
- The county and place (town, village, or city) of the excavation according to legally incorporated municipal boundaries. The FULL street address of the excavation/ drilling.
- The name of the nearest intersecting street on either side of the excavation;
- The date and time the excavation is scheduled to begin;
- A description of where, on the property, the work is to be performed and details about the extent of the excavation;
- The type of work being done, and the type of equipment being used to do it;
- If you will be blasting; and,
- Any special instructions.

The PM/SM will be notified not less than two days before the interruption of any utilities. Work will not proceed without the written permission of the PM or SM.

4.2 PROPERTY OWNERSHIP

Prior to the start of work, coordination with the property owners, must be conducted to ensure that any privately owned utilities are identified and that permission to work on the land has been granted.

All coordination with property owners will be coordinated through the Air Force Real Property Agency Representative:

Ms. Cathy Jerrard
AFRPA Project Manager
315-356-0810 x204

Ms. Jerrard, AFRPA, will assist in coordinating with:

City of Rome Public Works: Mr. Frank Tallarino, Commissioner of Public Works 315-336-6000
City of Rome Water Pollution Control Facility: Mr. Bruce Clifford 315-339-7775
Griffiss Airpark Representative[1]: Mr. Ed Arcuri 315-269-7372
Griffiss Local Development Corporation (GLDC): Mr. Steven J. DiMeo 315-338-0393
Oneida County Representative: Mr. Roger B. Sorrel Commissioner of Aviation 315-736-4171
[1] Any field activities requiring access to the airport secure area must comply with approved safety procedures. These procedures will be reviewed prior to accessing the area.

4.3 ELECTRICAL POWER

As part of the Building 775 remedial activity, electrical power will be required to operate the pumps and controls at the extraction wells. Overhead electrical power lines exist near the site, along Perimeter Road and adjacent to Landfill 6. The electrical site plan and the electrical details are included at the end of this section

The installation of the pole mounted transformer and the electrical meter shall be provided and installed by the Griffiss Utility Service Corporation (GUSC). Chargo Earthworks, Inc. will be responsible for the installation of the pump and discharge electrical components (i.e. control panel, pump connections, etc.).

The PM/SM will be notified not less than two days before the interruption of any utilities. Work will not proceed without the written permission of the PM or SM.

4.4 PRE-CONSTRUCTION SURVEY

A surveyor, licensed to practice in New York State, will identify, locate, set and maintain lines, level contours and datum required to perform the work. Pre-construction mark out surveys will be conducted as necessary at each site location.

Following well installation/site completion, locations will be re-surveyed for final verification and used in the as-built and final site drawings.

4.5 PERMITTING AND APPROVAL AUTHORITIES

All permits and approvals will be reviewed and approved by AFRPA prior to submittal to the appropriate agencies.

4.5.1 Landfill 6 and Building 817/WSA

The City of Rome Public Works Department (Mr. Frank Tallarino, 315-336-6000) will be contacted one (1) month prior to the start of injection activities to coordinate the use of water from a nearby fire hydrant. There are two potential fire hydrants available for use. One is located near Building 817 and the other is on the corner of Ellsworth Road and Otis Street.

4.5.2 Building 775

The effluent discharge of the extraction system will be discharged directly to the sanitary sewer. Discharge to the sanitary sewer will require coordination, and permitting with the City of Rome Water Pollution Control Facility (WPCF).

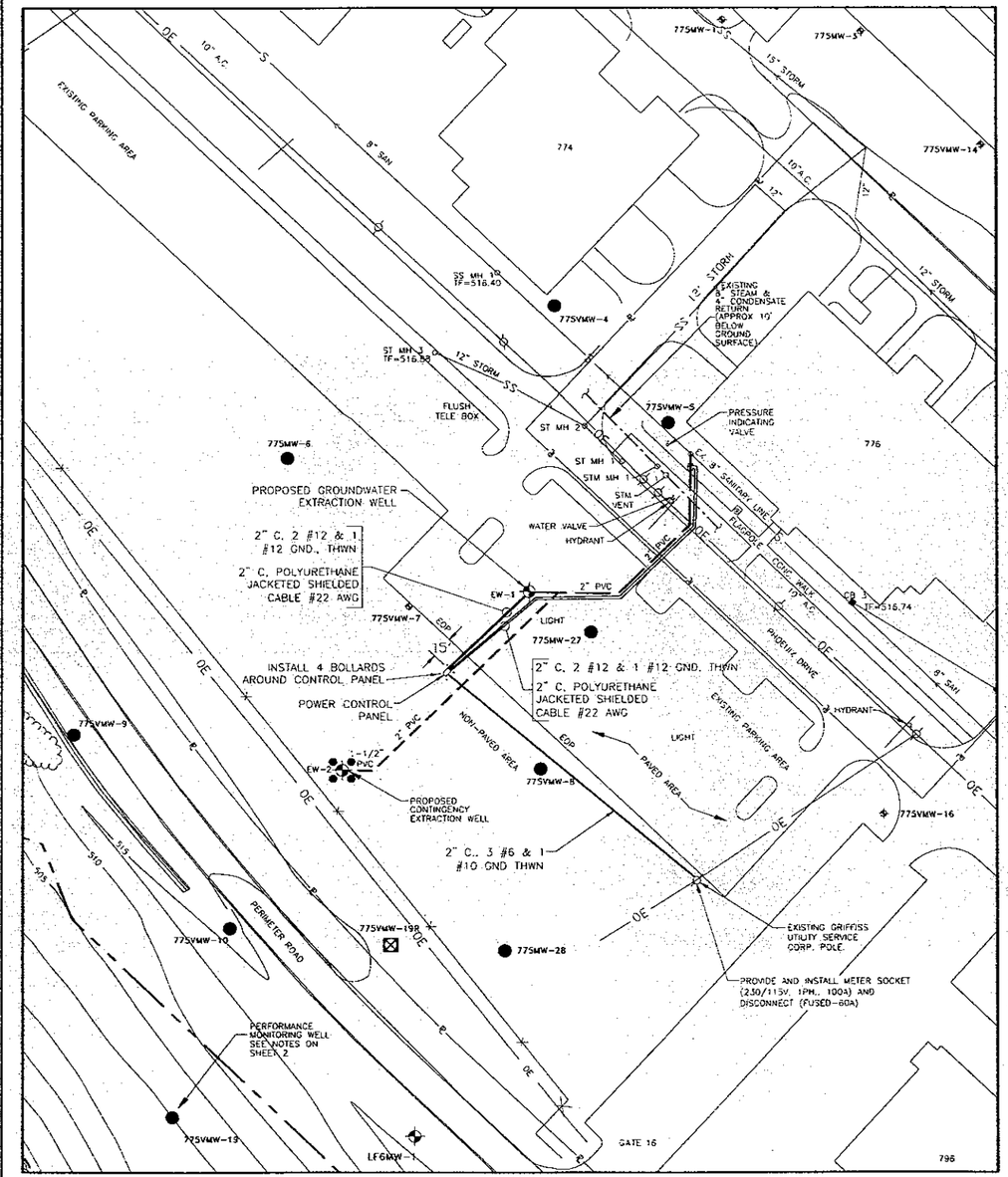
Discharge and permitting requirements will require coordination with the City of Rome WPCF, Mr. Bruce Clifford, at 315-339-7775. Mr. Clifford will be notified a minimum of 30-days prior to the start of construction to process the appropriate permits. A permit must be in place prior to effluent discharge to the sanitary sewer.

The discharge point will be installed by a licensed plumber from the existing sanitary sewer system to the manhole located along Phoenix Drive, north of the Building 775 plume.

4.5.3 Underground Injection Permitting

In New York, the USEPA is the regulatory authority that administers the Underground Injection Control (UIC) Program. Injection of the substrate at the site is considered subject to 40 CFR Part 144 because the injection points fall under the definition, “any dug hole or well that is deeper than its largest surface dimension, where the principal function of the hole is emplacement of fluids” (40 CFR 144.1(g)(1)(ii)). The injection wells are classified as Class V wells because they are not included in the descriptions of Class I, II, III, or IV wells. Class V wells are authorized by the rule contingent upon provision of basic operator information and notification of planned injection activities, as described in 40 CFR Part 144.24. Although a permit will not be required, a notification to the USEPA will need to be filed prior to injection activities.

The "Inventory of Injection Wells" EPA Form 7520-16 (OMB No. 2040-0042) must be submitted (Appendix A) 90 days prior to start of injection unless the UIC Program Director indicates otherwise.



GENERAL ELECTRICAL NOTES:

1. REFERENCE SHEET #2 OF "ON-BASE GROUNDWATER REMEDIAL DESIGN, BUILDING 775 SITE," DATED 05/01/08 BY ECOLOGY AND ENVIRONMENT ENGINEERING P.C. (EEEPC) FOR GENERAL NOTES UNDER THE FOLLOWING HEADINGS:

   GENERAL: ALL NOTES, COORDINATE WITH GENERAL CONTRACTOR

   HEALTH AND SAFETY: ALL NOTES, COORDINATE WITH GENERAL CONTRACTOR

   PERMITS/AGREEMENTS: ALL NOTES, COORDINATE WITH GENERAL CONTRACTOR

   PROJECT COORDINATION: NOTES #1 AND #2.

   NOTE #3, MODIFIED AS FOLLOWS: LU ENGINEERS AND EEEPC SHALL NOT BE RESPONSIBLE FOR CONTRACTOR MEANS AND METHODS, INCLUDING DESIGN AND IMPLEMENTATION OF FUTURE CONTINGENCY MEASURES.

   SURVEYS/SCHEDULE/AS-BUILT DRAWINGS/RECORD DOCUMENTS:

   NOTE #2, EXCEPT THE K-CRETE SUBMITTAL, UNLESS REQUIRED.

   NOTE #3, EXCEPT FOR THE WELL DRILLERS' LICENSE AND PERMITS.

   NOTES #4, 5, 6, 7, 8, 9, AND 10.

   TEMPORARY FACILITIES AND CONTROLS:

   NOTES #1, 2, 3 AND 6, UNLESS PROVIDED BY THE GENERAL CONTRACTOR.

   NOTES #4 AND 5.

   SITE RESTORATION: ALL NOTES, COORDINATE WITH GENERAL CONTRACTOR

   EXCAVATION: ALL NOTES, COORDINATE WITH GENERAL CONTRACTOR

   DEWATERING: ALL NOTES, COORDINATE WITH GENERAL CONTRACTOR

   BACKFILL: ALL NOTES, COORDINATE WITH GENERAL CONTRACTOR

   THE ELECTRICAL CONTRACTOR SHALL COMPLY WITH THESE NOTES.

2. ALL WORK SHALL CONFORM TO THE LATEST REQUIREMENTS OF THE N.E.C., N.E.M.A., U.L., AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES.

3. PROVIDE AND INSTALL CONDUIT, WIRE, AND DEVICES TO MECHANICAL SYSTEM AS NOTED ON MECHANICAL DRAWINGS AND SPECIFICATIONS, OR AS REQUIRED FOR A COMPLETE AND PROPER INSTALLATION. REFERENCE SHEETS #3 AND #4 OF "ON-BASE GROUNDWATER REMEDIAL DESIGN, BUILDING 775 SITE," DATED 05/01/08 BY EEEPC.

4. PROVIDE AND INSTALL ALL ELECTRICAL WORK, COMPLETE, IN-PLACE AS SHOWN ON ELECTRICAL DRAWINGS/SPECIFICATIONS, OR AS REQUIRED FOR A COMPLETE AND PROPER INSTALLATION.

5. ALL WIRING SHALL BE INSTALLED IN SCH. 80 PVC CONDUIT, UNLESS OTHERWISE NOTED ON DRAWINGS OR APPROVED IN WRITING BY LOCAL ELECTRICAL N.E.C. AUTHORITY.

6. ALL WIRES SHALL BE COPPER NO. 12 MINIMUM, 600 V, THHN/THWN UNLESS OTHERWISE SPECIFIED ON DRAWING OR APPROVED IN WRITING BY LOCAL ELECTRICAL N.E.C. AUTHORITY.

7. ALL DEVICES SHALL BE IDENTIFIED WITH A PERMANENT TAG INDICATING PANEL NO., CIRCUIT NO., ETC. PER N.E.C. AUTHORITY.

8. ALL CONTROL DEVICES AND PUMP SHALL BE TESTED AFTER ALL WIRING IS COMPLETED. A TEST REPORT SHALL BE SUBMITTED TO EEEPC. THE TEST REPORT SHALL BE SIGNED AND DATED.

9. UNDERGROUND CONDUIT TO BE LOCATED A MINIMUM OF 24" BELOW GROUND SURFACE. PROVIDE AND INSTALL A 3" WIDE, 4 MIL POLYETHYLENE, LOCATOR TAPE APPROXIMATELY 12" BELOW GROUND OVER THE UNDERGROUND CONDUITS. TAPE SHALL BE LABELED WITH THE WORDS "CAUTION: BURIED ELECTRIC LINE".

10. BELOW GROUND LEVEL JUNCTION BOXES SHALL BE PVC WITH A NON-HARDENING WATER REJECTION SEALING COMPOUND.

11. PROVIDE PADLOCKS WITH COMMON KEY FOR DISCONNECTS, AND CONTROL PANEL.

12. PROVIDE FOUR (4) SPARE DISCONNECT FUSES, STORE IN PUMP CONTROLLER ENCLOSURE.

13. PROVIDE THREE (3) SPARE 40 W LAMPS, STORE IN PUMP CONTROLLER ENCLOSURE.

14. POLE-MOUNTED TRANSFORMER AND ELECTRIC METER SHALL BE SUPPLIED AND INSTALLED BY THE GRIFFISS UTILITY SERVICE CORPORATION. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE GRIFFISS UTILITY SERVICE CORPORATION FOR THE INSTALLATION OF THE TRANSFORMER AND ELECTRIC METER. CONTACT THE GRIFFISS UTILITY SERVICE CORPORATION AT (315) 838-4872.

15. REFERENCE SHEET #4 OF "ON-BASE GROUNDWATER REMEDIAL DESIGN, BUILDING 775 SITE," DATED 05/01/08 BY EEEPC FOR "TYPICAL BOLLARD DETAIL."

ABBREVIATIONS:

1. REFERENCE SHEET #2 OF "ON-BASE GROUNDWATER REMEDIAL DESIGN, BUILDING 775 SITE," DATED 05/01/08 BY EEEPC FOR ABBREVIATIONS AND AS NOTED BELOW:

#	NUMBER
A	AMPERAGE
C.	CONDUIT
C.B.A.	CIRCUIT BREAKER AMPERAGE
CU	COPPER
DIA.	DIAMETER
DWG.	DRAWING
EEEPC	ECOLOGY AND ENVIRONMENT ENGINEERING, P.C.
GND.	GROUND
HZ	HERTZ
MIL	MILLIMETER
N.E.C.	NATIONAL ELECTRICAL CODE
PH	PHASE
SCH.	SCHEDULE
THHN	THERMOPLASTIC HIGH HEAT RESISTANT NYLON COATED
THWN	THERMOPLASTIC HEAT AND WATER RESISTANT NYLON COATED
U.L.	UNDERWRITERS LABORATORIES, INC.
V	VOLT
VAC	VOLTAGE ALTERNATING CURRENT
VDC	VOLTAGE DIRECT CURRENT
W	WATT

SCALE IN FEET
0 50 100 150

NO	DATE	DWN	APP'D	DESCRIPTION
0	5/12/08	MEH	MEH	ISSUED FOR CONSTRUCTION

REVISIONS

ecology and environment engineering p.c.

NO	DATE	DWN	APP'D	DESCRIPTION
B	2/29/08	SS	MEH	RE-ISSUED FOR 90% DESIGN DRAFT FINAL
A	2/15/08	SS	MEH	ISSUED FOR 90% DESIGN DRAFT FINAL

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DESIGNED BY	CHECKED BY
J. TILL, P.E.	M. HANSCOM, P.E.
DRAWN BY	APPROVED BY
S. SABELLA	R. ELLIOTT, P.E.

FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 775
ELECTRICAL SITE PLAN

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
AS NOTED	2/15/08	E-101	Sheet 1 of 2	0

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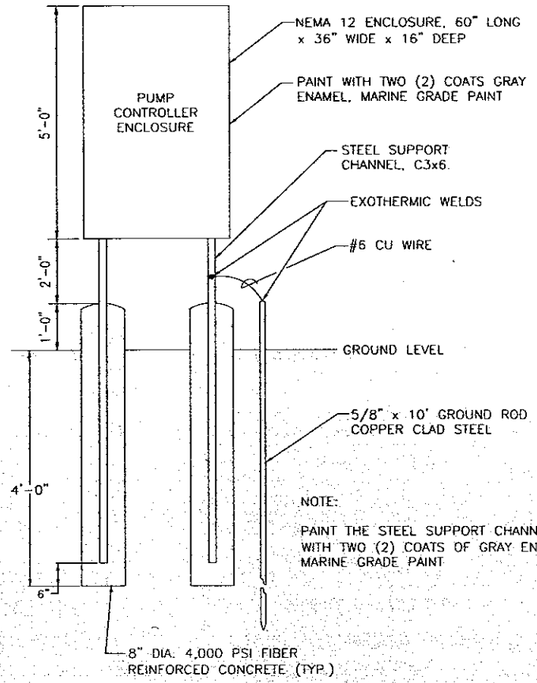
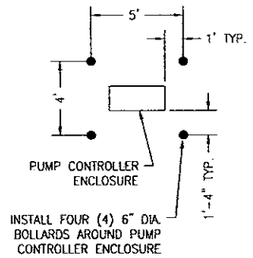
05/12/08 MEH



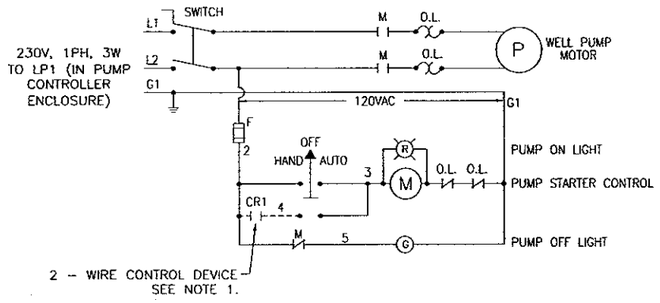
PANEL STAND DETAIL

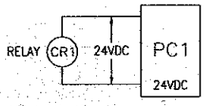
N.T.S.



PANEL STAND - PLAN VIEW

N.T.S.





NOTES:

1. WIRING DIAGRAM FOR CONTROL DEVICE TO BE FURNISHED BY CONTROLS VENDOR.

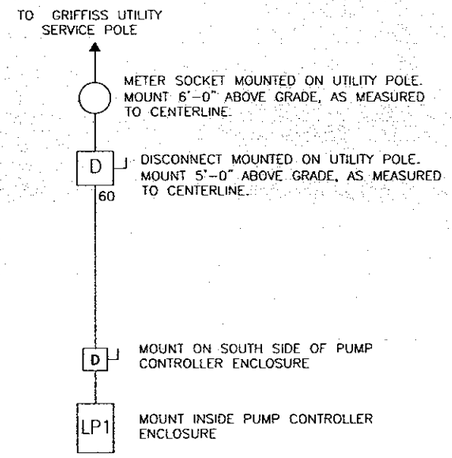
TYPICAL WELL PUMP MOTOR STARTER CONTROL CIRCUIT

N.T.S.

PANEL NO. LP1 MAINS RATING 100 A'S MAIN CIR. BR. — A'S PHASE 1 VOLTAGE 120/240 # OF WIRES 3 HZ 60 NO. OF POLES 12 GROUND BAR X MOUNTING SURFACE							
CIR. #	DESCRIPTION	C.B.A.'S	POLES	CIR. #	DESCRIPTION	C.B.A.'S	POLES
1	PANEL BOX LIGHT	15	1	2	RECEPTACLE	20	1
3	PC1	15	1	4	PC2 FUTURE	15	1
5	M1	15	2	6	M2 FUTURE	15	2
7	M1	—	—	8	M2 FUTURE	—	—
9	FM	15	1	10	SPACE		
11	SPACE			12	SPACE		

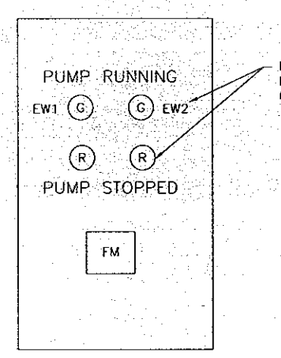
ELECTRICAL SYMBOL SCHEDULE

SYMBOL	DESCRIPTION
G	DUPLEX RECEPTACLE, 120V, 20A
D 60	FUSED DISCONNECT, 240V, 3 WIRE, 1PH, 100A, NEMA 3R, HEAVY-DUTY SERVICE RATED. SUPPLY WITH PADLOCK FOR LOCKING IN THE "ON" OR "OFF" POSITION.
D	DISCONNECT, 240V, 3 WIRE, 1PH, 100A, NEMA 3R
LP1	LOAD CENTER, 100A MAINS, 12P, 120/240V, NEMA 1
M	MOTOR STARTER, 2P, 230V, 1PH, SIZE 0, NEMA 1 120V COIL
G	NEMA 12 PILOT LIGHT, 120V, GREEN
R	NEMA 12 PILOT LIGHT, 120V, RED
	120V, 40 WATT LAMP AND SOCKET
S	SWITCH, 1P, 120V, 15A WITH ENCLOSURE
CR	RELAY 24VDC COIL, 120VAC CONTACT VOLTAGE
FM	FLOW METER



ELECTRICAL ONE - LINE DIAGRAM

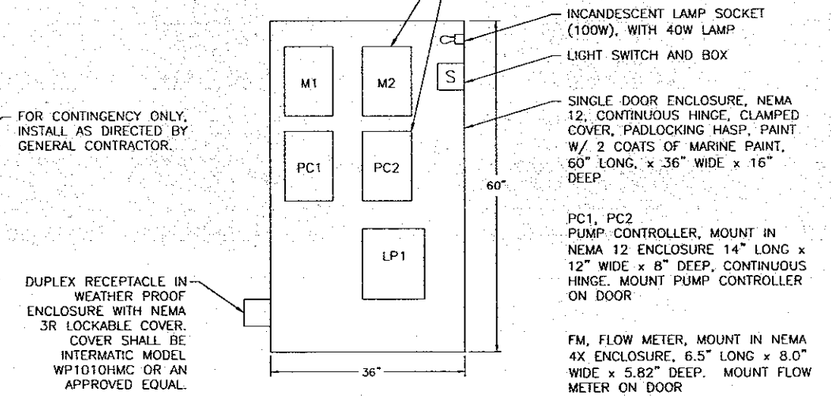
N.T.S.



FOR CONTINGENCY ONLY, INSTALL AS DIRECTED BY GENERAL CONTRACTOR.

PUMP CONTROLLER ENCLOSURE DOOR - FACING NORTH

N.T.S.



PUMP CONTROLLER ENCLOSURE

N.T.S.

NO.	DATE	DWN	APP'D	DESCRIPTION
0	5/12/08	MEH	MEH	ISSUED FOR CONSTRUCTION

REVISIONS

NO.	DATE	DWN	APP'D	DESCRIPTION
B	2/29/08	SS	MEH	RE-ISSUED 90% DESIGN DRAFT FINAL
A	2/15/08	SS	MEH	ISSUED 90% DESIGN DRAFT FINAL

REVISIONS

ecology and environment engineering p.c.

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FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 775
ELECTRICAL DETAILS

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
AS NOTED	2/15/08	E-501	Sheet 2 of 2	O

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SECTION 5

LANDFILL 6 SITE ACTIVITIES

5.1 SITE ACTIVITIES

The recommended remedy for the Landfill 6 Site is enhanced bioremediation and is intended to increase biodegradation of the contaminants. The first phase of this remedy consists of a vegetable oil emulsion injected into six existing injection wells. In addition, a monitoring well will be installed to complete the groundwater monitoring network. Subsequent phases will be implemented only if necessary, based on the results of the performance monitoring.

5.2 SITE MOBILIZATION

Mobilization activities will commence upon the receipt of all required permits and authorizations as discussed in Section 4. Mobilization activities will consist of the following tasks:

- Mobilization of surveyors, licensed in NY to locate and set lines, levels, contours to perform the work.
- Mark out of the proposed monitoring well location.
- Coordination of utility clearances for all drilling locations.
- Site access coordination with Oneida County and the Griffiss Air Park Flight Personnel, (if applicable) one month before start to obtain access and approval.
- Coordination with Griffiss Air Force personnel for the use of Building 817 for the storage of chemicals (at minimum one month prior).
- Delivery of organic substrates and injection equipment.
- Mobilization of one drilling contractor to support the monitoring well installation activities.
- Coordination with the City of Rome Public Works Department for the use of a fire hydrant located at the corner of Ellsworth Road and Otis Street (minimum one month prior).
- The site access road located between Perimeter Road and the Landfill 6 injection site will be improved prior to the start of work. The road improvement will be conducted approximately one week before the start of site activities. Improvements will include the addition of geotextile and gravel to improve surface condition. The road will not extend into the delineated wetlands (see Section 9.6).

5.2.1 Temporary Facilities

Temporary facilities will be available for use during the remedial construction activities as discussed in Section 9. Due to the remoteness of the Landfill 6 Site, a portable generator will be required to provide electricity for site activities.

5.2.2 Establish Work Zones

Exclusion zones, decontamination reduction, and clean work zones will be established with visible barriers to maintain site safety requirements and prevent waste migration. Barriers will be orange construction style fencing staked into the ground or similar. The work zones shall be relocated, as needed, based on existing site conditions and upon agreement of the SM and SSHO.

5.2.3 Permitting and Approval Authorities

As discussed in Section 4, the "Inventory of Injection Wells" EPA Form 7520-16 (OMB No. 2040-0042) is to be completed before the start of work. Appropriate property approvals will be obtained prior to the initiation of work activities, including coordination with Rome Public Works, Griffiss Air Force personnel, and Griffiss Air Park Flight personnel.

5.3 GROUNDWATER MONITORING WELL INSTALLATION

One new groundwater monitoring well (LF6MW-39) will be installed to complete the groundwater monitoring network. The network is required to evaluate the performance of the enhanced bioremediation application and determine the effectiveness of the remediation of the site groundwater. The new monitoring well will be located slightly south east of current monitoring wells LF6VMW-13R and LF6MW-13RD, as shown on the Landfill 6 Design Drawing Sheet 4 of 5, located at the end of this section. Monitoring well LF6MW-39 will be installed such that the screen interval will be located at approximately 10 to 30 feet bgs. The screen interval for LF6MW-39 was selected based on groundwater cross-sections from the Groundwater Study at Landfill 6 and Building 775 (EEEPC, 2000). The purpose of the monitoring well LF6MW-39 is to monitor potential VOC contamination reaching Three Mile Creek. Installation of the screen at a deeper interval may not be representative of the groundwater that could flow to the creek. LF6MW- 39 will be installed following the procedures in Section 10.

5.3.1 Falling Head Slug Test

In addition to the installation of monitoring well LF6MW-39, slug testing (both falling and rising-head slug testing) will be conducted in monitoring wells LF6MW-28 and LF6MW-30 in order to determine the hydraulic conductivity at the Landfill 6 Site. Slug testing will be performed at each well within one month prior to injection activities, during injection activities, and during the first round of sampling following injection activities. Additional slug testing will also be performed one year after injection activities have been completed in order monitor bio mass accumulation.

The falling-head slug test involves displacement of the water in the wells by inserting a decontaminated solid slug of a known volume. A pressure transducer and a data logger will be used to measure the water levels at predetermined time intervals on a logarithmic scale at the

insertion of the slug. Data collection will occur as the water level returns to its initial static level. The slug test will be completed when the appropriate number of readings can clearly show a trend (semi-log plot of time versus depth) or when the water level has returned to at least 10% of the static conditions. The slug will then be removed from the well and the same water level monitoring process will be repeated as the water level rises (rising-head slug test).

All slug testing activities will be conducted in accordance with the USEPA Standard Operating Procedure (SOP) #2046 (Appendix B) and all data collected will be interpreted by the Bower Rice method for unconfined aquifers (or equivalent).

5.4 ORGANIC SUBSTRATE INJECTION

5.4.1 Substrate Injection Wells

A total of six pre-existing injections wells (LF6IW-01 through LF6IW-06) were constructed in 2002 and will be utilized for the enhanced bioremediation injection activity. The approximate orientation of these injections wells are shown on the Landfill 6, Design Drawing Sheet 4 of 5, located at the end of this section.

5.4.2 Substrates

The injection fluid that will be deployed at Landfill 6 will consist of a four part emulsion. The injection fluid will consist of approximately 1150 gallons of make-up water, 26 gallons of vegetable oil, 12 gallons of sodium lactate, and approximately 17 gallons of pH buffering product per injection well.

The injection mixture shall consist of 100% vegetable oil (Textrol-BR™ or equivalent). This is a soybean oil and lecithin product manufactured by Solae, Inc. or equal. The lactate is a 60% sodium lactate in water solution manufactured by JRW Bioremediation, LLC, or equal. The pH buffer product (Neutral Zone™ or equal) is manufactured by Remediation and Natural Attenuation Services, Inc. (or approved equivalent). All manufacturers will be required to submit Material Safety Data Sheets (MSDS), which will be included in the final report document.

Potable water from a nearby fire hydrant will be used to dilute and emulsify the organic substrates prior to injection. Potable water will serve as a dispersant for the soybean oil-in-water emulsion as well as a carrier for the pH product and the sodium lactate product.

5.4.3 Substrate Preparation and Emplacement

Substrate injection activities will begin with the delivery and staging of the organic substrates and the setup of a portable injection system at Building 817. The injection system will then be moved and staged near existing monitoring well LF6TW-33 in close proximity to the injection wells. All equipment piping and valves shall be chemically resistant to the substrate used during injection. The piping shall be high density polyethylene (HDPE). The system will be capable mixing and injecting a minimum of 15 gallons per minute (gpm) of emulsion mixture.

Potable water will be supplied to the injection system from a nearby fire hydrant. A tanker truck will transport water from the fire hydrant to a large storage tank (frac tank) staged in the

immediate vicinity of the injection system. The storage tank will be filled periodically during injection and the full tank will serve as the water supply during injection. A HDPE pipe line will be run from a ball valve on the bottom of the storage tank to a 6-inch diaphragm pump. The diaphragm pump will pump the water through the HDPE conveyance line to the dosimeters, the in-line mixer, and eventually to the injection manifold. The organic substrates and the pH buffering product will be mixed into the hydrant water at the correct dosage rate inline through a series of dosimeters. A static in-line mixer will be used to emulsify the soybean oil-lactate-pH buffer mixture and potable water to form an oil-in-water emulsion.

This oil-in-water emulsion will then be pumped to the injection manifold and injected into the injection wells. The number and sequence of wells to be injected at the same time are to be determined in the field. It is expected that the total oil-in-water emulsion flow (15 to 20 gpm) will be split so that substrate can be injected into two to four injection locations at the same time (0.5 to 5 gpm per location). The injection manifold will include pressure gauges and flow meters dedicated to each injection well so that flows and pressures at each injection well can be monitored and recorded. Substrate injection will start at each location at a relatively low flow rate for the first 5 to 10 minutes to ensure that all aspects of the system are in order. During that period, system pressures will be monitored and flow rate adjustments made as needed to avoid excessive pressure that could constitute a health and safety hazard. System pressures shall not exceed the overburden pressure of approximately 35 pounds per square inch (psi) as indicated in Table 1 on the Landfill 6, Design Drawing Sheet 5 of 5, located at the end of this section. The flow rates will be adjusted to reduce pressures. Once the system has initialized, the flow rates can be increased without exceeding safe operating pressures or the overburden pressure of the system.

After the appropriate volume of the emulsion has been injected into the subsurface the emulsion flow will be stopped, and the system pressure will be reduced to zero prior to disconnecting any injection lines.

During the injection event, the pressures, flow rates, substrate volumes, injection well seals, and nearby monitoring wells will be monitored. The injection pressures will not exceed the values listed in Table 1 on the Landfill 6, Design Drawing Sheet 5 of 5. The ground surface around the injection wells will be monitored during the injection to determine if the emulsion is leaking from the well seals. Water levels in monitoring wells LF6MW-16, LF6MW-17, LF6MW-18, LF6MW-19, and LF6MW-2 will be monitored for mounding using an electronic water level tape measure.

If significant mounding occurs (not to exceed the top of the unsaturated zone resulting in daylighting of the substrate) the flow rates will be reduced to limit mounding. Nearby down gradient wells shall be visually monitored to check for substrate break through. Clear bailers will be used and the presence of substrate will be evident by the color yellow.

5.5 SUBSEQUENT REMEDIATION ACTIVITIES

If necessary, several additional remediation options may be implemented at the Landfill 6 Site. If the groundwater monitoring results from the initial bioremediation treatment indicates that contaminant degradation rates are slower than the projected contaminant reduction trend

resulting from natural degradation, then additional injections will be preformed. These secondary injections would be performed no sooner than 2009, preferably 12 months after the first injection and more likely no sooner than 2010, 24 months after the first injections as referenced in the RDWP. The follow-on substrate mixture and injection volume may be modified based on site observations to provide better treatment.

Depending on the results of the secondary injection, it may be necessary to install an *in situ* bioreactor by extracting groundwater from the downgradient edge of the treatment area, amending it with additional organic substrate, and re-injecting it on the upgradient edge of the treatment area. The "bioreactor" concept will create an artificially hydraulic gradient through the treatment area that is greater than the natural gradient and will provide a mechanism for constant substrate loading. The installation of such a system would result in an increase flow of contaminated groundwater through the treatment zone and increased substrate loading. This treatment would only be implemented following the evaluation of the secondary injection results, and if the concentrations of Total VOCs exceed 50 parts per million (ppm) in LF6TW-38 after two consecutive performance monitoring events.

5.6 SITE RESTORATION

After well installation and substrate injection activities are complete any areas that were disturbed, including but not limited to asphalt, will be returned to their pre-construction state as described in Section 11.

5.7 CONTINGENCY PLANS

The contingency plan for Landfill 6 is discussed in Section 12

5.8 LANDFILL 6 SITE VERIFICATION CHECKLIST

To ensure that all aspects of the Landfill 6 construction remediation efforts have been accounted for a verification checklist has been prepared. This checklist identifies the steps and requirements associated with the Landfill 6 site activities. This checklist (located at the end of the section) is to be used in conjunction with the Well Verification Checklist (See Section 10) and maintained in the project files following completion. These checklists are designed are to be used in addition to the project field log book and can be modified if necessary to better document field activities.

LANDFILL 6 SITE
VERIFICATION CHECKLIST

HEALTH AND SAFETY

APP/HASP updated yes/no

AHA Prepared and Reviewed title

1 _____ 4 _____
2 _____ 5 _____
3 _____ 6 _____

SITE MOBILIZATION

Dig Safely New York Contacted Date
Utilities Marked and Cleared Date
Griffiss Air Park Flight Personnel Contacted Date
Access Confirmed yes/no

EPA Inventory of Injection Wells Form Submitted Date

Approval/Confirmation to Continue yes/no

Site Access Road Improved yes/no

Site Facilities Prepared yes/no

Decontamination Area yes/no

Drilling Contractor Mobilized yes/no

Oneida County Representative Contacted Date
Access Confirmed yes/no
City of Rome Public Works Department Contacted Date
Fire Hydrant Use Approved yes/no
Hydrant ID/Location: _____

Survey Conducted Date

Building 817 Storage Access Approved yes/no

Equipment/Supplies Staging Area yes/no

Monitoring Well Installation Completed (Attach additional sheet)
LF6MW-39 yes/no

OIL VEGETABLE INJECTION

Injection Chemicals Delivered yes/no
vegetable oil volume gallons
Sodium lactate Volume gallons
pH Buffering Volume gallons
Material Safety Data Sheets yes/no

Injection System Setup yes/no
Issues _____

Injection well	LF6IW-01	LF6IW-02	LF6IW-03	LF6IW-04	LF6IW-05	LF6IW-06
Total Flow						
Average Pressure						

Total Vegetable Oil Volume Injected gallons

Total Sodium Lactate Volume Inject gallons
Total pH Buffering Injected gallons
Total Water Injected gallons
TOTAL VOLUME INJECTED gallons

Site Restored to Existing Condition yes/no

Monitoring wells observed

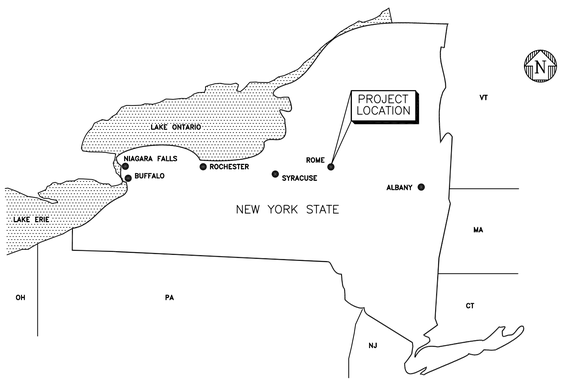
LF6MW-16 yes/no
LF6MW-17 yes/no
LF6MW-18 yes/no
LF6MW-19 yes/no
LF6MW-20 yes/no

Comments:

_____
_____
_____
_____

ON-BASE GROUNDWATER REMEDIAL DESIGN
LANDFILL 6 SITE
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

MAY 2008



VICINITY MAP
NTS

US Army Corps of Engineers

PARSONS *In Association with:* **FPM group**

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SOURCE: WOOLPERT CONSULTANTS

SITE LOCATION PLAN
1" = 1000'

LIST OF DRAWINGS

DWG. NO.	REV.	TITLE
1	C	COVER SHEET AND LIST OF DRAWINGS
2	C	NOTES, LEGEND AND ABBREVIATIONS
3	F	EXISTING SITE PLAN
4	C	PROPOSED SITE PLAN
5	C	SUBSTRATE SYSTEM SCHEMATIC

REFERENCE DRAWINGS			REVISIONS				
DWG NO.	DATE	DESCRIPTION	NO.	DATE	DWN	APP'D	DESCRIPTION
GR1216r-pn-17	9/1/98	SITE FEATURES SUPPLIED BY WOOLPERT CONSULTANTS	B	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
TOPO.DWG	2/11/99	BASE TOPOGRAPHY SUPPLIED BY WOOLPERT CONSULTANTS	A	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW
			0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
			C	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW

ecology and environment engineering p.c.

DESIGNED BY	CHECKED BY
KM POWELL	T HEINS P.E.
DRAWN BY	APPROVED BY
KM KRAJEWSKI/WA BAYLES	DJ MILLER P.E.

FORMER GRIFFISS AIR FORCE BASE
ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
LANDFILL 6
COVER SHEET AND LIST OF DRAWINGS

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
AS NOTED	11/21/07	Cover Sheet.dwg	Sheet 1 of 5	0

F:\Griffiss\2007 P&T\LF6\Construction Issue\Cover Sheet.dwg
BUFFplot: 4/1/08 KMK

NOTES:

GENERAL:

1. SUMMARY: THE LANDFILL 6 GROUNDWATER REMEDIATION WORK IS A SERIES OF VEGETABLE OIL INJECTIONS INTENDED TO ENHANCE BIODEGRADATION OF THE CONTAMINANTS OF CONCERN. THE PROJECT INCLUDES A VEGETABLE OIL INJECTION INTO A ROW OF SIX EXISTING INJECTION WELLS (LF6IW–01 THROUGH LF6IW–06) LOCATED IN THE AREA OF HIGHEST GROUNDWATER CONTAMINATION. AN ADDITIONAL VEGETABLE OIL INJECTION OR GROUNDWATER RECIRCULATION SYSTEM WILL BE USED IF DATA COLLECTED AFTER THE INJECTION INDICATES THEY ARE NEEDED. REFER TO THE "FINAL REMEDIAL DESIGN WORK PLAN" (EEEPC 2008) FOR ADDITIONAL INFORMATION.
2. LOCATION OF CENTERLINE OF THREE MILE CREEK HAS BEEN MODIFIED AS OF 2005.
3. TOPOGRAPHY AT LANDFILL 6 PERIMETER IS A COMBINATION OF SOURCES DATED 2–99 AND 7/06.
4. WETLANDS DELINEATION PROVIDED BY ECOLOGY AND ENVIRONMENT, INC. DATED 11/1/06.
5. UTILITY INFORMATION IS APPROXIMATE. VERIFY ALL UTILITIES, LOCATIONS, AND CONDITIONS WITH PROPERTY OWNERS PRIOR TO START OF FIELD ACTIVITIES.
6. PARCEL BOUNDARIES OBTAINED FROM AFRPA VIA FPM (MARCH 2007), AND WERE NOT VERIFIED IN THE FIELD.
7. VEHICULAR TRAFFIC AND CHEMICAL STORAGE IS PROHIBITED IN WETLANDS. SEE EXECUTION NOTE 1.

HEALTH AND SAFETY:

1. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE HEALTH AND SAFETY OF ALL ON–SITE PERSONNEL.
2. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT A HASP IN ACCORDANCE WITH USACE EM 385–1–1 TO PROTECT ALL SITE PERSONNEL INCLUDING THOSE OF SITE VISITORS, BUILDING OWNERS, AND THE OWNER'S TENANTS.
3. THE CONTRACTOR'S HEALTH AND SAFETY PLAN MUST COMPLY WITH ALL APPLICABLE FEDERAL AND STATE REGULATIONS PROTECTING HUMAN HEALTH AND THE ENVIRONMENT.
4. THE CONTRACTOR SHALL NOT INITIATE ONSITE WORK UNTIL A HASP HAS BEEN ISSUED.

PERMITS/AGREEMENTS:

1. THE CONTRACTOR IS RESPONSIBLE FOR SECURING ALL REQUIRED APPLICATIONS, PERMITS, EASEMENTS, PERMISSIONS, APPROVALS, LETTERS, AGREEMENTS, RIGHTS OF WAY AND CERTIFICATIONS NECESSARY FOR THE COMPLETION OF THE WORK.
2. MANAGE STORMWATER IN ACCORDANCE WITH NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES (GP–02–01) OR MOST RECENT VERSION.

PROJECT COORDINATION:

1. CONTACT "DIG SAFELY NEW YORK" TO LOCATE UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION ACTIVITIES. REGULATIONS PERTAINING TO THE PROTECTION OF UNDERGROUND FACILITIES IN NEW YORK STATE ARE GOVERNED BY NEW YORK CODES, RULES, AND REGULATIONS. HOWEVER, OTHER PRIVATELY OWNED UTILITIES AT THE SITE MAY EXIST THAT ARE NOT MEMBERS OF THE UTILITY LOCATOR SERVICE. COORDINATE ALL INTRUSIVE WORK WITH THE PROPERTY OWNER(S) TO IDENTIFY ANY OTHER POTENTIAL PRIVATELY OWNED UTILITIES PRESENT IN THE REMEDIAL CONSTRUCTION AREA.
2. CONTACT THE CITY OF ROME PUBLIC WORKS DEPARTMENT A MINIMUM OF 1 MONTH PRIOR TO INJECTION ACTIVITIES TO COORDINATE THE USE OF WATER FROM THE FIRE HYDRANT NEAR BUILDING 817 OR ON THE CORNER OF ELLSWORTH ROAD AND OTIS STREET.
3. CONTACT GRIFFISS AIR FORCE PERSONNEL A MINIMUM OF 1 MONTH PRIOR TO INJECTION ACTIVITIES TO COORDINATE THE USE OF BUILDING 817 FOR THE STORAGE OF CHEMICALS.
4. THE CONTRACTOR SHALL COORDINATE WITH GRIFFISS AIRPARK FLIGHT PERSONNEL (IF APPLICABLE) AND APPLICABLE PROPERTY OWNERS ON A DAILY BASIS TO OBTAIN ACCESS AND APPROVAL FOR WORK TO BE PERFORMED.
5. EEEPC SHALL NOT BE RESPONSIBLE FOR CONTRACTOR MEANS AND METHODS, INCLUDING DESIGN AND IMPLEMENTATION OF FUTURE CONTINGENCY MEASURES.

SURVEYS/AS–BUILT DRAWINGS/RECORD DOCUMENTS:

1. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING RECORD AS–BUILT DRAWINGS AND MAINTAINING RECORDS OF FINAL INSPECTIONS, TREATMENT SYSTEM OPERATION, CHEMICAL DATA SHEETS, START–UP, MAINTENANCE, AND ENVIRONMENTAL MONITORING DURING TREATMENT SYSTEM START–UP. ALL RECORD DOCUMENTS, AS–BUILT DRAWINGS, AND SURVEYS SHALL BE CERTIFIED FOR ACCURACY BY PROJECT MANAGEMENT AND PROVIDED TO ECOLOGY AND ENVIRONMENT ENGINEERING P.C. OF LANCASTER, NEW YORK IN PREPARATION OF THE REMEDIAL ACTION REPORT.

TEMPORARY FACILITIES AND CONTROLS

1. THE CONTRACTOR SHALL SECURE AND PROVIDE ALL TEMPORARY UTILITIES REQUIRED TO PERFORM THE WORK INCLUDING BUT NOT LIMITED TO ELECTRICITY, LIGHTING, HEAT, VENTILATION, TELEPHONE SERVICE, WATER, SANITARY FACILITIES AND FIRE PROTECTION. THE CONTRACTOR SHALL COORDINATE THE LOCATION OF TEMPORARY FACILITIES WITH GRIFFISS AIR FORCE PERSONNEL PRIOR TO COMMENCEMENT OF WORK.
2. THE CONTRACTOR SHALL SECURE, PROVIDE AND MAINTAIN ALL TEMPORARY TRAFFIC CONTROLS, BARRIERS, ENCLOSURES, FENCING, TARPAULINS, CANOPIES AND WATER CONTROLS REQUIRED TO SATISFACTORILY PERFORM THE WORK.
3. TEMPORARY FACILITIES AND SERVICES PROVIDED BY THE CONTRACTOR INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, ACCESS ROADS, PARKING, AND DUST CONTROL.
4. THE CONTRACTOR IS RESPONSIBLE FOR CLEANUP AND REPAIR OF ALL DAMAGE CAUSED BY THE INSTALLATION OR USE OF TEMPORARY FACILITIES.
5. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE SECURITY OF THE CONTRACTOR'S WORK AREAS, EQUIPMENT, MATERIALS, AND SUPPLIES.
6. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT A SPCC PLAN FOR ALL CHEMICALS STORED ON SITE IF REQUIRED BY FEDERAL OR STATE REGULATIONS.
7. THE PRODUCTS SPECIFIED HEREIN SHALL BE LEASED OR OWNED BY THE CONTRACTOR AND WILL NOT BECOME PROPERTY OF THE FORMER GRIFFISS AIR FORCE BASE. ALL PRODUCTS SPECIFIED HEREIN SHALL BE REMOVED FROM THE WORK SITE WHEN NO LONGER NEEDED.

SITE RESTORATION:

1. ALL AREAS DISTURBED DURING PERFORMANCE OF THE WORK, INCLUDING BUT NOT LIMITED TO ASPHALT, SHALL BE RESTORED TO PRE–CONSTRUCTION CONDITIONS.
2. PROTECT ALL RESTORED AREAS FROM EROSION AND DAMAGE UNTIL SURFACE IS STABILIZED.
3. CONTRACTOR SHALL REPAIR OR REPLACE ANY RESTORED AREAS DAMAGED WITHIN 6 MONTHS OF PROJECT COMPLETION.
4. RESTORE ALL GRADES TO MAINTAIN EXISTING SURFACE WATER DRAINAGE PATTERNS.
5. IMPORTED TOPSOIL SHALL BE ORGANIC LOAM, WELL DRAINED, HOMOGENOUS AND MEET THE FOLLOWING MINIMUM REQUIREMENTS:
   a. PH BETWEEN 4.5 AND 7
   b. FREE OF ANY VEGETATION (ESPECIALLY INVASIVE SPECIES), DEBRIS OR OTHER OBJECTIONABLE MATERIALS.
   c. FREE OF ANY STONES OR PARTICLES GREATER THAN 1".
6. IN AREAS OF SOIL DISTURBANCE, PLACE 3" OF TOPSOIL ON EARTH FILL AND APPLY GRASS SEED AT A MINIMUM OF 3 POUNDS/1,000 SQUARE FEET. PROTECT NEWLY SEEDED AREAS FROM TRAFFIC AND EROSION. MAINTAIN ADEQUATE SOIL MOISTURE CONDITIONS UNTIL YOUNG PLANTS ARE WELL ESTABLISHED.
7. GRASS SEED SHALL BE A MIXTURE OF 30% ANNUAL RYEGRASS AND 70% PERENNIAL RYEGRASSES.
8. SOW GRASS SEED EVENLY BY HAND, HYDROSEED OR SEED SPREADER ON DRY OR MODERATELY DRY SOIL.
9. FERTILIZER SHALL BE A COMMERCIAL–GRADE 5–10–5 MIXTURE.
10. APPLY FERTILIZER IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DIRECTIONS.

PRODUCTS AND EQUIPMENT:

1. THE INJECTION SYSTEM SHALL BE CAPABLE OF PUMPING A MINIMUM OF 40 GPM.
2. THE MIXING AND INJECTION SYSTEM PIPING SHALL BE HDPE. ALL EQUIPMENT, PIPING, VALVES, ETC., SHALL BE CHEMICALLY RESISTANT TO THE SUBSTRATE USED DURING INJECTION ACTIVITIES.
3. VALVES, CHECK VALVES, ETC. NOT SHOWN ON SHEET 5 FOR CLARITY (INSTALL AS REQUIRED).
4. INJECTION MIXTURE SHALL CONSIST OF 100% VEGETABLE OIL (CENTROMIX® WD, A SOY LECITHIN PRODUCT MANUFACTURED BY CENTRAL SOYA COMPANY, INC.), LACTATE (SODIUM LACTATE 60% SOLUTION MANUFACTURED BY JRW BIOREMEDIATION LLC), PH BUFFER PRODUCT (NEUTRAL ZONE ™ MANUFACTURED BY REMEDIATION AND NATURAL ATTENUATION SERVICES), AND MAKE–UP WATER. SEE TABLE 1 ON SHEET 5 FOR VOLUMES. OBTAIN CHEMICAL DATA SHEETS FROM THE MANUFACTURER AND SUBMIT AS SPECIFIED IN SURVEYS/AS–BUILT DRAWINGS/RECORD DOCUMENTS NOTE 1. MAKE–UP WATER SHALL BE OBTAINED FROM NEARBY FIRE HYDRANT VIA TANKER TRUCK. CONTRACTOR SHALL COORDINATE WATER DISTRIBUTION WITH UTILITY PERSONNEL PRIOR TO INJECTION ACTIVITIES.

QA/QC:

1. DURING THE INJECTION EVENT, PRESSURES, FLOWRATES, SUBSTRATE VOLUMES, INJECTION WELL SEALS, AND NEARBY MONITORING WELLS. INJECTION PRESSURES AND FLOWRATES SHALL NOT EXCEED VALUES LISTED IN TABLE 1 ON SHEET 5. SEE EXECUTION NOTE 12 FOR ADDITIONAL INSTRUCTIONS. INJECTION WELL SEALS SHALL BE VISUALLY INSPECTED TO ENSURE THAT THE SEAL HAS NOT BEEN COMPROMISED DURING OPERATION. MONITOR WATER LEVELS AT LF6MW–16, LF6MW–17, LF6MW–18, LF6MW–19, AND LF6MW–20 FOR MOUNDING. IF SIGNIFICANT MOUNDING OCCURS (NOT TO EXCEED THE TOP OF THE UNSATURATED ZONE RESULTING IN DAYLIGHTING OF THE SUBSTRATE), REDUCE FLOWRATES TO LIMIT THE MOUNDING. NEARBY DOWNGRADIENT WELLS SHALL BE VISUALLY MONITORED TO CHECK FOR SUBSTRATE BREAKTHROUGH USING DEDICATED CLEAR BAILERS. THE PRESENCE OF SUBSTRATE WILL BE EVIDENCED BY THE COLOR YELLOW.

EXECUTION:

1. IMPROVE ACCESS ROAD FROM PERIMETER ROAD TO THE LANDFILL 6 INJECTION SITE AS NEEDED. ROAD IMPROVEMENTS SHALL NOT EXTEND IN TO WETLAND AREAS (SEE SHEETS 3 AND 4 FOR WETLAND LOCATIONS). THE CONTRACTOR SHALL MARK THE LOCATION OF THE WETLANDS IN THE FIELD PRIOR TO INITIATING THIS REMEDIATION WORK. NO CONSTRUCTION ACTIVITIES SHALL OCCUR WITHIN 5 FEET OF THE EDGE OF THE WETLANDS.
2. INSTALL AND DEVELOP MONITORING WELL LF6MW–39 AT LEAST 1 MONTH PRIOR TO INJECTION ACTIVITIES. WELL TO BE CONSTRUCTED AS DESCRIBED IN THE "FINAL WORK PLAN PREDESIGN INVESTIGATIONS AT LANDFILL 6, BUILDING 817/WSA, BUILDING 775, AND AOC 9" (EEEPC 2006). SCREEN INTERVAL DEPTH TO BE 10–30 FEET BGS.
3. THE INJECTION SHALL BE PERFORMED IN EXISTING WELLS INCLUDED IN TABLE 1 ON SHEET 5. ADDITIONAL INJECTION EVENTS MAY BE PERFORMED BASED ON CRITERIA DESCRIBED IN THE "FINAL REMEDIAL DESIGN WORK PLAN" (EEEPC 2008). ADDITIONAL INJECTION DETAILS TBD PRIOR TO THE EVENTS.
4. PERFORM A FALLING–HEAD SLUG TEST AT WELLS LF6MW–30 AND LF6MW–28 WITHIN 1 MONTH PRIOR TO INJECTION ACTIVITIES AND DURING INJECTION ACTIVITIES. IF ADDITIONAL INJECTIONS ARE PERFORMED, SLUG TESTING WILL BE COMPLETED DURING THE NEXT REGULARLY SCHEDULED SAMPLING EVENT AFTER THE INJECTION ACTIVITY. THE FALLING–HEAD SLUG TEST INVOLVES DISPLACING THE WATER IN THE WELLS BY INSERTING A SOLID SLUG OF KNOWN VOLUME. DATA COLLECTION TO COMMENCE AT THE TIME OF SLUG INSERTION USING A PRESSURE TRANSDUCER/DATA LOGGER OR ELECTRONIC TAPE WATER LEVEL READER. COLLECT WATER LEVEL MEASUREMENTS AT PREDETERMINED TIME INTERVALS ON AN APPROXIMATE LOGARITHMIC SCALE AS THE WATER LEVEL RETURNS TO ITS INITIAL STATIC LEVEL. THE SLUG TEST WILL BE COMPLETE WHEN THE WATER LEVEL HAS RETURNED TO WITHIN AT LEAST 10% OF STATIC CONDITIONS OR A SUFFICIENT NUMBER OF READINGS HAVE BEEN MADE TO CLEARLY SHOW A TREND ON A SEMI–LOG PLOT OF TIME VERSUS DEPTH. DATA SHALL BE INTERPRETED BY THE BOWER AND RICE METHOD FOR UNCONFINED AQUIFERS, OR EQUIVALENT. THE SLUG WILL THEN BE REMOVED AND THE WATER LEVEL MONITORING PROCESS WILL BE REPEATED AS THE WATER LEVEL RISES.
5. CONTACT "DIG SAFELY NEW YORK" TO LOCATE UNDERGROUND UTILITIES PRIOR TO INJECTION ACTIVITIES. REGULATIONS PERTAINING TO THE PROTECTION OF UNDERGROUND FACILITIES IN NEW YORK STATE ARE GOVERNED BY NEW YORK CODES, RULES, AND REGULATIONS. HOWEVER, OTHER PRIVATELY OWNED UTILITIES AT THE SITE MAY EXIST THAT ARE NOT MEMBERS OF THE UTILITY LOCATOR SERVICE. COORDINATE ALL INTRUSIVE WORK WITH THE PROPERTY OWNER(S) TO IDENTIFY ANY OTHER POTENTIAL PRIVATELY OWNED UTILITIES PRESENT IN THE REMEDIAL CONSTRUCTION AREA.
6. STORE MATERIAL AND EQUIPMENT IN BUILDING 817, SEE PROJECT COORDINATION NOTE 3.
7. STORE BULK CHEMICALS UNDER COVER WHEN NOT IN USE AND IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS AND THE SITE'S SPCC PLAN (IF APPLICABLE).
8. CONTAINERIZE WASTE MATERIAL FROM THE SITE DAILY AND DISPOSE OF APPROPRIATELY.
9. PREPARE INJECTION MIXTURE (COMPRISED OF MAKE–UP WATER, VEGETABLE OIL, LACTATE, AND PH BUFFER) IN THE FIELD USING A STATIC–IN–LINE MIXER AS SHOWN ON SHEET 5. INJECT MIXTURE VOLUME CONTINUOUSLY UNTIL TOTAL VOLUME INJECTED.
10. THE NUMBER AND SEQUENCE OF WELLS TO BE INJECTED AT THE SAME TIME TBD IN THE FIELD.
11. INITIAL FLOW RATES OF THE SUBSTRATE INJECTION SHALL BE LESS THAN THE FLOW RATES PRESENTED IN TABLE 1 ON SHEET 5 FOR EACH INJECTION WELL TO ENSURE THAT ALL ASPECTS OF THE SYSTEM ARE IN PROPER WORKING ORDER. SYSTEM PRESSURES SHALL NOT EXCEED OVERBURDEN PRESSURES PRESENTED IN TABLE 1 ON SHEET 5. ADJUST FLOW RATES AS NEEDED TO REDUCE PRESSURES. AFTER SYSTEM INITIALIZED, FLOW RATES CAN BE INCREASED, HOWEVER THEY SHALL NOT EXCEED VALUES LISTED IN TABLE 1 ON SHEET 5.
12. AFTER THE SUBSTRATE VOLUME HAS BEEN INJECTED INTO THE SUBSURFACE, STOP THE SUBSTRATE FLOW AND REDUCE SYSTEM PRESSURE TO ZERO PRIOR TO DISCONNECTING ANY INJECTION LINE.
13. CONDUCT PERFORMANCE MONITORING ACCORDING TO "FINAL REMEDIAL DESIGN WORK PLAN" (EEEPC 2008).

LEGEND:

UE	UNDERGROUND ELECTRIC LINE
OE	OVERHEAD ELECTRIC LINE
X X	FENCE LINE
470	TOPOGRAPHIC CONTOUR LINE (5 FOOT INTERVAL)
2623	BUILDING LOCATION
WL WL	DELINEATED WETLANDS
LF6MW–18	EXISTING MONITORING WELL
LF6TW–37	EXISTING TEMPORARY MONITORING WELL
LF6MW–32	PERFORMANCE MONITORING WELL
LF6MW–39	PROPOSED PERFORMANCE MONITORING WELL TO BE INSTALLED
LF6/TMCSW–1 / LF6SW–1PM	EXISTING SURFACE WATER SAMPLE LOCATION/SURFACE WATER SAMPLE LOCATION
LF6IW–03	EXISTING INJECTION WELL TO BE RE–USED

50 – – – – – – – – 50	CENTERLINE OF THREE–MILE CREEK
	APPROXIMATE EXTENT OF HARDFILL C
	APPROXIMATE EXTENT OF LANDFILL 4
	APPROXIMATE EXTENT OF LANDFILL 6
50 50	MONITORING WELL TOTAL CHLORINATED VOC GROUNDWATER DATA IN ug/L FROM 2004 AND 2006
	MONITORING WELL TOTAL CHLORINATED VOC GROUNDWATER DATA IN ug/L FROM 2007
RE	PARCEL BOUNDARY
	APPROXIMATE BOUNDARY OF B775 PLUME IN 2000
	APPROXIMATE BOUNDARY OF LF6 PLUME BASED ON AVAILABLE 2006 AND 2007 DATA
	BALL VALVE
	DOSIMETER
	PRESSURE GAUGE

ABBREVIATIONS:

AFRPA	AIR FORCE REAL PROPERTY AGENCY	LF6	LANDFILL 6	QA/QC	QUALITY ASSURANCE/QUALITY CONTROL
BGS	BELOW GROUND SURFACE	ND	NON DETECT	SPCC	SPILL PREVENTION, CONTROL, AND COUNTERMEASURE
EEEPC	ECOLOGY AND ENVIRONMENT ENGINEERING, P.C.	NO.	NUMBER	TBD	TO BE DETERMINED
GPM	GALLONS PER MINUTE	NTS	NOT TO SCALE	USACE	UNITED STATES ARMY CORPS OF ENGINEERS
HASP	HEALTH AND SAFETY PLAN	P	PROPERTY LINE	VOC	VOLATILE ORGANIC COMPOUND
HDPE	HIGH DENSITY POLYETHYLENE	PPB	PARTS PER BILLION	'	FEET
ID	IDENTIFICATION	PSI	POUNDS PER SQUARE INCH	"	INCHES
				µg/L	MICROGRAMS PER LITER

IT IS A VIOLATION OF NEW YORK STATE EDUCATION LAW TO ALTER THIS DOCUMENT BY MEANS INCONSISTENT WITH SECTION 7209 OF SAID LAW.

DWG NO.	DATE	DESCRIPTION
REFERENCE DRAWINGS		

NO.	DATE	DWN	APP'D	DESCRIPTION
0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
C	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
B	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
A	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW
REVISIONS				

ecology and environment engineering p.c.

DESIGNED BY	CHECKED BY
KM POWELL	T HEINS PE
DRAWN BY	APPROVED BY
WA BAYLES	DJ MILLER PE

FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN LANDFILL 6 NOTES, LEGEND AND ABBREVIATIONS

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
NTS	11/21/07	2.dwg	Sheet 2 of 5	0

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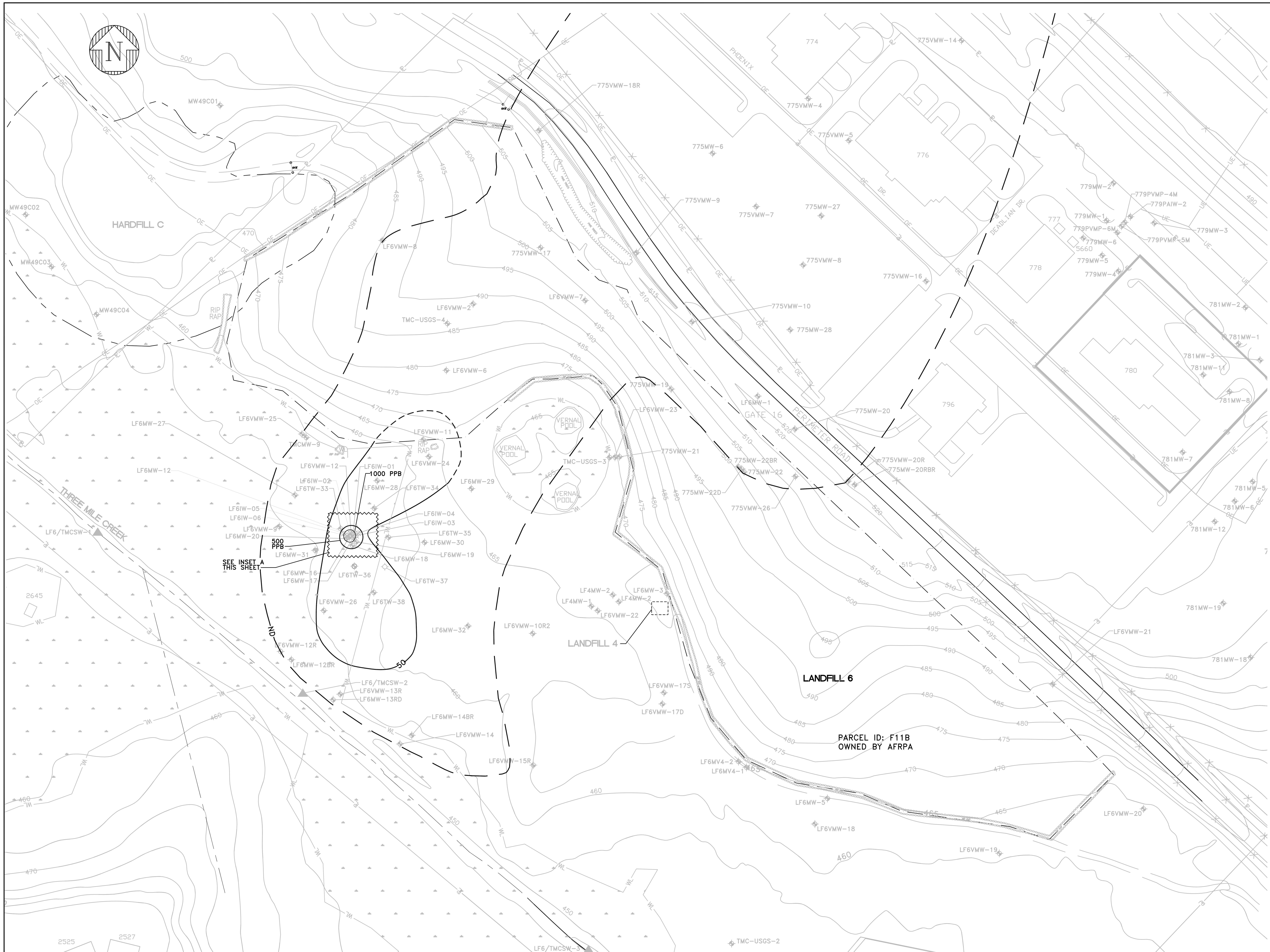
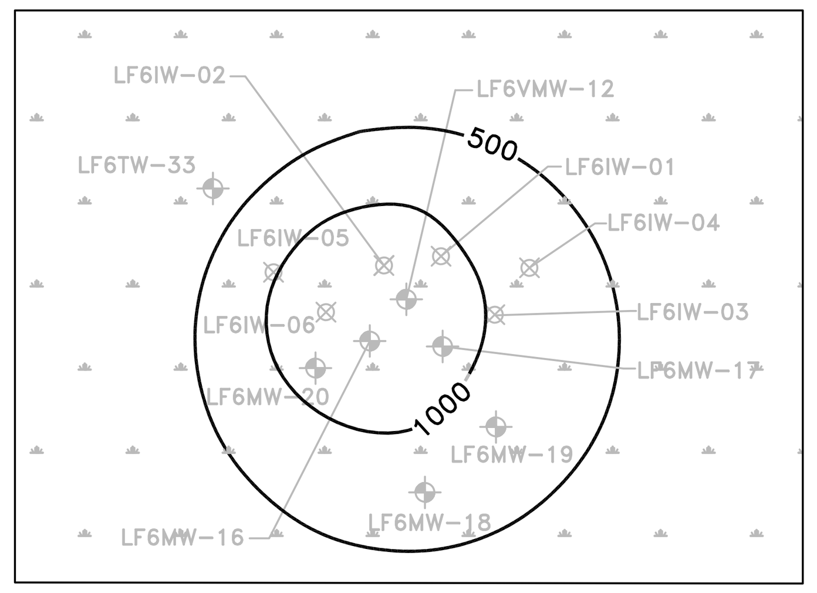
BUFFplot: 5/1/08 KMK





INSET A

SCALE: 1" = 20'-0"

SCALE IN FEET

0 20 40 60

IT IS A VIOLATION OF NEW YORK STATE EDUCATION LAW TO ALTER THIS DOCUMENT BY MEANS INCONSISTENT WITH SECTION 7209 OF SAID LAW.

SCALE IN FEET

0 100 200 300

DWG NO.	DATE	DESCRIPTION
LF6_NEWMXD	3/14/07	PROPERTY OWNER INFO FROM AFRPA
LF6_Feb27.shp	2/27/07	PARCEL BOUNDARY PER FPM GROUP
ACAD-04C02R0-FINAL	7/12/06	LF 6 SURVEY SUPPLIED BY LAFAVE, WHITE & MCGIVERN L.S.,P.C.
GR1216r-pn-17	9/1/98	SITE FEATURES SUPPLIED BY WOOLPERT CONSULTANTS
TOPO.DWG	2/11/99	BASE TOPOGRAPHY SUPPLIED BY WOOLPERT CONSULTANTS

REFERENCE DRAWINGS

NO.	DATE	DWN	APP'D	DESCRIPTION
0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
F	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
E	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
D	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW
C	9/20/07	KMK	DJM	ISSUED FOR REGULATORY REVIEW
B	7/16/07	KMK	DJM	ISSUED FOR FOR AFRPA/USACE REVIEW
A	6/12/07	KMK	DJM	ISSUED FOR 30% DESIGN FOR PARSONS REVIEW

REVISIONS

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DRAWN BY	**APPROVED BY**
KM KRAJEWSKI/WA BAYLES	DJ MILLER P.E.

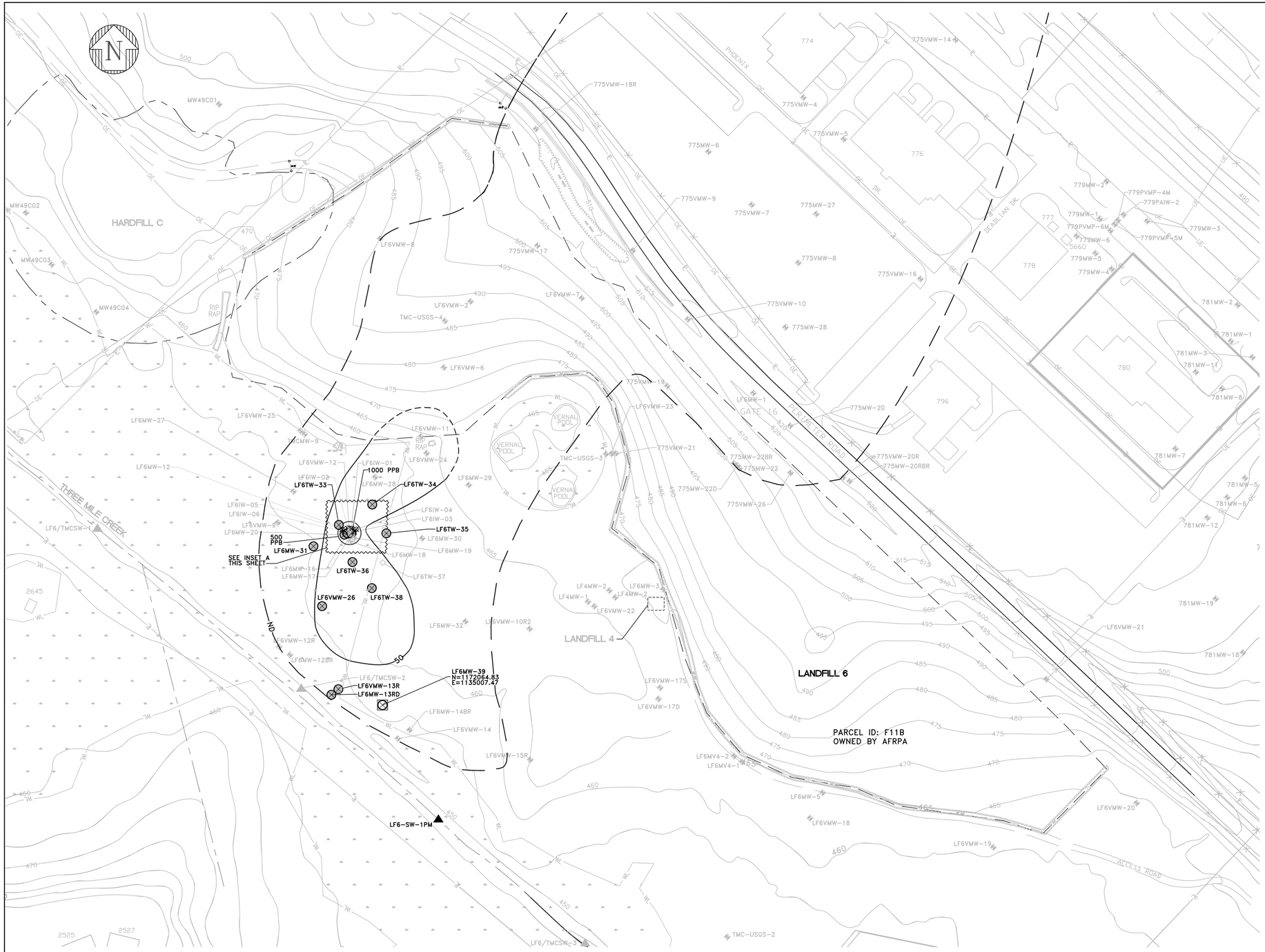
FORMER GRIFFISS AIR FORCE BASE

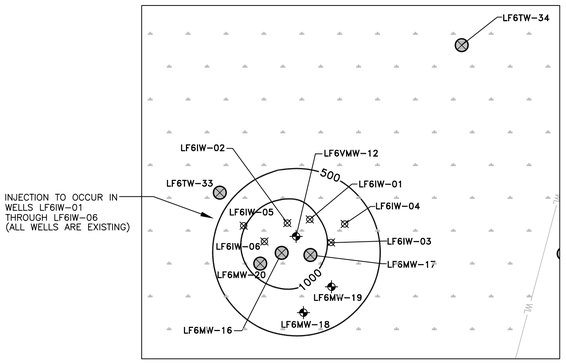
ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
LANDFILL 6
EXISTING SITE PLAN

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
1"=100'	6/12/07	3.dwg	Sheet 3 of 5	0

F:\Griffiss\2007 P&T\LF6\Construction Issue\1.dwg
BUFFplot: 5/1/08 KMK





INSET A

SCALE: 1" = 20'-0"

SCALE IN FEET

0 20 40 60

SCALE IN FEET

0 100 200 300

REFERENCE DRAWINGS

DWG NO.	DATE	DESCRIPTION
LF6_NEWMXD	3/14/07	PROPERTY OWNER INFO FROM AFRPA
LF6_Feb27.shp	2/27/07	PARCEL BOUNDARY PER FPM GROUP
ACAD-04C02R0-FINAL	7/12/06	LF 6 SURVEY SUPPLIED BY LAFAVE, WHITE & MCGIVERN L.S.,P.C.
GR1216r-pn-17	9/1/98	SITE FEATURES SUPPLIED BY WOOLPERT CONSULTANTS
TOPO.DWG	2/11/99	BASE TOPOGRAPHY SUPPLIED BY WOOLPERT CONSULTANTS

REVISIONS

NO.	DATE	DWN	APP'D	DESCRIPTION
0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
C	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
B	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
A	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW

ecology and environment engineering p.c.

DESIGNED BY	CHECKED BY
KM POWELL	T. HEINS P.E.
DRAWN BY	APPROVED BY
KM KRAJEWSKI/WA BAYLES	DJ MILLER P.E.

FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
LANDFILL 6
PROPOSED SITE PLAN

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
1"=100'	11/21/07	4.dwg	Sheet 4 of 5	0

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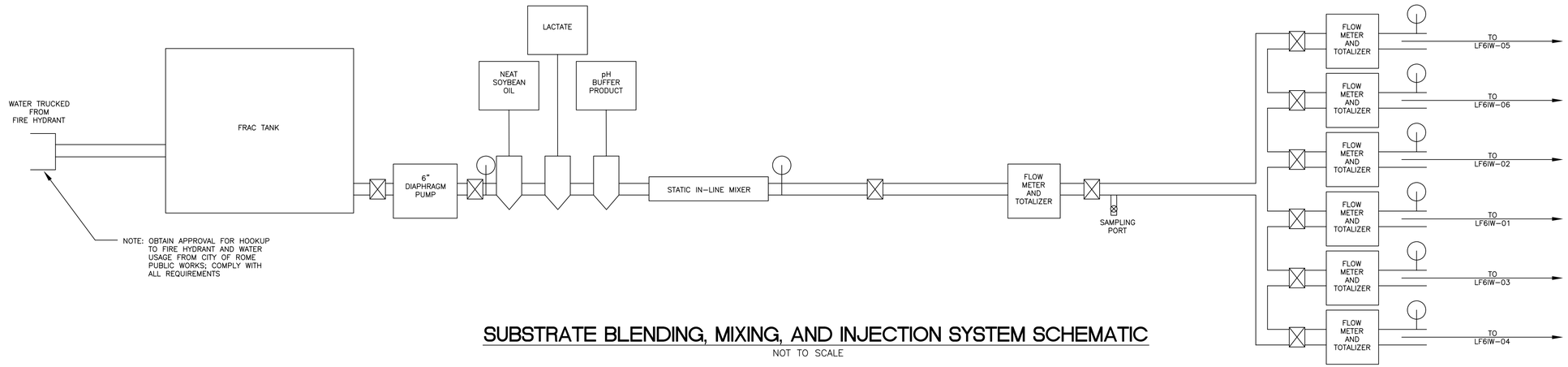
BUFFplot: 5/1/08 KMK



SUBSTRATE BLENDING, MIXING, AND INJECTION SYSTEM SCHEMATIC

NOT TO SCALE

NOTE: THE NUMBER AND SEQUENCE OF WELLS TO BE INJECTED AT THE SAME TIME TBD IN THE FIELD.

TABLE 1–SUBSTRATE MIXTURE AND INJECTION VOLUME

INJECTION WELL NO.	SCREEN INTERVAL (FEET BGS)	NEAT SOYBEAN OIL VOLUME (GALLONS)	LACTATE VOLUME (GALLONS)	pH BUFFER PRODUCT VOLUME (GALLONS)	MAKE-UP WATER VOLUME (GALLONS)	TOTAL SUBSTRATE VOLUME (GALLONS)	MAXIMUM OVERBURDEN PRESSURE (PSI)	MAXIMUM INJECTION FLOW RATE (GPM)
LF6IW-01	37-47	26	12	17	1150	1176	34	5
LF6IW-02	45-55	26	12	17	1150	1176	42	5
LF6IW-03	37-47	26	12	17	1150	1176	34	5
LF6IW-04	45-55	26	12	17	1150	1176	42	5
LF6IW-05	37-47	26	12	17	1150	1176	34	5
LF6IW-06	45-55	26	12	17	1150	1176	42	5

NOTE: THE TOTAL SUBSTRATE VOLUME DOES NOT INCLUDE LACTATE AND PH BUFFER VOLUMES AS THESE COMPONENTS ARE COMPLETELY SOLUBLE. THE COMBINED LACTATE AND PH BUFFER VOLUME IS MINOR COMPARED TO THE COMBINED VOLUME OF THE NEAT SOYBEAN OIL AND MAKE-UP WATER. THE INJECTED TOTAL SUBSTRATE VOLUME SHOULD BE +/- 5% OF THE TOTAL VOLUME PRESENTED IN TABLE 1.

DWG NO.	DATE	DESCRIPTION
FIGURE 3.4	9/10/07	PROCESS FLOW DIAGRAM FOR SUBSTRATE BLENDING AND MIXING SYSTEM BY PARSONS ENGINEERING SCIENCE, INC.
FIGURE 3.5	9/4/07	PROCESS FLOW DIAGRAM FOR SUBSTRATE INJECTION SYSTEM BY PARSONS ENGINEERING SCIENCE, INC.

REFERENCE DRAWINGS

NO.	DATE	DWN	APP'D	DESCRIPTION
0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
C	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
B	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
A	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW

REVISIONS

ecology and environment engineering p.c.

DESIGNED BY	CHECKED BY
KM POWELL	T HEINS PE
DRAWN BY	APPROVED BY
WA BAYLES	DJ MILLER PE

FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
LANDFILL 6
SUBSTRATE SYSTEM SCHEMATIC

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
NTS	11/21/07	5.dwg	Sheet 5 of 5	0

F:\Griffiss\2007 P&T\LF6\Construction Issue\5.dwg
BUFFplot: 5/1/08 KMK

SECTION 6

BUILDING 817/WSA SITE ACTIVITIES

6.1 SITE ACTIVITIES

The recommended remedy for the Building 817/WSA is enhanced anaerobic bioremediation and it is intended to increase in-situ biologically mediated sequential reductive dechlorination of chlorinated ethene mass present in groundwater beneath the site. The first phase of this remedy consists of a vegetable oil emulsion injected into the ground via existing temporary wells. Subsequent phases will be implemented only if necessary, based on the results of the performance monitoring.

6.2 SITE MOBILIZATION

Mobilization activities will commence upon the receipt of all required permits and authorizations as discussed in Section 4. Mobilization activities will consist of the following tasks:

- Coordination of utility clearances for all drilling locations.
- Site access coordination with AFRPA and Oneida County personnel (if applicable) on a daily basis to obtain access and approval. Griffiss Airpark Flight line personnel will also be contacted if the secondary injection event occurs.
- Coordination with Griffiss Air Force personnel for the use of Building 817 for the storage of chemicals (at minimum one month prior).
- Coordination with the City of Rome Public Works Department for the use of a fire hydrant located on the south side of Perimeter Road (minimum one month prior).
- Delivery of organic substrates and injection equipment.

6.2.1 Temporary Facilities

Temporary facilities will be available for use during the remedial constructions activities as discussed in Section 9. Due to the absence of electrical supply at Building 817 (power disconnected), a portable generator will be required to provide electricity for site activities.

6.2.2 Establish Work Zones

Exclusion zones, decontamination reduction, and clean work zones will be established with visible barriers to maintain site safety requirements and prevent waste migration. Barriers will be orange construction style fencing staked into the ground or equivalent. The work zones shall be relocated, as needed, based on existing site conditions and upon agreement of the SM and SHSO.

6.2.3 Permitting and Approval Authorities

As discussed in Section 4.5, the "Inventory of Injection Wells" EPA Form 7520-16 (OMB No. 2040-0042) requires completion before the start of work. Appropriate property approvals will be obtained prior to the initiation of work activities, including coordination with Rome Public Works, Griffiss Air Force personnel, and Griffiss Air Park Flight personnel.

6.3 MONITORING WELL INSTALLATION

Building 817/WSA remediation activities do not include the installation of any new monitoring wells.

6.3.1 Falling-Head Slug Test

A slug test (both falling and rising-head slug testing) will be conducted at existing wells WSA-MW8 and WSA-MW18. Slug testing will be performed at each well within one month prior to injection activities, during injection activities, and during the first round of sampling following injection activities. Additional slug testing will also be performed one year after injection activities have been completed in order monitor bio mass accumulation.

If the secondary injection activities are scheduled to occur, the falling-head slug test will still be performed at the regular scheduled sampling event.

The falling-head slug test involves displacement of the water in the wells by inserting a decontaminated solid slug of a known volume. A pressure transducer /data logger or electronic tape water level reader will be used to measure the water levels at predetermined time intervals on a logarithmic scale at the insertion of the slug. Data collection will occur as the water level returns to its initial static level. The slug test will be completed when the appropriate number of readings can clearly show a trend (semi-log plot of time versus depth) or when the water level has returned to at least 10% of the static conditions. The slug will be removed from the well and the water level monitoring process will be repeated as the water level rises.

All slug testing activities will be conducted in accordance with the USEPA SOP #2046 (Appendix B) and all data collected will be interpreted by the Bower Rice method for unconfined aquifers (or equivalent).

6.4 ORGANIC SUBSTRATE INJECTION

6.4.1 Substrate Injection Wells

A total of eight (8) pre-existing temporary injections wells (B817IW-1 through B817IW-8) that were used during the 2006 Pre-Design Investigation will be used for the full scale vegetable oil injection activities. The orientation of these injection wells are shown on Building 817/WSA, Design Drawing Sheet 4 of 5, located at the end of this section.

6.4.2 Substrates

The injection fluid that will be deployed at Building 817/WSA will consist of a three part emulsion. The injection fluid will consist of approximately 3,000 gallons of make-up water,

approximately 90 gallons of vegetable oil, and approximately 45 gallons of pH buffering product per injection well.

The injection mixture shall consist of 100% vegetable oil (Textrol-Br™ or equal). This is a soybean oil and lecithin product manufactured by Solae, Inc. or equal. The pH buffer product (Neutral Zone™ or equivalent) is manufactured by Remediation and Natural Attenuation Services, Inc. (or approved equal). All manufacturers will be required to submit MSDSs that will be included in the final report document.

Potable water from a nearby fire hydrant will be used to dilute the organic substrates prior to injection. Potable water will serve as a dispersant for the soybean oil-in-water emulsion as well as a carrier for the pH product.

6.4.3 Substrate Preparation and Emplacement

Substrate injection activities will begin with the delivery and staging of the organic substrates and the setup of a portable injection system at Building 817. The injection system will be staged near the existing temporary injection wells. All equipment piping and valves shall be chemically resistant to the substrate used during injection. The piping material will be HDPE. The system will be capable of pumping a minimum of 15 gpm.

Potable water will be supplied to the injection system from a nearby fire hydrant. The fire hydrant will be connected to the existing onsite clean 1,000 gallon polyethylene tank. The hose attached to the hydrant and the tank will be protected from the traffic. The storage tank will be filled periodically during injection and the full tank will serve as the water supply during injection. A HDPE line will be run from the bottom ball valve on the storage tank to a 6-inch diaphragm pump. The diaphragm pump will pump the water through the HDPE conveyance line to the dosimeters, the inline mixer, and finally through the injection manifold to the injection points. The organic substrates and the pH product will be added to the hydrant water at the correct dosage rate inline through a series of dosimeters. A static in-line mixer will be used to emulsify the soybean oil-pH buffer mixture and potable water to form an oil-in-water emulsion.

This oil-in-water emulsion will then be pumped to the valve manifold and injected into each injection well. The number and sequence of wells to be injected at the same time are to be determined in the field. It is expected that the total oil-in-water emulsion flow (15 to 20 gpm) will be split so that substrate can be injected into three to four injection locations at the same time at approximately 1 to 5 gpm per location. Substrate injection will start at each location at a relatively low flow rate for the first 5 to 10 minutes to ensure that all aspects of the system are in order. During that period, system pressures will be monitored and flow rate adjustments made as needed to avoid excessive pressure, which could constitute a health and safety hazard. System pressures shall not exceed the overburden pressures of 12 psi as shown in Table 1 on the Building 817/WSA, Design Drawing Sheet 5 of 5. The flow rates will be adjusted to keep injection pressures below 12 psi. Once the system has initialized, the flow rates will be increased to maximize injection rates without exceeding safe operating pressures or the overburden pressure of the system. It is expected that the injection rate will not exceed approximately 7 gpm at any injection location.

After the appropriate volume of emulsion has been injected into the subsurface the emulsion flow will be stopped. The system pressure will be reduced to zero prior to disconnecting any injection lines.

During the injection event, the pressures, flow rates, substrate volumes, injection well seals, and nearby monitoring wells will be monitored. The injection pressures will not exceed the values listed in Building 817/WSA, Design Drawing Sheet 5 of 5. The ground surface around the injection wells will be monitored during the injection to determine if the emulsion is leaking from the well seals. Water levels in monitoring wells B817-MW1, B817-MW2, and B817-MW3 will be monitored for mounding using an electronic water level tape measure.

If significant mounding occurs (not to exceed the top of the unsaturated zone resulting in daylighting of the substrate) the flow rates will be reduced to limit mounding. Nearby down gradient wells shall be visually monitored through the use of clear bailers to check for substrate break through. The soybean oil-in-water emulsion is milky yellow in color and can be detected visually in a clear bailer.

In addition to watching the monitoring wells, three manholes (MH-1, MH-2, and MH-3) will be monitored. There is an existing underground utility corridor that extends from Building 817 across Perimeter Road. This utility corridor may be a potential pathway for the substrate migration. If substrate is observed in the manholes, then injection activities will stop, and dissolved organic carbon (DOC) concentrations will be monitored. DOC concentrations will be monitored within the injection area and at the monitoring wells installed down gradient of the injection area. DOC concentrations in excess of 20 mg/L are required to maintain reductive dechlorination as defined by USEPA, 1998. Therefore, reinjection will not be considered until DOC concentrations decline and remain below 20 mg/L.

6.5 SUBSEQUENT REMEDIATION ACTIVITIES

Following the vegetable oil injection activities, various groundwater wells located throughout the site will be monitored and the results will be evaluated to determine the performance of the enhanced reductive dechlorination and the effectiveness of the remediation. As part of this data evaluation it will be determined whether there is a need to perform a secondary injection event. If the total VOC concentrations exceed concentrations greater than 30 ppb total VOC, for two consecutive sampling events, then a secondary injection will be considered. Prior to the secondary injection activity, changes to the substrate mixture and concentrations will be assessed.

Sample results from the secondary injection activity will determine if in is necessary to procedure to the contingency plan for the Building 817/WSA site.

6.6 SITE RESTORATION

After substrate injection activities are complete, any areas that were disturbed, including but not limited to asphalt, will be returned to their pre-construction state as discussed in Section 11.

6.7 CONTINGENCY PLAN

The contingency plan for Building 817/WSA is discussed in Section 12.

6.8 BUILDING 817/WSA SITE VERIFICATION CHECKLIST

To ensure that all aspects of the Building 817/WSA construction remediation efforts have been accounted for a verification checklist has been prepared. This checklist identifies the steps and requirements associated with the Building 817/WSA site activities. This checklist (located at the end of the section) is to be used and maintained in the project files following completion. These checklists are designed are to be used in addition to the project field log and can be modified if necessary to better document project requirements.

BUILDING 817/WSA SITE
VERIFICATION CHECKLIST

HEALTH AND SAFETY

APP/HASP updated yes/no

AHA Prepared and Reviewed title

1 _____ 4 _____
2 _____ 5 _____
3 _____ 6 _____

SITE MOBILIZATION

Dig Safely New York Contacted	Date		Oneida County Representative Contacted	Date	
Utilities Marked and Cleared	Date		Access Confirmed	yes/no	
Griffiss Air Park Flight Personnel Contacted	Date		City of Rome Public Works Department Contacted	Date	
Access Confirmed	yes/no		Fire Hydrant Use Approved	yes/no	
			Hydrant ID/Location:		
EPA Inventory of Injection Wells Form Submitted	Date				
Approval/Confirmation to Continue	yes/no				
Site Access Road Improved	yes/no		Survey Conducted	Date	
Site Facilities Prepared	yes/no		Building 817 Storage Access Approved	yes/no	
Decontamination Area	yes/no		Equipment/Supplies Staging Area	yes/no	
Drilling Contractor Mobilized	yes/no		Monitoring Well Installation Completed	NA	

Falling-Head Slug Test

WSA-MW8	yes/no	
WSA-MW18	yes/no	

OIL VEGETABLE INJECTION

Injection Chemicals Delivered		yes/no	Injection System Setup	yes/no
vegetable oil volume		gallons	Issues	
pH Buffering Volume		gallons		
Material Safety Data Sheets		yes/no		

Injection well	B817W-1	B817W-2	B817W-3	B817W-4
Total Flow				
Average Pressure				

Injection well	B817W-5	B817W-6	B817W-7	B817W-8
Total Flow				
Average Pressure				

Injected		gallons	Monitoring wells/Manholes observed		
Total pH Buffering Injected		gallons	B817-MW1	yes/no	
Total Water Injected		gallons	B817-MW2	yes/no	
TOTAL VOLUME INJECTED		gallons	B817-MW3	yes/no	
			MH-1	yes/no	
Utility Corridor Monitor	yes/no		MH-2	yes/no	
			MH-3	yes/no	
Site Restored to Existing Condition	yes/no				

Comments:

_____

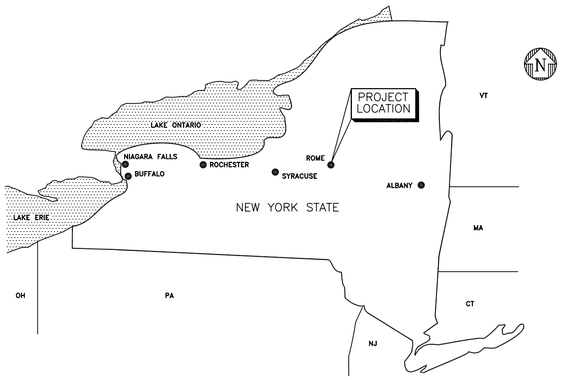
_____

_____

_____

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 817/WSA SITE
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

MAY 2008



VICINITY MAP
NTS

US Army Corps
of Engineers

PARSONS *In Association with:* **FPM** group

ecology and environment
engineering, p.c.

SOURCE: WOOLPERT CONSULTANTS

SITE LOCATION PLAN
1" = 1000'

LIST OF DRAWINGS

DWG. NO.	REV.	TITLE
1	F	COVER SHEET AND LIST OF DRAWINGS
2	C	NOTES, LEGEND AND ABBREVIATIONS
3	F	EXISTING SITE PLAN
4	F	PROPOSED SITE PLAN
5	C	SUBSTRATE SYSTEM SCHEMATIC

REFERENCE DRAWINGS

DWG NO.	DATE	DESCRIPTION
GR1216r-pn-17	9/1/98	SITE FEATURES SUPPLIED BY WOOLPERT CONSULTANTS
TOPO.DWG	2/11/99	BASE TOPOGRAPHY SUPPLIED BY WOOLPERT CONSULTANTS

REVISIONS

NO.	DATE	DWN	APP'D	DESCRIPTION
0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
F	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
E	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
D	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW
C	9/20/07	KMK	DJM	ISSUED FOR REGULATORY REVIEW
B	7/16/07	KMK	DJM	ISSUED FOR FOR AFRPA/USACE REVIEW
A	6/12/07	KMK	DJM	ISSUED FOR 30% DESIGN FOR PARSONS REVIEW

ecology and environment
engineering p.c.

DESIGNED BY	CHECKED BY
KM POWELL	T HEINS P.E.
DRAWN BY	APPROVED BY
JJ KOHLER/KM KRAJEWSKI/WA BAYLES	DJ MILLER P.E.

FORMER GRIFFISS AIR FORCE BASE
ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 817/WSA
COVER SHEET AND LIST OF DRAWINGS

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
AS NOTED	6/12/07	Cover Sheet.dwg	Sheet 1 of 5	0

F:\Griffiss\2007 P&T\Building 817\Construction Issue\Cover Sheet.dwg
BUFFplot: 5/1/08 KMK

NOTES:

GENERAL:

1. SUMMARY: THE BUILDING 817/WSA REMEDIATION WORK IS A SERIES OF VEGETABLE OIL INJECTIONS INTENDED TO ENHANCE BIODEGRADATION OF THE CONTAMINANTS OF CONCERN. THE PROJECT INCLUDES A PRIMARY VEGETABLE OIL INJECTION INTO A ROW OF EXISTING WELLS LOCATED NEAR THE UPGRADIENT PORTION OF THE PLUME. UP TO TWO SECONDARY VEGETABLE OIL INJECTION ROWS WILL BE USED IF DATA COLLECTED AFTER THE PRIMARY INJECTION INDICATES THEY ARE NEEDED. REFER TO THE "FINAL REMEDIAL DESIGN WORK PLAN" (EEEPC 2008) FOR ADDITIONAL INFORMATION.
2. UTILITY INFORMATION IS APPROXIMATE. VERIFY ALL UTILITIES, LOCATIONS, AND CONDITIONS WITH PROPERTY OWNERS PRIOR TO START OF FIELD ACTIVITIES.
3. PARCEL BOUNDARIES OBTAINED FROM AFRPA VIA FPM (MARCH 2007), AND WERE NOT VERIFIED IN THE FIELD.

HEALTH AND SAFETY:

1. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE HEALTH AND SAFETY OF ALL ON-SITE PERSONNEL.
2. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT A HASP IN ACCORDANCE WITH USACE EM 385-1-1 TO PROTECT ALL SITE PERSONNEL INCLUDING THOSE OF SITE VISITORS, BUILDING OWNERS, AND THE OWNER'S TENANTS.
3. THE CONTRACTOR'S HEALTH AND SAFETY PLAN MUST COMPLY WITH ALL APPLICABLE FEDERAL AND STATE REGULATIONS PROTECTING HUMAN HEALTH AND THE ENVIRONMENT.
4. THE CONTRACTOR SHALL NOT INITIATE ONSITE WORK UNTIL A HASP HAS BEEN ISSUED.

PERMITS/AGREEMENTS:

1. THE CONTRACTOR IS RESPONSIBLE FOR SECURING ALL REQUIRED APPLICATIONS, PERMITS, EASEMENTS, PERMISSIONS, APPROVALS, LETTERS, AGREEMENTS, RIGHTS OF WAY AND CERTIFICATIONS NECESSARY FOR THE COMPLETION OF THE WORK.
2. MANAGE STORMWATER IN ACCORDANCE WITH NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES (GP-02-01) OR MOST RECENT VERSION.

PROJECT COORDINATION:

1. CONTACT THE CITY OF ROME PUBLIC WORKS DEPARTMENT A MINIMUM OF 1 MONTH PRIOR TO INJECTION ACTIVITIES TO COORDINATE THE USE OF WATER FROM THE FIRE HYDRANT ON THE SOUTH SIDE OF PERIMETER ROAD (SEE SHEETS 3 AND 4 FOR APPROXIMATE LOCATION).
2. CONTACT GRIFFISS AIR FORCE PERSONNEL A MINIMUM OF 1 MONTH PRIOR TO INJECTION ACTIVITIES TO COORDINATE THE USE OF BUILDING 817 FOR THE STORAGE OF CHEMICALS.
3. CONTACT GRIFFISS AIRPARK FLIGHTLINE PERSONNEL A MINIMUM OF 1 MONTH PRIOR TO INJECTION ACTIVITIES TO COORDINATE ACCESS TO THE FLIGHTLINE FOR THE SECONDARY INJECTION EVENT.
4. THE CONTRACTOR SHALL COORDINATE WITH GRIFFISS AIRPARK FLIGHT PERSONNEL AND APPLICABLE PROPERTY OWNERS ON A DAILY BASIS TO OBTAIN ACCESS AND APPROVAL FOR WORK TO BE PERFORMED.
5. EEEPC SHALL NOT BE RESPONSIBLE FOR CONTRACTOR MEANS AND METHODS, INCLUDING DESIGN AND IMPLEMENTATION OF FUTURE CONTINGENCY MEASURES.

SURVEYS/AS-BUILT DRAWINGS/RECORD DOCUMENTS:

1. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING RECORD AS-BUILT DRAWINGS AND MAINTAINING RECORDS OF FINAL INSPECTIONS, TREATMENT SYSTEM OPERATION, CHEMICAL DATA SHEETS, START-UP, MAINTENANCE, AND ENVIRONMENTAL MONITORING DURING TREATMENT SYSTEM START-UP. ALL RECORD DOCUMENTS, AS-BUILT DRAWINGS, AND SURVEYS SHALL BE CERTIFIED FOR ACCURACY BY PROJECT MANAGEMENT AND PROVIDED TO ECOLOGY AND ENVIRONMENT ENGINEERING P.C. OF LANCASTER, NEW YORK IN PREPARATION OF THE REMEDIAL ACTION REPORT.

TEMPORARY FACILITIES AND CONTROLS:

1. THE CONTRACTOR SHALL SECURE AND PROVIDE ALL TEMPORARY UTILITIES REQUIRED TO PERFORM THE WORK INCLUDING BUT NOT LIMITED TO ELECTRICITY, LIGHTING, HEAT, VENTILATION, TELEPHONE SERVICE, WATER, SANITARY FACILITIES AND FIRE PROTECTION. THE CONTRACTOR SHALL COORDINATE THE LOCATION OF TEMPORARY FACILITIES WITH GRIFFISS AIR FORCE PERSONNEL PRIOR TO COMMENCEMENT OF WORK.
2. THE CONTRACTOR SHALL SECURE, PROVIDE AND MAINTAIN ALL TEMPORARY TRAFFIC CONTROLS, BARRIERS, ENCLOSURES, FENCING, TARPAULINS, CANOPIES AND WATER CONTROLS REQUIRED TO SATISFACTORILY PERFORM THE WORK.
3. TEMPORARY FACILITIES AND SERVICES PROVIDED BY THE CONTRACTOR INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, ACCESS ROADS, PARKING, AND DUST CONTROL.
4. THE CONTRACTOR IS RESPONSIBLE FOR CLEANUP AND REPAIR OF ALL DAMAGE CAUSED BY THE INSTALLATION OR USE OF TEMPORARY FACILITIES.
5. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE SECURITY OF THE CONTRACTOR'S WORK AREAS, EQUIPMENT, MATERIALS, AND SUPPLIES.
6. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT A SPCC PLAN FOR ALL CHEMICALS STORED ON SITE IF REQUIRED BY FEDERAL OR STATE REGULATIONS.
7. THE PRODUCTS SPECIFIED HEREIN SHALL BE LEASED OR OWNED BY THE CONTRACTOR AND WILL NOT BECOME PROPERTY OF THE FORMER GRIFFISS AIR FORCE BASE. ALL PRODUCTS SPECIFIED HEREIN SHALL BE REMOVED FROM THE WORK SITE WHEN NO LONGER NEEDED.

SITE RESTORATION:

1. ALL AREAS DISTURBED DURING PERFORMANCE OF THE WORK, INCLUDING BUT NOT LIMITED TO ASPHALT, SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS.
2. PROTECT ALL RESTORED AREAS FROM EROSION AND DAMAGE UNTIL SURFACE IS STABILIZED.
3. CONTRACTOR SHALL REPAIR OR REPLACE ANY RESTORED AREAS DAMAGED WITHIN 6 MONTHS OF PROJECT COMPLETION.
4. RESTORE ALL GRADES TO MAINTAIN EXISTING SURFACE WATER DRAINAGE PATTERNS.
5. IMPORTED TOPSOIL SHALL BE ORGANIC LOAM, WELL DRAINED, HOMOGENOUS AND MEET THE FOLLOWING MINIMUM REQUIREMENTS:
   a. PH BETWEEN 4.5 AND 7
   b. FREE OF ANY VEGETATION (ESPECIALLY INVASIVE SPECIES), DEBRIS OR OTHER OBJECTIONABLE MATERIALS.
   c. FREE OF ANY STONES OR PARTICLES GREATER THAN 1".
6. IN AREAS OF SOIL DISTURBANCE, PLACE 3" OF TOPSOIL ON EARTH FILL AND APPLY GRASS SEED AT A MINIMUM OF 3 POUNDS/1,000 SQUARE FEET. PROTECT NEWLY SEEDED AREAS FROM TRAFFIC AND EROSION. MAINTAIN ADEQUATE SOIL MOISTURE CONDITIONS UNTIL YOUNG PLANTS ARE WELL ESTABLISHED.
7. GRASS SEED SHALL BE A MIXTURE OF 30% ANNUAL RYEGRASS AND 70% PERENNIAL RYEGRASSES.
8. SOW GRASS SEED EVENLY BY HAND, HYDROSEED OR SEED SPREADER ON DRY OR MODERATELY DRY SOIL.
9. FERTILIZER SHALL BE A COMMERCIAL-GRADE 5-10-5 MIXTURE.
10. APPLY FERTILIZER IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DIRECTIONS.

PRODUCTS AND EQUIPMENT:

1. THE INJECTION SYSTEM SHALL BE CAPABLE OF PUMPING A MINIMUM OF 40 GPM.
2. THE MIXING AND INJECTION SYSTEM PIPING SHALL BE HDPE. ALL EQUIPMENT, PIPING, VALVES, ETC., SHALL BE CHEMICALLY RESISTANT TO THE SUBSTRATE USED DURING INJECTION ACTIVITIES.
3. VALVES, CHECK VALVES, ETC. NOT SHOWN ON SHEET 5 FOR CLARITY (INSTALL AS REQUIRED).
4. INJECTION MIXTURE SHALL CONSIST OF 100% VEGETABLE OIL (CENTROMIX® WD, A SOY LECITHIN PRODUCT MANUFACTURED BY CENTRAL SOYA COMPANY, INC.), PH BUFFER PRODUCT (NEUTRAL ZONE ™ MANUFACTURED BY REMEDIATION AND NATURAL ATTENUATION SERVICES), AND MAKE-UP WATER. SEE TABLE 1 ON SHEET 5 FOR VOLUMES. OBTAIN CHEMICAL DATA SHEETS FROM THE MANUFACTURER AND SUBMIT AS SPECIFIED IN SURVEYS/AS-BUILT DRAWINGS/RECORD DOCUMENTS NOTE 1. MAKE-UP WATER SHALL BE OBTAINED FROM FIRE HYDRANT ON SOUTH SIDE OF PERIMETER ROAD (SEE SHEETS 3 AND 4 FOR APPROXIMATE LOCATION). CONTRACTOR SHALL COORDINATE WATER DISTRIBUTION WITH UTILITY PERSONNEL PRIOR TO INJECTION ACTIVITIES.

QA/QC:

1. DURING THE INJECTION EVENT, PRESSURES, FLOWRATES, SUBSTRATE VOLUMES, INJECTION WELL SEALS, AND NEARBY MONITORING WELLS AND MANHOLES SHALL BE MONITORED. INJECTION PRESSURES AND FLOWRATES SHALL NOT EXCEED VALUES LISTED IN TABLE 1 ON SHEET 5. SEE EXECUTION NOTE 11 FOR ADDITIONAL INSTRUCTIONS. INJECTION WELL SEALS SHALL BE VISUALLY INSPECTED TO ENSURE THAT THE SEAL HAS NOT BEEN COMPROMISED DURING OPERATION. MONITOR WATER LEVELS AT B817-MW1, -MW2, AND -MW3 FOR MOUNDING. IF SIGNIFICANT MOUNDING OCCURS (NOT TO EXCEED THE TOP OF THE UNSATURATED ZONE RESULTING IN DAYLIGHTING OF THE SUBSTRATE), REDUCE FLOWRATES TO LIMIT THE MOUNDING. NEARBY DOWNGRADIENT WELLS SHALL BE VISUALLY MONITORED TO CHECK FOR SUBSTRATE BREAKTHROUGH USING DEDICATED CLEAR BAILERS. THE PRESENCE OF SUBSTRATE WILL BE EVIDENCED BY THE COLOR YELLOW. A POTENTIAL PREFERENTIAL PATHWAY (E.G., UNDERGROUND UTILITY CORRIDOR) EXTENDS FROM BUILDING 817 AND ACROSS PERIMETER ROAD. OBSERVE THE THREE MANHOLES IN THE AREA OF THE UNDERGROUND UTILITY CORRIDOR (MH-1, MH-2, AND MH-3) DURING THE INJECTION EVENT FOR THE PRESENCE OF SUBSTRATE. IF SUBSTRATE IS OBSERVED IN THE MANHOLES, DISCONTINUE INJECTION ACTIVITIES AND MONITOR DOC LEVELS. IF TARGET DOC CONCENTRATIONS ARE MET, CONTINUE INJECTION. IF TARGET DOC CONCENTRATIONS ARE NOT MET, DISCUSS FURTHER ACTION WITH PROJECT TEAM.

EXECUTION:

1. PRIMARY INJECTION SHALL BE PERFORMED IN EXISTING WELLS INCLUDED IN TABLE 1 ON SHEET 5. SECONDARY INJECTION EVENT SHALL BE PERFORMED AS NEEDED BASED ON CRITERIA DESCRIBED IN THE "FINAL REMEDIAL DESIGN WORK PLAN" (EEEPC 2008). DETAILS FOR SECONDARY INJECTION TBD.
2. PERFORM A FALLING-HEAD SLUG TEST AT WELLS WSA-MW8 AND WSA-MW18 FOR THE PRIMARY INJECTION WITHIN 1 MONTH PRIOR TO INJECTION ACTIVITIES AND DURING INJECTION ACTIVITIES. IF THE SECONDARY INJECTION IS REQUIRED, SLUG TESTING WILL BE COMPLETED DURING THE NEXT REGULARLY SCHEDULED SAMPLING EVENT AFTER THE INJECTION ACTIVITY. THE FALLING-HEAD SLUG TEST INVOLVES DISPLACING THE WATER IN THE WELLS BY INSERTING A SOLID SLUG OF KNOWN VOLUME. DATA COLLECTION TO COMMENCE AT THE TIME OF SLUG INSERTION USING A PRESSURE TRANSDUCER/DATA LOGGER OR ELECTRONIC TAPE WATER LEVEL READER. COLLECT WATER LEVEL MEASUREMENTS AT PREDETERMINED TIME INTERVALS ON AN APPROXIMATE LOGARITHMIC SCALE AS THE WATER LEVEL RETURNS TO ITS INITIAL STATIC LEVEL. THE SLUG TEST WILL BE COMPLETE WHEN THE WATER LEVEL HAS RETURNED TO WITHIN AT LEAST 10% OF STATIC CONDITIONS OR A SUFFICIENT NUMBER OF READINGS HAVE BEEN MADE TO CLEARLY SHOW A TREND ON A SEMI-LOG PLOT OF TIME VERSUS DEPTH. DATA SHALL BE INTERPRETED BY THE BOWER AND RICE METHOD FOR UNCONFINED AQUIFERS, OR EQUIVALENT. THE SLUG WILL THEN BE REMOVED AND THE WATER LEVEL MONITORING PROCESS WILL BE REPEATED AS THE WATER LEVEL RISES.
3. CONTACT "DIG SAFELY NEW YORK" TO LOCATE UNDERGROUND UTILITIES PRIOR TO INJECTION ACTIVITIES. REGULATIONS PERTAINING TO THE PROTECTION OF UNDERGROUND FACILITIES IN NEW YORK STATE ARE GOVERNED BY NEW YORK CODES, RULES, AND REGULATIONS. HOWEVER, OTHER PRIVATELY OWNED UTILITIES AT THE SITE MAY EXIST THAT ARE NOT MEMBERS OF THE UTILITY LOCATOR SERVICE. COORDINATE ALL INTRUSIVE WORK WITH THE PROPERTY OWNER(S) TO IDENTIFY ANY OTHER POTENTIAL PRIVATELY OWNED UTILITIES PRESENT IN THE REMEDIAL CONSTRUCTION AREA.
4. STORE MATERIAL AND EQUIPMENT IN BUILDING 817, SEE PROJECT COORDINATION NOTE 2.
5. STORE BULK CHEMICALS UNDER COVER WHEN NOT IN USE AND IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS AND THE SITE'S SPCC PLAN (IF APPLICABLE).
6. CONTAINERIZE WASTE MATERIAL FROM THE SITE DAILY AND DISPOSE OF APPROPRIATELY.
7. PROTECT THE HOSE THAT WILL DELIVER WATER FROM THE NEARBY FIRE HYDRANT FROM VEHICULAR TRAFFIC ON PERIMETER ROAD.
8. PREPARE INJECTION MIXTURE (COMPRISED OF MAKE-UP WATER, VEGETABLE OIL, AND PH BUFFER) IN THE FIELD USING A STATIC-IN-LINE MIXER AS SHOWN ON SHEET 5. INJECT MIXTURE VOLUME CONTINUOUSLY UNTIL TOTAL VOLUME INJECTED.
9. THE NUMBER AND SEQUENCE OF WELLS TO BE INJECTED AT THE SAME TIME TBD IN THE FIELD.
10. INITIAL FLOW RATES OF THE SUBSTRATE INJECTION SHALL BE LESS THAN THE FLOW RATES PRESENTED IN TABLE 1 ON SHEET 5 FOR EACH INJECTION WELL TO ENSURE THAT ALL ASPECTS OF THE SYSTEM ARE IN PROPER WORKING ORDER. SYSTEM PRESSURES SHALL NOT EXCEED OVERBURDEN PRESSURES PRESENTED IN TABLE 1 ON SHEET 5. ADJUST FLOW RATES AS NEEDED TO REDUCE PRESSURES. AFTER SYSTEM INITIALIZED, FLOW RATES CAN BE INCREASED, HOWEVER THEY SHALL NOT EXCEED VALUES LISTED IN TABLE 1 ON SHEET 5.
11. AFTER THE SUBSTRATE VOLUME HAS BEEN INJECTED INTO THE SUBSURFACE, STOP THE SUBSTRATE FLOW AND REDUCE SYSTEM PRESSURE TO ZERO PRIOR TO DISCONNECTING ANY INJECTION LINE.
12. CONDUCT PERFORMANCE MONITORING ACCORDING TO "FINAL REMEDIAL DESIGN WORK PLAN" (EEEPC 2008).

LEGEND:

- ABANDONED UNDERGROUND ELECTRIC
- 2623 — BUILDING LOCATION
- WL / WL — DELINEATED WETLANDS
- EXISTING RAILROAD TRACK
- X — X — FENCE LINE
- UE — UNDERGROUND ELECTRIC LINE
- OE — OVERHEAD ELECTRIC LINE
- S — SANITARY SEWER
- 480 — TOPOGRAPHIC CONTOUR LINE (5 FOOT INTERVAL)
- TREE OR TREE LINE
- W — WATER LINE
- LINE OF SUBSTRATE INJECTION POINT FOR SECONDARY INJECTION (NUMBER OF WELLS TBD)
- 600 — — — — — — — 600 — MONITORING WELL TOTAL CHLORINATED VOC GROUNDWATER DATA IN ug/L FROM 2004 AND 2006
- PL — / — PL — PARCEL BOUNDARY OUTSIDE AREA OF CONCERN/ PARCEL BOUNDARY INSIDE AREA OF CONCERN
- WSA-MW13Br — BEDROCK MONITORING WELL SAMPLED IN 2004
- WSA-MW11 — EXISTING MONITORING WELL
- WSATW-5 — SUPPLEMENTAL INVESTIGATION TEMPORARY WELL LOCATION
- MH — EXISTING MANHOLE
- B817IW-8 / B817IW-8 — EXISTING INJECTION WELL/EXISTING INJECTION WELL TO BE RE-USED
- WSA-MW21 — INJECTION AND PERFORMANCE MONITORING WELL
- WSA-SW1PW — SURFACE WATER SAMPLE LOCATION
- BALL VALVE
- DOSIMETER
- PRESSURE GAUGE

ABBREVIATIONS:

AFRPA	AIR FORCE REAL PROPERTY AGENCY	ID	IDENTIFICATION	SPCC	SPILL PREVENTION, CONTROL, AND COUNTERMEASURE
BGS	BELOW GROUND SURFACE	MH	MANHOLE	TBD	TO BE DETERMINED
EEEPC	ECOLOGY AND ENVIRONMENT ENGINEERING, P.C.	ND	NON DETECT	USACE	UNITED STATES ARMY CORPS OF ENGINEERS
DOC	DISSOLVED ORGANIC CARBON	NTS	NOT TO SCALE	'	FEET
GPM	GALLONS PER MINUTE	PL	PROPERTY LINE	"	INCHES
HDPE	HIGH DENSITY POLYETHYLENE	PSI	POUNDS PER SQUARE INCH	µg/L	MICROGRAMS PER LITER
HASP	HEALTH AND SAFETY PLAN	QA/QC	QUALITY ASSURANCE/QUALITY CONTROL	±	PLUS OR MINUS

DWG NO.	DATE	DESCRIPTION (REFERENCE DRAWINGS)	NO.	DATE	DWN	APP'D	DESCRIPTION (REVISIONS)
			0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
			C	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
			B	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
			A	11/21/07	KMK	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW

ecology and environment engineering p.c.

DESIGNED BY	CHECKED BY
KM POWELL	T HEINS PE
DRAWN BY	APPROVED BY
KM KRAJEWSKI/WA BAYLES	DJ MILLER PE

FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN BUILDING 817/WSA NOTES, LEGEND AND ABBREVIATIONS

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
NTS	11/21/07	1.dwg	Sheet 2 of 5	0

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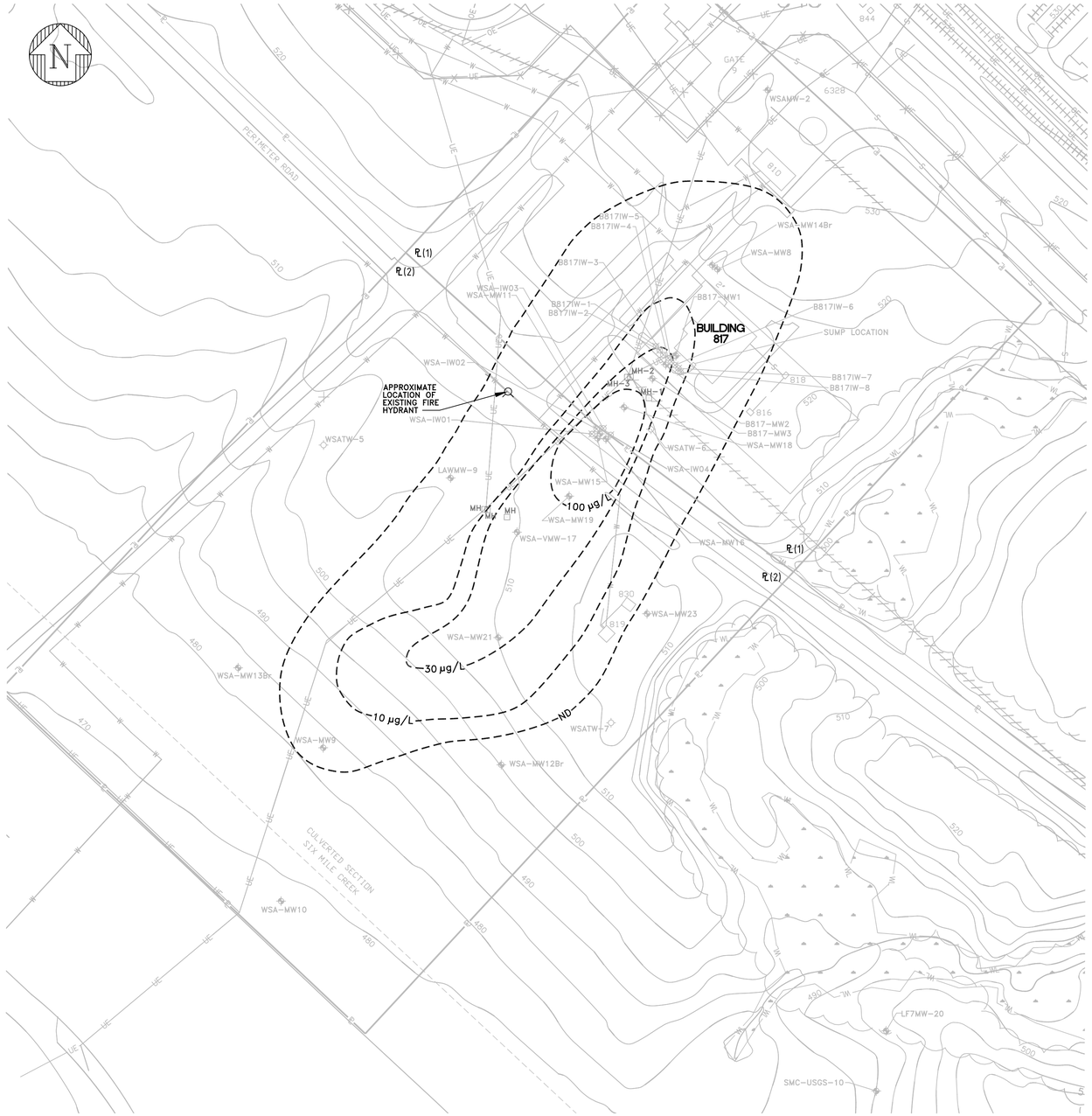
BUFFplot: 5/1/08 KMK



℄(1) PARCEL ID: F10C
OWNED BY AIR FORCE

℄(2) PARCEL ID: A5
OWNED BY AIR FORCE
LEASED TO ONEIDA COUNTY

SCALE IN FEET
0 100 200 300

DWG NO.	DATE	DESCRIPTION
B817_NEWMXD	3/14/07	PROPERTY OWNER INFO FROM AFRPA
B817_Feb27.shp	2/27/07	PARCEL BOUNDARY PER FPM GROUP
F06_VR_WT-ARS	11/1/06	WETLANDS DELINEATION PER ECOLOGY AND ENVIRONMENT, INC.
GR1216r-pn-17	9/1/98	SITE FEATURES SUPPLIED BY WOOLPERT CONSULTANTS
TOPO.DWG	2/11/99	BASE TOPOGRAPHY SUPPLIED BY WOOLPERT CONSULTANTS

REFERENCE DRAWINGS

NO.	DATE	DWN	APP'D	DESCRIPTION
0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
F	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
E	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
D	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW
C	9/20/07	KMK	DJM	ISSUED FOR REGULATORY REVIEW
B	7/16/07	KMK	DJM	ISSUED FOR FOR AFRPA/USACE REVIEW
A	6/12/07	KMK	DJM	ISSUED FOR 30% DESIGN FOR PARSONS REVIEW

REVISIONS

ecology and environment engineering p.c.

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DRAWN BY	APPROVED BY
KM KRAJEWSKI/WA BAYLES	DJ MILLER PE

FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 817/WSA
EXISTING SITE PLAN

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
1"=100'	6/12/07	2.dwg	Sheet 3 of 5	0

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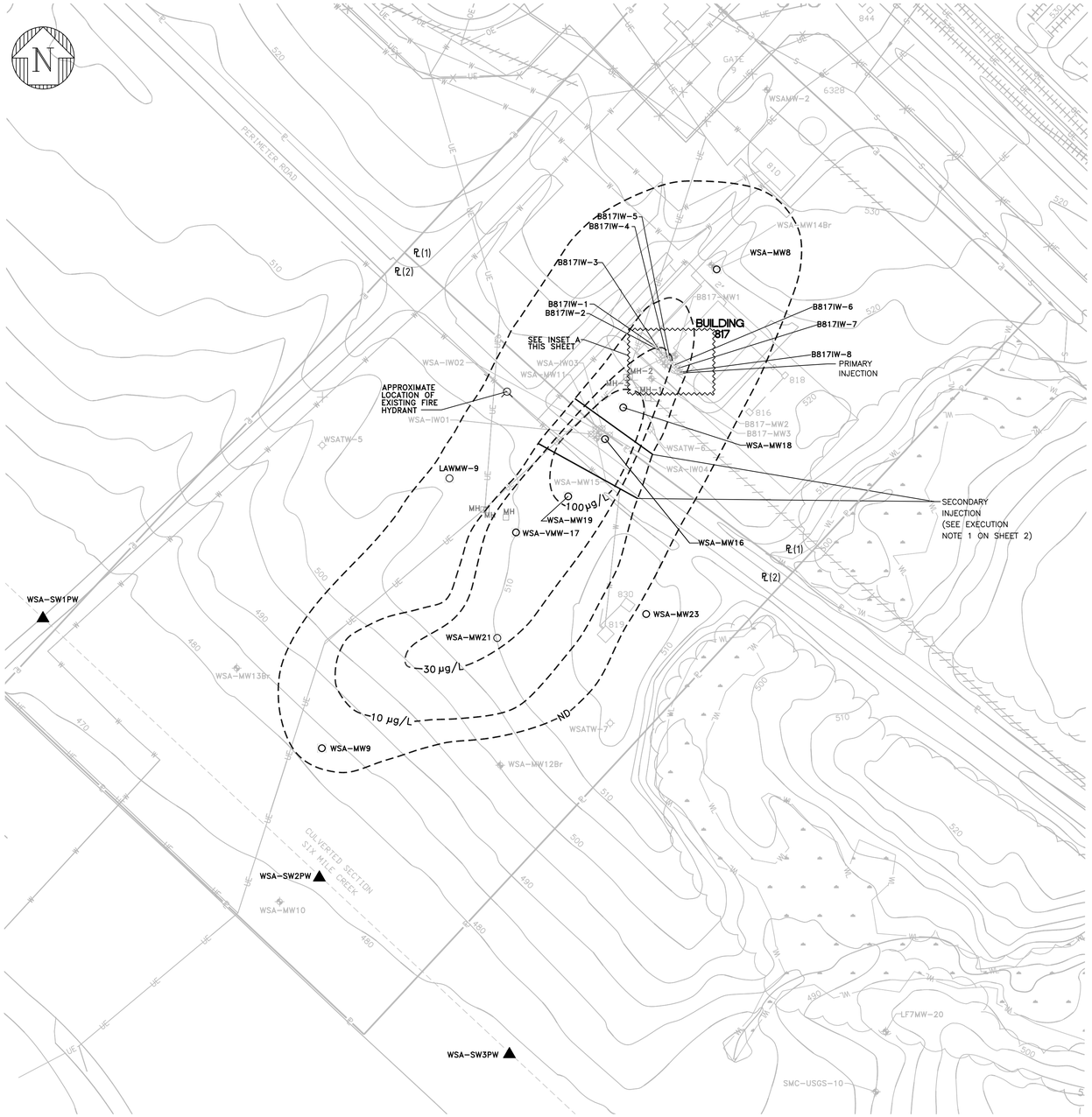
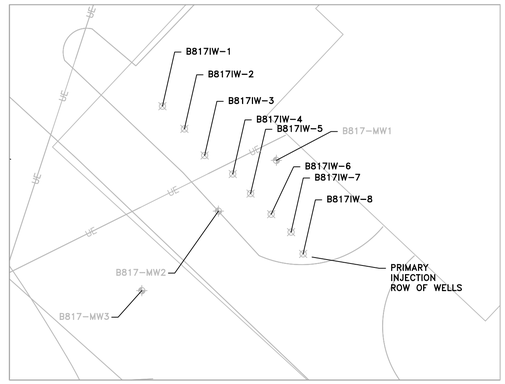
BUFFplot: 5/1/08 KMK



℄(1) PARCEL ID: F10C
OWNED BY AIR FORCE

℄(2) PARCEL ID: A5
OWNED BY AIR FORCE
LEASED TO ONEIDA COUNTY



INSET A

SCALE: 1" = 20'-0"

SCALE IN FEET

0 20 40 60

SCALE IN FEET

0 100 200 300

REFERENCE DRAWINGS

DWG NO.	DATE	DESCRIPTION
B817_NEWMXD	3/14/07	PROPERTY OWNER INFO FROM AFRPA
B817_Feb27.shp	2/27/07	PARCEL BOUNDARY PER FPM GROUP
F06_VR_WT-ARS	11/1/06	WETLANDS DELINEATION PER ECOLOGY AND ENVIRONMENT, INC.
GR1216r-pn-17	9/1/98	SITE FEATURES SUPPLIED BY WOOLPERT CONSULTANTS
TOPO.DWG	2/11/99	BASE TOPOGRAPHY SUPPLIED BY WOOLPERT CONSULTANTS

REVISIONS

NO.	DATE	DWN	APP'D	DESCRIPTION
O	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
F	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
E	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
D	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW
C	9/20/07	KMK	DJM	ISSUED FOR REGULATORY REVIEW
B	7/16/07	KMK	DJM	ISSUED FOR FOR AFRPA/USACE REVIEW
A	6/12/07	KMK	DJM	ISSUED FOR 30% DESIGN FOR PARSONS REVIEW

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DRAWN BY	APPROVED BY
KM KRAJEWSKI/WA BAYLES	DJ MILLER PE

FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 817/WSA
PROPOSED SITE PLAN

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
1"=100'	6/12/07	3.dwg	Sheet 4 of 5	0

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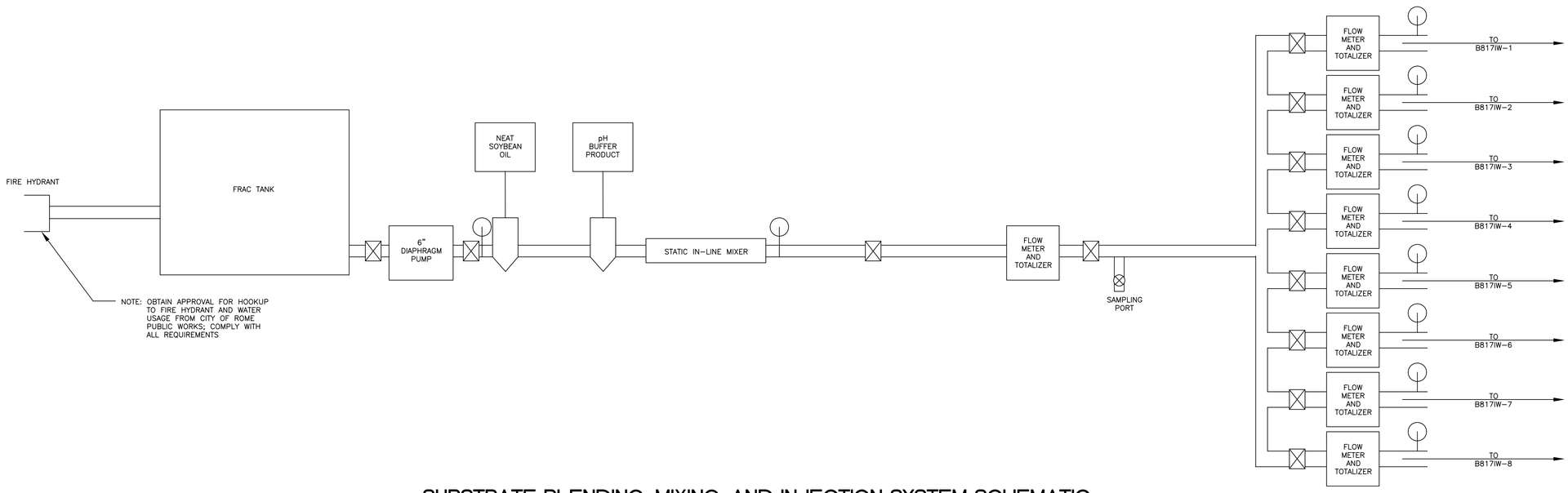
BUFFplot: 5/1/08 KMK



SUBSTRATE BLENDING, MIXING, AND INJECTION SYSTEM SCHEMATIC (PRIMARY INJECTION SHOWN)

NOT TO SCALE

NOTE: THE NUMBER AND SEQUENCE OF WELLS TO BE INJECTED AT THE SAME TIME TBD IN THE FIELD.

TABLE 1–SUBSTRATE MIXTURE AND INJECTION VOLUME

INJECTION WELL NO.	SCREEN INTERVAL (FEET BGS)	NEAT SOYBEAN OIL VOLUME (GALLONS)	pH BUFFER PRODUCT VOLUME (GALLONS)	MAKE-UP WATER VOLUME (GALLONS)	TOTAL SUBSTRATE VOLUME (GALLONS)	MAXIMUM OVERBURDEN PRESSURE (PSI)	MAXIMUM INJECTION FLOW RATE (GPM)
B817IW-1	14–19	90	45	3,000	3,090	12	7
B817IW-2	14–19	90	45	3,000	3,090	12	7
B817IW-3	14–19	90	45	3,000	3,090	12	7
B817IW-4	14–19	90	45	3,000	3,090	12	7
B817IW-5	14–19	90	45	3,000	3,090	12	7
B817IW-6	14–19	90	45	3,000	3,090	12	7
B817IW-7	14–19	90	45	3,000	3,090	12	7
B817IW-8	14–19	90	45	3,000	3,090	12	7

NOTE: THE TOTAL SUBSTRATE VOLUME DOES NOT INCLUDE THE pH BUFFER VOLUME IS MINOR COMPARED TO THE COMBINED VOLUME OF THE NEAT SOYBEAN OIL AND MAKE-UP WATER. THE INJECTED TOTAL SUBSTRATE VOLUME SHOULD BE ±5% OF THE TOTAL VOLUME PRESENTED IN TABLE 1.

REFERENCE DRAWINGS			REVISIONS				
DWG NO.	DATE	DESCRIPTION	NO.	DATE	DWN	APP'D	DESCRIPTION
			0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
			C	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
FIGURE 3.4	9/10/07	PROCESS FLOW DIAGRAM FOR SUBSTRATE BLENDING AND MIXING SYSTEM BY PARSONS ENGINEERING SCIENCE, INC.	B	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
FIGURE 3.5	9/4/07	PROCESS FLOW DIAGRAM FOR SUBSTRATE INJECTION SYSTEM BY PARSONS ENGINEERING SCIENCE, INC.	A	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW

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DESIGNED BY	CHECKED BY
KM POWELL	T HEINS PE
DRAWN BY	APPROVED BY
WA BAYLES	DJ MILLER PE

FORMER GRIFFISS AIR FORCE BASE
ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 817/WSA
SUBSTRATE SYSTEM SCHEMATIC

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
NTS	11/21/07	4.dwg	Sheet 5 of 5	0

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BUFFplot: 5/1/08 KMK

SECTION 7

BUILDING 775 SITE ACTIVITIES

7.1 SITE ACTIVITIES

The recommended remedy for the Building 775 site consists of groundwater extraction, and discharge for off-site treatment. An unmanned and automated operational pump and discharge system has been designed to contain the contaminated plume and extract groundwater to remove contaminants from the aquifer.

An analysis of the plume and aquifer properties conducted as part of the Feasibility Study demonstrated that an extraction rate of 1.5 gpm would capture the volumetric flow of the plume. This extraction rate was increased to 4.5 gpm for costing purposes. Data obtained from the pre-design investigation reduced the size of the plume. The recent reduction in plume size noted during the pre-design investigation adds further conservatism to the 4.5 gpm extraction rate assumption. The recommended range for the selected pump is 1.5 to 10 gpm. However, the pumping rate and radius of influence will be confirmed during the pump testing performed in the field.

The actual pumping rate used and the radius of influence will be provided in the Interim Remedial Action Completion Report following implementation of site activities.

7.2 SITE MOBILIZATION

Mobilization activities will commence upon the receipt of all required permits and authorizations as discussed in Section 4. Mobilization activities will consist of the following tasks:

- Mark out of the proposed monitoring well and extraction well locations.
- Coordination of utility clearances for all drilling locations.
- Site access coordination with AFRPA and GLDC personnel (if applicable) on a daily basis to obtain access and approval.
- Mobilization of surveyors, licensed in NY to locate and set lines, levels, and contours to perform the work.
- Approval from the City of Rome Water Pollution Control Facility to discharge the effluent groundwater.
- Mobilization of one drilling contractor to support the extraction well installation activities.

7.2.1 Temporary Facilities

Temporary facilities will be available for use during the remedial constructions activities as discussed in Section 9.

7.2.2 Permitting and Approval Authorities

As discussed in Section 4, all permits and approvals must be obtained prior to the start of remediation activities. Appropriate property approvals will be obtained prior to the initiation of work activities, including coordination with Rome Water Pollution Control Facility, GLDC and Griffiss Air Force personnel. An effluent discharge permit will be in place prior to discharging to the sewer system.

7.3 MONITORING WELL INSTALLATION

One new monitoring well (775VMW-19R) will be installed to complete the groundwater monitoring network. The location of the new monitoring well will be located slightly west of current monitoring well 775MW-28 as shown on Building 775, Design Drawing, Sheet 3 of 5. Monitoring well 775VMW-19R will be installed such that the screen interval will be located at 40 to 60 feet bgs.

Monitoring well 775VMW-19R will be installed following the procedures described in Section 10.

7.4 EXTRACTION WELL INSTALLATION

Extraction well (EW-1) will be installed in an existing parking area, located southwest of Building 776 (location approximate: 1173031.89N and 1135795.07 E). The extraction well will be installed within the vicinity of monitoring well 775MW-27 (Building 775, Design Drawing, Sheet 3 of 5, located at the end of this section), and used to extract contaminated groundwater from the subsurface aquifer.

A second extraction well (EW-2) will be installed as part of the contingency plan. This extraction well will be located southwest of EW-1 at approximate location 1172909.97N and 1135667.9E. EW-2 will be installed if the EW-1 pump test (see Section 7.4.2) indicates an insufficient radius of influence and additional groundwater extraction is required.

Construction reports and well development records with field measurements will be prepared and submitted following installation completion.

7.4.1 Installation of Extraction Well

The extraction wells will be installed in conformance with the NYSDEC Water Well Program. The extraction wells will be installed using a mobile/ATV drill rig, advancing a 10-inch inner-diameter (ID) hollow stem auger and installing the 6-inch ID extraction wells through the augers. Based on the data available from nearby groundwater wells, extraction well EW-1 will be advanced approximately 70 feet bgs with a screen interval between 49 to 69 feet bgs, while EW-2 (if required) will be to a depth of approximately 60 feet bgs. The depth to groundwater and bedrock at EW-1 will be measured in the field as the boring is advanced. The 20-foot screened interval will be adjusted based on these water levels to extend down from two feet above the water table so that the approximately upper 18 feet of the saturated zone is screened.

The final extraction well depth and screen interval will be provided in the Interim Remedial Action Completion Report following implementation of site activities.

Extraction Well Casing and Screen

Each well casing will consist of new, 6-inch ID, Schedule 40, stainless steel with flush thread joint fittings. The well casing will conform to American Society for Testing and Materials (ASTM) A312/ A312M standards. The casing for well EW-1 will be a flush mount, while the casing for EW-2 (if required) will rise approximately two feet about the ground and be set within a 4-inch x 2 foot x 2 foot concrete pad designed to slope away from the extraction well. The well screens will consist of new, 6-inch ID, Schedule 40, 0.030-inch continuous machine slotted, stainless steel construction. The screen will be constructed and wire wound with flush threaded joint ends. A stainless steel bottom cap will be placed on the bottom of each well. All well material will be certified as "clean" by the vendor and sealed in plastic prior to installation. Building 775, Design Drawing, Sheet 4 of 5 Typical Extraction Well Detail represents a typical well construction.

Extraction Well Filter Pack

A sand filter pack will be installed in the annular space between the boring and well screen. The filter pack will consist of clean, chemically inert, non-carbonated, well-sorted silica sand (#3Q-ROK Unground Silica by U.S. Silica Company or equal). Care will be taken to prevent bridging by continuously probing and measuring the thickness of the filter pack as it is placed. The screen and filter pack will be tremied into place. The sand filter pack will be placed from the bottom of the well screen to a minimum of 2 feet above the top of the well screen.

Monitoring Well Seal

The sand pack will be capped with a three to five-foot thick hydrated sodium-bentonite seal (pellets or 3/8 inch chips) depending on the amount of space between the top of the screen and the ground surface. The bentonite seal will be hydrated with clean potable water from a USACE-approved source on base. After the bentonite seal has hydrated for a minimum of 12 hours, a 5% bentonite/ cement grout will be installed at the top of the sodium-bentonite seal and ground surface. The grout will be installed using a tremi pipe and will stop within three feet of the ground surface.

Plumbness and Alignment

All risers and screens will be set round, plumb, and true to line. The well assembly must be hung in the borehole prior to the placement of the filter pack and not allowed to rest on the bottom of the hole so as to keep the well assembly straight and plumb. A centralizer will be installed at the bottom of wells greater than 20 feet in depth. Centralizers will be stainless steel and attached to the well casing via stainless-steel fasteners or strapping. Centralizers will not be attached to the well screen or the part of the well casing exposed to the granular filter or bentonite seal.

Well Completion Details

A 4-inch diameter, ½ horse power (hp), 60 hertz (hz) standard capacity submersible pump (Model #7GS, Goulds Pumps or equivalent) will be installed in the well via a steel pump cable with eyelet, and a capacity of 3600 pounds (lbs) working load. Approximately 20 feet of excess cable will be stored in the well casing. The pump motor will be National Electrical Manufacturers Association (NEMA) rated, corrosion resistant stainless steel, construction with a

stainless steel splined shaft and hermetically sealed windings. The pump shall be supplied with a built in stainless steel check valve. The pump will be capable of continuous operation within the working limits of the motor as recommended by the manufacturer.

A torque arrestor and a pressure transducer will also be inserted into the well casing. The pump will be connected to a Parker-Hannefin 1 foot- 4-inch ID GST II water hose, model #7093-125204 or equivalent. The hose will run horizontal from the well casing through a pitless adapter that is to be installed approximately 4.5 ft below grade. The electrical power and control wiring will be run from the top of the well casing. The electrical cable will be secured using nylon tie wraps and will be positioned using an installed centering guide.

Well Head

The well head (EW-1) will be flush with the existing pavement. A 10-inch well manhole with a metal skirt and bolted lid (Earth Exploration Inc. or equivalent) will be installed 2 inches below the well casing. It will allow for the passage of the electrical and power wiring conduit and include a watertight well cover. The well casing will be sealed with a rubber sealing ring that includes an access port and vent plug. A concrete pad (1.5 ft x 1 ft-10 inches x 6 inches) will be installed around the top 8 inches of the well casing and well manhole. A 1/8 inch elastomeric sealant will be installed at the joint between the existing pavement and the concrete pad.

The well head (EW-2) will rise approximately 2 feet above the ground and centered on a 2 ft x 2 ft concrete pad. The concrete pad will have a thickness of 4 inches and slope away from the well. Four bollards measuring 8 feet in length will be installed around the EW-2 well head for protection. An electrical power control conduit will be installed and a water tight cap will be fitted to the top of the well casing.

Curb Box

The water hose will be connected to the force main via a 1.5-inch polyvinyl chloride (PVC) gate valve. The gate valve will be located in a two piece adjustable cast iron curb box (#93-E or equal) with a flush fit cover to finished grade. The curb box will be manufactured by Bingham and Taylor Inc. or equivalent. The gate valve/valve box will be located approximately 4 ft-six inches below grade and sit on a 2 ft x 2 ft x 6 inch concrete pad. Details are shown in Building 775, Design Drawing Sheet 4 of 5.

Force Main

The gate valve will be connected to the two-inch, PVC, Schedule 80, force main via a compression connection. The PVC piping shall be cut, joined, and installed in conformance with the manufacturer's written direction and all pressure piping will conform to ASTM D1785. The piping will be joined using a solvent-weld connection except when connecting to unions valves or other threaded connection requiring future disassembly. Socket connections will be prepared using a PVC primer that conforms to ASTM F656 and joined using PVC solvent cement that will conform to ASTM D2564. There will be no buried flanged or threaded connections. The pipe fittings will be Schedule 80 conforming to ASTM D2466 or ASTM D2467 and homogenous throughout, free of cracks holes, or other foreign inclusions. The pipe will be uniform in color, density, melt index, and have similar physical properties.

All piping will be pressure tested in the presence of the PM or his designee and in accordance with ANSI/AWWA C605-05 prior to placing fill over the pipe. Appropriate staging areas will be defined to ensure that all piping and equipment will be protected from dirt, water, and damage prior to installation. A reducer and a two-inch wye will be installed as shown in the isometric drawing on Building 775, Design Drawing Sheet 3 of 5.

Meter Box

Prior to connection to the manhole the force main will be connected to a standard non-metallic, lightweight, meter box assembly (#194513 with snap lock lid by Armor Access Boxes, or approved equivalent). The meter box will contain a ¼-inch flex sampling hose with tether cord, and a 1-inch diameter FT16 Turbine flow meter with FC70A remote flow computer by Flow Technology or equivalent. The flow meter will be installed in a low section of pipe to prevent air/gas/vapor from collecting in the upper part of the tube. The meter box will be set on a 2 ft x 2 ft x 6-inch concrete pad. Additional details are shown on the meter box detail located on Building 775, Design Drawing Sheet 3 of 5.

The flow meter will be connected to a control panel field located within 100 feet of EW-1. The flow meter will be an in-line turbine type effluent meter/totalizer with analog type readout. The control panel will have an indicator light identifying when the pump is running or not running.

Existing Manhole

The force main will exit the meter box and connect to the existing manhole through a mechanical type compressible penetration seal (Model #LS-300-CS-4-8, Link Seal Corp or approved equivalent) for two-inch PVC pipe. The PVC pipe will have a resulting invert elevation of 512.36 feet AMSL. The manhole penetration will be completed using a drill to core the sidewall of the manhole, installing a carbon steel pipe sleeve, and filling the annular space with an epoxy type ground filler. A 3-inch x 3-inch x 2-inch tee will be connected to the end of the force main (located on the interior of the manhole).

All equipment, bollards, wells, and meter boxes will be installed in accordance with the specifications and details listed on the Building 775 Design Drawings.

7.4.2 Well Development and Testing

Well development will begin no sooner than 48 hours after well installation. The new well will be developed until a turbidity of 50 nephelometric turbidity units (NTU), the pH and the conductivity of the groundwater stabilized, or a minimum of two hours of well development time has elapsed, which ever is shortest. A minimum of five well volumes will be removed. Well development activities are described in section 10.

After the completion of well development, a pump test will be performed to determine the well yield, optimum pumping rate, verify the radius of influence (ROI) extends at least to the 50 ppb contour and evaluate potential impact on the Landfill 6 Site and the Apron 2 Site. The pump test shall consist of a step test and a constant rate test. The actual pumping rate used and the radius of influence will be provided in the Interim Remedial Action Completion Report following implementation of the site activities. Because of the excessive amount of water that

will be generated during the pump test, a large capacity water storage vessel or a Frac Tank will be required for containment of the extracted water. Disposal of the generated groundwater will be conducted in accordance with the procedures listed in Section 10.

Groundwater Measurements

Using pressure transducers and data loggers, groundwater levels will be collected at the pumping well and at existing monitoring wells (775VMW-4, 775VMS-28, and 775VMW-10). The frequency of measurements will be in accordance to Table 7-1 shown below. To verify the measurements from the data loggers, water level measurements will be collected at least once per hour using a portable electric water level indicator.

Table 7-1
Time Intervals for Measuring Drawdown

Elapsed Time Since Start or Stop of Test	Intervals Between Measurements
0-5 Seconds	0.5 Seconds
5-20 Seconds	1 Second
20-120 Seconds	5 Seconds
2-10 Minutes	30 Seconds
10-100 Minutes	2 Minutes
>100 Minutes	5 Minutes

Step Testing

Step testing will be performed by progressively increasing the flow rate at two hour intervals or until the increment is stabilized. The testing will be performed at five steps, which include 5 gpm, 10 gpm, 15 gpm, 25 gpm, and 50 gpm. The flow rate will be determined by evaluating the drawdown versus time on a semi-logarithmic scale for each step. Groundwater measurements will be collected as discussed in the sub-section above.

Constant Rate Pump Test

After the well has recovered from the step testing, a constant rate pump test will be performed. This will continue until a straight line trend is observed on a drawdown versus time on a logarithmic scale. A 72-hour pump test is assumed to be required. Recovery data will be recorded until approximately 90% recovery.

If a sufficient ROI is not achieved at extraction well EW-1, extraction well EW-2 will be installed as part of the contingency plan.

7.5 SITE RESTORATION

All areas that were disturbed, including but not limited to asphalt, will be returned to their pre-construction state as discussed in Section 11.

7.6 CONTINGENCY PLAN

The contingency plan for Building 775 is discussed in Section 12

7.7 BUILDING 775 SITE VERIFICATION CHECKLIST

To ensure that all aspects of the Building 775 construction remediation efforts have been accounted for a verification checklist has been prepared. This checklist identifies the steps and requirements associated with the Building 775 site activities. This checklist (located at the end of the section) is to be used in conjunction with the Well Verification Checklist (See Section 10) and maintained in the project files following completion. The Well Verification Checklist is to be used to document the groundwater monitoring well installation and the extraction well installation. These checklists are designed to be used in addition to the project field log and can be modified if necessary to better document project requirements.

BUILDING 775 SITE
VERIFICATION CHECKLIST

HEALTH AND SAFETY

APP/HASP updated yes/no

AHA Prepared and Reviewed title

1 _____ 4 _____
2 _____ 5 _____
3 _____ 6 _____

SITE MOBILIZATION

Dig Safely New York Contacted	Date		Oneida County Representative Contacted	Date	
Utilities Marked and Cleared	Date		Access Confirmed	yes/no	
Griffiss Local Development Agency Contacted	Date		City of Rome Water Pollution Control Facility Contacted	Date	
Access Confirmed			Sewer Discharge Permit Approved	yes/no	
Licensed Plumber Contracted	yes/no				

Name _____
Company _____
Address _____
Phone _____

Survey Conducted	Date		Site Facilities Prepared	yes/no	
Decontamination Area	yes/no		Equipment/Supplies Staging Area	yes/no	
Drilling Contractor Mobilized	yes/no		Electrical Utility Company	yes/no	

Extraction Well Installation

(Attach additional sheet)

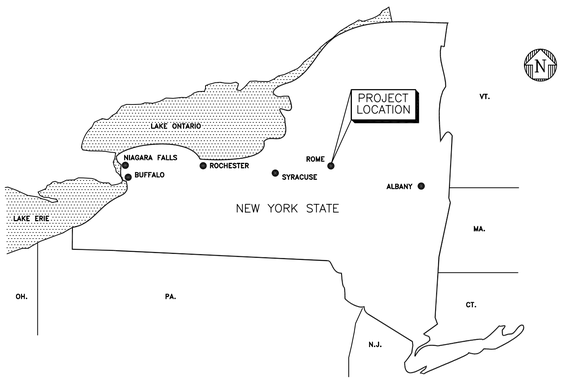
EW-1	yes/no		Monitoring Well Installation Completed (Attach additional sheet)		
EW-2	yes/no/na		775VMW-19R	yes/no	
Curb box installed	yes/no		Meter Box installed	yes/no	
Force main installed	yes/no		Existing manhole connectio	yes/no	
Site Restored to Existing Condition	yes/no				

Comments:

_____
_____
_____
_____

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 775 SITE
FORMER GRIFFISS AIR FORCE BASE
ROME, NEW YORK

MAY 2008

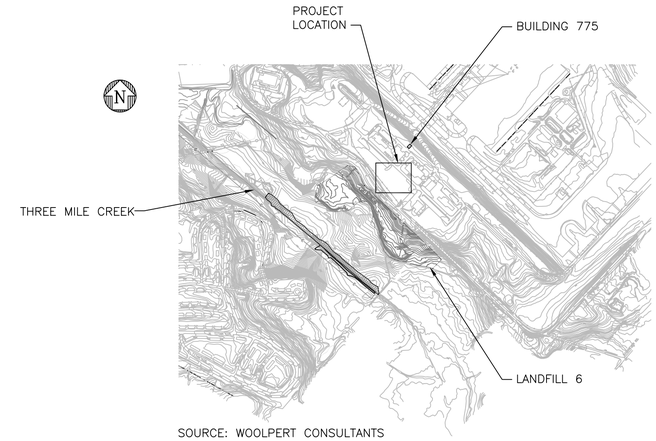


VICINITY MAP
NTS

US Army Corps of Engineers

PARSONS *In Association with:* **FPM** group

ecology and environment engineering, p.c.



SOURCE: WOOLPERT CONSULTANTS

SITE LOCATION PLAN
1" = 1000'

LIST OF DRAWINGS

DWG. NO.	REV.	TITLE
1	F	COVER SHEET AND LIST OF DRAWINGS
2	F	NOTES, LEGEND AND ABBREVIATIONS
3	F	EXTRACTION WELL PLAN
4	F	SECTIONS AND DETAILS
5	F	EROSION AND SEDIMENT CONTROL PLAN

REFERENCE DRAWINGS

DWG NO.	DATE	DESCRIPTION
GR1216r-pn-17	9/1/98	SITE FEATURES SUPPLIED BY WOOLPERT CONSULTANTS
TOPO.DWG	2/11/99	BASE TOPOGRAPHY SUPPLIED BY WOOLPERT CONSULTANTS

REVISIONS

NO.	DATE	DWN	APP'D	DESCRIPTION
0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
F	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
E	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
D	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW
C	9/20/07	KMK	DJM	ISSUED FOR REGULATORY REVIEW
B	7/16/07	KMK	DJM	ISSUED FOR FOR AFRPA/USACE REVIEW
A	6/12/07	KMK	DJM	ISSUED FOR 30% DESIGN FOR PARSONS REVIEW

ecology and environment engineering p.c.

DESIGNED BY	CHECKED BY
JJ KOHLER	AM MURPHY P.E.
DRAWN BY	APPROVED BY
KM KRAJEWSKI/WA BAYLES	DJ MILLER P.E.

FORMER GRIFFISS AIR FORCE BASE
ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 775
COVER SHEET AND LIST OF DRAWINGS

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
AS NOTED	6/12/07	Cover Sheet.dwg	Sheet 1 of 5	0

F:\Griffiss\2007 P&T\Building 775\Construction Issue\Cover Sheet.dwg
BUFFplot: 5/1/08 KMK

NOTES:

GENERAL:

1. THIS WORK GENERALLY CONSISTS OF THE FOLLOWING:
   - COORDINATION WITH UTILITIES AND PROPERTY OWNERS
   - WELL DRILLING
   - PUMP TESTING
   - TRENCHING AND DEWATERING
   - INSTALLATION OF FORCEMAIN PIPING, PUMPS, AND CONTROLS
   - PRESSURE TESTING PIPING
   - SITE RESTORATION
2. LOCATIONS OF EXISTING ACCESS PATHS, ROADWAYS AND STRUCTURES SHOWN ON THE DRAWINGS ARE APPROXIMATE. ACTUAL LOCATIONS TO BE DETERMINED IN FIELD.
3. BUILDING LOCATIONS AND UTILITIES PROVIDED BY LAFAVE, WHITE AND MCGIVERN, L.S., P.C. ON OCTOBER 9TH, 2007.
4. LOCATIONS OF EXISTING ABOVE AND BELOW GROUND UTILITIES, PIPELINES AND OTHER FEATURES SHOWN ON THE DRAWINGS ARE APPROXIMATE. ACTUAL LOCATIONS AND EXTENT OF THESE UTILITIES MUST BE VERIFIED BY THE CONTRACTOR IN THE FIELD.
5. CONTACT "DIG SAFELY NEW YORK" TO LOCATE UNDERGROUND UTILITIES PRIOR TO REMEDIAL WORK ACTIVITIES. REGULATIONS PERTAINING TO THE PROTECTION OF UNDERGROUND FACILITIES IN NEW YORK STATE ARE GOVERNED BY NEW YORK STATE CODES, RULES AND REGULATIONS. HOWEVER, THERE MAY EXIST OTHER PRIVATELY OWNED UTILITIES AT THIS SITE THAT ARE NOT MEMBERS OF THE UTILITY LOCATOR SERVICE. COORDINATE ALL INTRUSIVE WORK WITH THE PROPERTY OWNER TO IDENTIFY ANY OTHER POTENTIAL PRIVATELY OWNED UTILITIES PRESENT IN THE REMEDIAL CONSTRUCTION AREA.

5.1 NOTIFY PROJECT MANAGER NOT LESS THAN TWO DAYS IN ADVANCE OF PROPOSED UTILITY INTERRUPTIONS.
5.2 DO NOT PROCEED WITH UTILITY INTERRUPTIONS WITHOUT WRITTEN PERMISSION FROM THE PROJECT MANAGER.

6. PARCEL BOUNDARIES OBTAINED FROM AFRPA (MARCH 2007).
7. THE TERM "PROJECT MANAGER" USED IN THESE NOTES SHALL REFER TO THE DESIGNATED REPRESENTATIVE OF PARSONS INFRASTRUCTURE AND TECHNOLOGY GROUP, INC. IN ALL CASES.

HEALTH AND SAFETY:

1. THE CONTRACTOR IS SOLELY RESPONSIBLE AND LIABLE FOR THE HEALTH AND SAFETY OF ALL ON-SITE PERSONNEL.
2. THE CONTRACTOR SHALL DEVELOP AND IMPLEMENT A HEALTH AND SAFETY PLAN (HASP) IN ACCORDANCE WITH USACE EM 385-1-1 TO PROTECT ALL SITE PERSONNEL INCLUDING THOSE OF THE PROJECT MANAGER, SITE VISITORS, BUILDING OWNER AND THE OWNER'S TENANTS.
3. THE CONTRACTOR'S HEALTH AND SAFETY PLAN MUST COMPLY WITH ALL APPLICABLE FEDERAL AND STATE REGULATIONS PROTECTING HUMAN HEALTH AND THE ENVIRONMENT.
4. THE CONTRACTOR SHALL SUBMIT THE HASP TO THE PROJECT MANAGER FOR APPROVAL, AND SHALL NOT INITIATE ONSITE WORK UNTIL AN APPROVED HASP ADDRESSING ALL COMMENTS HAS BEEN ISSUED.

PERMITS/AGREEMENTS:

1. THE CONTRACTOR IS RESPONSIBLE FOR SECURING ALL REQUIRED APPLICATIONS, PERMITS, EASEMENTS, PERMISSIONS, APPROVALS, LETTERS, AGREEMENTS, RIGHTS OF WAY AND CERTIFICATIONS NECESSARY FOR THE COMPLETION OF THE WORK.
2. MANAGE STORMWATER IN ACCORDANCE WITH NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES (GP-02-01) OR MOST RECENT VERSION.

PROJECT COORDINATION:

1. THE CONTRACTOR SHALL COORDINATE WITH APPLICABLE PROPERTY OWNERS TO OBTAIN ACCESS AND APPROVAL FOR WORK TO BE PERFORMED.
2. THE PROJECT MANAGER SHALL BE RESPONSIBLE FOR OBTAINING AN INDUSTRIAL DISCHARGE PERMIT FROM THE CITY OF ROME WATER POLLUTION CONTROL FACILITY FOR FULL TIME SYSTEM OPERATION.
3. EEEPC SHALL NOT BE RESPONSIBLE FOR CONTRACTOR MEANS AND METHODS, INCLUDING DESIGN AND IMPLEMENTATION OF FUTURE CONTINGENCY MEASURES.

SURVEYS/SCHEDULE/AS-BUILT DRAWINGS/RECORD DOCUMENTS:

1. CONTRACTOR SHALL ENGAGE THE SERVICES OF A SURVEYOR, LICENSED TO PRACTICE IN THE STATE OF NEW YORK, TO IDENTIFY, PROVIDE, LOCATE, SET AND MAINTAIN LINES, LEVELS, CONTOURS AND DATUM REQUIRED TO PERFORM THE WORK. FINAL INVERT AND GRADE INFORMATION SHALL BE STAKED OUT AT INTERVALS AND LOCATIONS AS DIRECTED BY THE CONTRACTOR.
2. SUBMIT CATALOG CUTSHEETS AND PRODUCT INFORMATION FOR ALL MATERIALS AND EQUIPMENT TO BE FURNISHED AND INSTALLED AS DIRECTED BY THE PROJECT MANAGER AS SHOP DRAWINGS. THE PROJECT MANAGER SHALL REVIEW ALL SHOP DRAWINGS AND APPROVE OR DISAPPROVE THEM. PROVIDE A SHOP DRAWING FOR K-CRETE WHICH INCLUDES THE JOB MIX FORMULA AND DESTRUCTIVE TESTING DATA.
3. SUBMIT WELL DRILLER LICENSES AND PERMITS, OPERATIONS AND MAINTENANCE MANUALS, WARRANTIES, GUARANTEES FOR ALL EQUIPMENT TO BE FURNISHED AND INSTALLED. CONTRACTOR SHALL GUARANTEE ALL EQUIPMENT FURNISHED FOR A MINIMUM OF 1 YEAR. THE GUARANTEE PERIOD SHALL BEGIN UPON THE DATE OF ACCEPTANCE BY THE PROJECT MANAGER.
4. CONTRACTOR SHALL PROVIDE PHOTOGRAPHIC DOCUMENTATION OF SITE ACTIVITIES FOR EACH DAY ONSITE, AS DIRECTED BY THE PROJECT MANAGER. PHOTOGRAPHS SHALL BE SUBMITTED IN AN ELECTRONIC FORMAT ACCEPTABLE TO THE PROJECT MANAGER.
5. THE CONTRACTOR SHALL COMPILE AND PREPARE TWO BOUND COPIES OF ALL PROJECT DOCUMENTS AND CERTIFICATES, INCLUDING BUT NOT LIMITED TO:
   - SHOP DRAWINGS AND PRODUCT DATA
   - CERTIFICATES, I.E., MATERIAL AND EQUIPMENT
   - PHOTOCOPIES OF GUARANTEES, WARRANTIES AND SERVICE CONTRACTS
6. IN ADDITION TO THE ABOVE, THE CONTRACTOR SHALL PROVIDE 2 COMPLETE RED LINE COPIES OF THE CONTRACT DRAWINGS CLEARLY INDICATING THE ACTUAL LOCATIONS OF WELLS, TRENCHES, CONTROL PANELS, METER BOX AND ELECTRICAL ROUTING AS INSTALLED IN THE FIELD.
7. CONTRACTOR SHALL SUBMIT A BAR TYPE PROJECT SCHEDULE TO THE PROJECT MANAGER FOR APPROVAL PRIOR TO MOBILIZING ON-SITE.
8. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF HIS WORK WITH ALL SUBCONTRACTORS AS WELL AS OTHER BUSINESSES AND UTILITY SERVICES AT THE SITE. INTERRUPTIONS TO NORMAL TRAFFIC PATTERNS AND PARKING AREAS MUST BE CLEARLY MARKED WITH CONES, SIGNS, FLASHERS AND BARRICADES TO PROTECT THE PUBLIC.
9. ADEQUATE TRAFFIC CONTROLS MUST BE MAINTAINED DURING THE CONSTRUCTION PHASE OF THE PROJECT. PROVIDE MIN 1 WEEK ADVANCE NOTICE TO THE PROJECT MANAGER OF ALL WORK IN ROADWAYS AND PARKING AREAS.
10. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING RECORD AS-BUILT DRAWINGS AND MAINTAINING RECORDS OF FINAL INSPECTIONS, TREATMENT SYSTEM OPERATION, START-UP, MAINTENANCE, AND ENVIRONMENTAL MONITORING DURING TREATMENT SYSTEM START-UP. ALL RECORD DOCUMENTS, AS-BUILT DRAWINGS, AND SURVEYS SHALL BE CERTIFIED FOR ACCURACY BY THE PROJECT MANAGER AND PROVIDED TO EEEPC IN PREPARATION OF THE REMEDIAL ACTION REPORT.

TEMPORARY FACILITIES AND CONTROLS:

1. THE CONTRACTOR SHALL SECURE AND PROVIDE ALL TEMPORARY UTILITIES REQUIRED TO PERFORM THE WORK INCLUDING BUT NOT LIMITED TO ELECTRICITY, LIGHTING, HEAT, VENTILATION, TELEPHONE SERVICE, WATER, SANITARY FACILITIES AND FIRE PROTECTION. CONTRACTOR SHALL COORDINATE THE LOCATION OF TEMPORARY FACILITIES WITH THE PROJECT MANAGER PRIOR TO THE COMMENCEMENT OF WORK.
2. THE CONTRACTOR SHALL SECURE, PROVIDE AND MAINTAIN ALL TEMPORARY TRAFFIC CONTROLS, BARRIERS, ENCLOSURES, FENCING, TARPAULINS, CANOPIES AND WATER CONTROLS REQUIRED TO SATISFACTORILY PERFORM THE WORK.
3. TEMPORARY FACILITIES AND SERVICES PROVIDED BY THE CONTRACTOR INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, ACCESS ROADS AND PARKING, DUST CONTROL AND SNOW REMOVAL.
4. ALL TEMPORARY UTILITIES AND CONTROLS SHALL BE SUBJECT TO THE PROJECT MANAGER'S ACCEPTANCE.
5. CONTRACTOR IS RESPONSIBLE FOR CLEANUP AND REPAIR OF ANY AND ALL DAMAGE CAUSED BY THE INSTALLATION OR USE OF TEMPORARY WORK.
6. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE SECURITY OF THE PROJECT MANAGER'S AND CONTRACTOR'S WORK AREAS, EQUIPMENT, MATERIALS, AND SUPPLIES.

SITE RESTORATION:

1. ALL AREAS DISTURBED DURING PERFORMANCE OF THE WORK SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS.
2. PROTECT ALL RESTORED AREAS FROM EROSION AND DAMAGE.
3. CONTRACTOR SHALL REPAIR OR REPLACE ANY RESTORED AREAS DAMAGED WITHIN 6 MONTHS OF PROJECT COMPLETION.
4. RESTORE ALL GRADES TO MAINTAIN EXISTING SURFACE WATER DRAINAGE PATTERNS.
5. RESTORE ASPHALT TO EXISTING THICKNESS WITH LIKE MATERIALS.
6. INSTALL ASPHALT IN ACCORDANCE WITH CURRENT NYSDOT STANDARD SPECIFICATIONS.
7. JOINTS BETWEEN EXISTING AND NEW ASPHALT SHALL BE SEALED WITH BITUMINOUS MATERIAL MEETING THE REQUIREMENTS OF NYSDOT SPECIFICATION SECTION 702-0700.
8. CAST-IN-PLACE CONCRETE SHALL BE NYSDOT CLASS E.
9. CONCRETE REINFORCING, IF NECESSARY, SHALL BE IN ACCORDANCE WITH ASTM A615 AND ASTM A185.
10. ALL CONCRETE SHALL BE PLACED IN ACCORDANCE WITH ACI 304.
11. PROTECT FRESHLY PLACED CONCRETE FROM TEMPERATURES BELOW 50 DEGREES FAHRENHEIT.
12. KEEP FRESHLY PLACED CONCRETE CONTINUOUSLY MOIST FOR NOT LESS THAN 72 HOURS OR CURE IN AN OTHERWISE APPROVED MANNER.
13. IMPORTED TOPSOIL SHALL BE ORGANIC LOAM, WELL DRAINED, HOMOGENOUS AND MEET THE FOLLOWING MINIMUM REQUIREMENTS:
    a. PH BETWEEN 4.5 AND 7
    b. FREE OF ANY VEGETATION, DEBRIS OR OTHER DELETERIOUS MATERIALS.
    c. FREE OF ANY STONES OR PARTICLES GREATER THAN 1-INCH.
14. PLACE 3" OF TOPSOIL ON EARTH FILL AND APPLY GRASS SEED AT A MINIMUM OF 3 POUNDS/1,000 SQUARE FEET. PROTECT NEWLY SEEDED AREAS FROM TRAFFIC AND EROSION. MAINTAIN ADEQUATE SOIL MOISTURE CONDITIONS UNTIL YOUNG PLANTS ARE WELL ESTABLISHED.
15. GRASS SEED SHALL BE A MIXTURE OF 30% ANNUAL RYEGRASS AND 70% PERENNIAL RYEGRASSES.
16. SOW GRASS SEED EVENLY BY HAND, HYDROSEED OR SEED SPREADER ON DRY OR MODERATELY DRY SOIL.
17. FERTILIZER SHALL BE A COMMERCIAL-GRADE 5-10-5 MIXTURE.
18. APPLY FERTILIZER IN ACCORDANCE WITH MANUFACTURER'S WRITTEN DIRECTIONS.
19. COVER THE SEEDED AREAS WITH A UNIFORM BLANKET OF STRAW MULCH AT THE RATE OF 100 POUNDS PER 1000 SQUARE FEET OF SEEDED AREA WITHIN ONE DAY AFTER SEEDING. IF CONTRACTOR CHOOSES TO PERFORM HYDROSEEDING, CONTRACTOR SHALL APPLY COLORED WOOD CELLULOSE FIBER PRODUCT SPECIFICALLY DESIGNED FOR USE AS A HYDRO-MECHANICAL APPLIED MULCH IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS AND RECOMMENDED RATES OF APPLICATION.

EXCAVATION:

1. CONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT, TOOLS, MATERIALS, AND SERVICES NEEDED TO EXCAVATE, HANDLE, TRANSPORT OR DISPOSE OF ANY AND ALL MATERIALS GENERATED DURING EXCAVATION OPERATIONS.
2. CONTRACTOR SHALL CONFINE EXCAVATION OPERATIONS TO THE IMMEDIATE WORK AREA. ALL WASTE MATERIALS SHALL BE PROMPTLY REMOVED FROM THE SITE.
3. PROVIDE WARNING SIGNS AND TRAFFIC CONTROL DEVICES TO PROTECT PEDESTRIANS AND MOTORISTS DURING DEWATERING OPERATIONS. DEWATERING PUMPS, POWER SUPPLY AND PIPING SHALL BE INSTALLED SO AS TO MINIMIZE DISRUPTION TO TRAFFIC.
4. EXCAVATION AND TRENCHING SHALL NOT BE PERFORMED UNTIL PUMP TEST RESULTS HAVE BEEN APPROVED BY THE PROJECT MANAGER.
5. ALL PAVED AREAS OUTSIDE THE IMMEDIATE WORK LIMITS MUST BE KEPT FREE OF MUD, SOIL OR OTHER DEBRIS CAUSED BY EXCAVATION OPERATIONS AT ALL TIMES.
6. CONTRACTOR SHALL STOCKPILE BORROWED MATERIALS AND SATISFACTORY EXCAVATED MATERIALS AT LOCATIONS DESIGNATED BY THE PROJECT MANAGER. MATERIALS SHALL BE STOCKPILED ON PLASTIC SHEETING WITHOUT INTERMIXING.
7. CONTRACTOR SHALL EMPLOY DUST CONTROL METHODS DURING EXCAVATION AND MATERIAL HANDLING OPERATIONS. STOCKPILES SHALL BE TARPED TO PREVENT WINDBLOWN DUST AND EROSION.
8. CONTRACTOR SHALL CLEARLY MARK ALL EXCAVATIONS PRIOR TO START OF WORK. CONTRACTOR SHALL CAREFULLY SAW CUT PAVED AREAS TO NEAT LINES. PERFORM EXCAVATIONS IN COMPLIANCE WITH OSHA GUIDELINES TO PROVIDE SAFE WORKING CONDITIONS. DO NOT UNDERMINE EXISTING PAVEMENT, WALKWAYS, LIGHT FIXTURES, UTILITIES OR OTHER STRUCTURES ADJACENT TO THE WORK AREA.
9. EXCAVATE TO REQUIRED SUB GRADE ELEVATIONS. PROTECT EXISTING DRAINAGE STRUCTURES, ELECTRICAL DISTRIBUTION CABLES AND OTHER UTILITIES WHICH MAY BE PRESENT IN THE WORK AREA.
10. NOTIFY PROJECT MANAGER WHEN EXCAVATIONS HAVE REACHED REQUIRED SUB GRADE. IF PROJECT MANAGER DETERMINES THAT UNSATISFACTORY BEARING CONDITIONS ARE PRESENT, CONTRACTOR SHALL CONTINUE EXCAVATION AND REPLACE WITH COMPACTED BACKFILL AS PER PROJECT MANAGER'S DIRECTIVE.

DEWATERING:

1. CONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT, TOOLS, MATERIALS, AND SERVICES NEEDED TO MAINTAIN A RELATIVELY DRY CONDITION IN ALL EXCAVATIONS AND TRENCHES.
2. WATER SHALL NOT BE DISCHARGED INTO OR THROUGH EXCAVATIONS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL HANDLING AND DISPOSAL OF WATER REMOVED FROM EXCAVATIONS. EXCAVATION WATER DISPOSAL METHODS MUST BE APPROVED BY THE PROJECT MANAGER PRIOR TO DISPOSAL.
4. UPON COMPLETION OF DEWATERING OPERATIONS, CONTRACTOR SHALL POWER WASH OR OTHERWISE CLEAN ALL PAVED AREAS OF MUD, SOIL OR OTHER DEBRIS. ANY AND ALL PAVEMENT, MARKINGS, CURBS, PLANTINGS OR GRASSED AREAS DAMAGED OR OTHERWISE DISTURBED BY DEWATERING ACTIVITIES SHALL BE RESTORED TO PRE-EXISTING CONDITIONS AT THE CONTRACTOR'S EXPENSE.

BACKFILL:

1. ALL BACKFILL MATERIALS SHALL BE PROVIDED AND PLACED AS SPECIFIED ON THE DRAWINGS. NO STONE, PIPE BEDDING, EARTH, CONCRETE, TOPSOIL OR ASPHALT PAVING SHALL BE PLACED WITHOUT APPROVAL OF THE PROJECT MANAGER.
2. PROVIDE ADEQUATE ADVANCE NOTICE OF PLACEMENT OF BACKFILL MATERIALS TO THE ON-SITE PROJECT MANAGER TO ALLOW VISUAL OBSERVATION OF SUB GRADES, PIPING, CONDUITS, WELLS, EARTHEN FILL OR OTHER MATERIALS. DO NOT PLACE BACKFILL MATERIALS ON SURFACES THAT ARE MUDDY, FROZEN OR COVERED WITH ICE.
3. CONTRACTOR SHALL PLACE CLEAN EARTHEN FILL IN 6-INCH LIFTS AND COMPACT UNTIL CORRECT SUB GRADE ELEVATIONS ARE ACHIEVED IN NON-PAVED AREAS.
   CLEAN NATIVE SOIL REMOVED DURING EXCAVATION OR TRENCHING OPERATIONS MAY BE UTILIZED WITH PRIOR APPROVAL OF THE PROJECT MANAGER.
4. THE PROJECT MANAGER RESERVES THE RIGHT TO ORDER TESTING OF MATERIALS AT ANY TIME DURING THE WORK. SUCH TESTING WILL BE DONE BY A QUALIFIED, INDEPENDENT TESTING LAB. THE CONTRACTOR SHALL PAY FOR ALL COMPACTION TESTING PERFORMED BY THE TESTING LABORATORY.
5. CONTRACTOR SHALL FURNISH AND INSTALL "K-CRETE" BENEATH ALL PAVED AREAS. CONTRACTOR SHALL UTILIZE THE SERVICES OF A QUALIFIED INDEPENDENT TESTING LABORATORY TO COLLECT 4 CYLINDERS FOR EVERY DAY OF PLACEMENT. THE CONTRACTOR SHALL SUBMIT THE CYLINDERS FOR COMPRESSIVE STRENGTH TESTING AT 7, 14 AND 28-DAYS.
6. COMPACTION OF FILL MATERIALS BELOW PAVED AREAS MUST MEET THE REQUIREMENTS OF NYSDOT SPECIFICATION SECTION 203-3.12 MOST CURRENT REVISION. IMPROPERLY COMPACTED FILL MATERIALS SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.
7. IN NON-PAVED AREAS, PLACE CLEAN EARTHEN FILL IN 6 INCH LIFTS AND LIGHTLY COMPACT UNTIL CORRECT SUB GRADE ELEVATIONS ARE ACHIEVED. CLEAN NATIVE SOIL REMOVED DURING EXCAVATION OR TRENCHING OPERATIONS MAY BE UTILIZED WITH PRIOR APPROVAL OF THE PROJECT MANAGER.
8. WHERE SETTLING OF GRADED AREAS OCCURS PRIOR TO THE END OF THE PROJECT COMPLETION PERIOD, CONTRACTOR SHALL REMOVE FINISHED SURFACING, BACKFILL AND COMPACT AS REQUIRED WITH ADDITIONAL SOIL MATERIAL AND RECONSTRUCT SURFACING.
9. RESTORE APPEARANCE, QUALITY AND CONDITION OF ALL FINISHED SURFACES, PAVEMENT, AND WALKWAY AREAS TO MATCH EXISTING WORK. ELIMINATE EVIDENCE OF RESTORATION TO THE GREATEST EXTENT POSSIBLE. ALL UNSATISFACTORY OR DEFECTIVE WORK SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE.

PLASTIC FORCE-MAIN PIPING:

1. PVC PIPING SHALL BE CUT, JOINED AND INSTALLED IN CONFORMANCE WITH THE MANUFACTURER'S WRITTEN DIRECTIONS. PVC PRESSURE PIPING SHALL BE SCHEDULE 80 CONFORMING TO ASTM D 1785.
2. ALL PVC PIPING SHALL BE HOMOGENOUS THROUGHOUT AND FREE OF VISIBLE CRACKS, HOLES, FOREIGN INCLUSIONS OR OTHER DELETERIOUS EFFECTS, AND SHALL BE UNIFORM IN COLOR, DENSITY, MELT INDEX AND OTHER PHYSICAL PROPERTIES.
3. PVC PRESSURE PIPING SHALL BE JOINED BY SOLVENT-WELD CONNECTIONS EXCEPT WHERE CONNECTING TO UNIONS, VALVES OR EQUIPMENT WITH THREADED CONNECTIONS THAT MAY REQUIRE FUTURE DISASSEMBLY.
4. SOCKET CONNECTIONS SHALL BE JOINED WITH PVC SOLVENT CEMENT CONFORMING TO ASTM D 2564. JOINTS SHALL BE PREPARED WITH PRIMERS CONFORMING TO ASTM F 656 PRIOR TO CEMENTING OR ASSEMBLY.
5. BURIED FLANGED OR THREADED CONNECTIONS SHALL NOT BE ALLOWED.
6. PVC FITTINGS SHALL BE SCHEDULE 80 CONFORMING TO ASTM D 2466 OR ASTM D 2467.
7. PIPING AND EQUIPMENT SHALL BE PROTECTED FROM DIRT, WATER AND DAMAGE PRIOR TO INSTALLATION.
8. ALL PIPE AND FITTINGS SHALL BE PRESSURE TESTED IN ACCORDANCE WITH ANSI/AWWA C605-05 PRIOR TO PLACING FILL OVER THE PIPE. ALL TESTING SHALL BE PERFORMED IN THE PRESENCE OF THE PROJECT MANAGER.
9. ALL PIPING SHALL BE OBSERVED IN PLACE BY THE PROJECT MANAGER PRIOR TO BACKFILLING. ANY PIPE BURIED WITHOUT APPROVAL OF THE PROJECT MANAGER SHALL BE UNCOVERED BY THE CONTRACTOR FOR OBSERVATION AT THE CONTRACTOR'S EXPENSE.

GROUNDWATER WELLS:

1. PUMPING WELLS SHALL BE INSTALLED IN CONFORMANCE WITH NYSDEC WATER WELL PROGRAM.
2. PERFORM PUMP TEST AT EW-1. EW-2 AND ASSOCIATED PIPING SHALL BE INSTALLED AS A CONTINGENCY BASED ON EW-1 PUMP TEST RESULTS.
3. CONTRACTOR SHALL PREPARE AND SUBMIT WELL CONSTRUCTION REPORTS AND WELL DEVELOPMENT REPORTS WITH FIELD MEASUREMENTS TO THE PROJECT MANAGER.
4. PUMPING WELL CASING SHALL BE SCHEDULE 40S STAINLESS STEEL CONFORMING TO ASTM A 312 / A312M WITH FLUSH THREADED JOINT FITTINGS.
5. PUMPING WELL SCREENS SHALL BE SCHEDULE 40S STAINLESS STEEL CONFORMING TO ASTM A 312 / A 312M. PROVIDE CONTINUOUS SLOT CONSTRUCTION, WIRE WOUND WITH FLUSH THREADED JOINT ENDS.
6. MONITORING WELL 775VMW-19 TO BE INSTALLED 1 MONTH PRIOR TO EXTRACTION WELL INSTALLATIONS. WELL TO BE CONSTRUCTED AS DESCRIBED IN THE "FINAL WORK PLAN PREDESIGN INVESTIGATIONS AT LANDFILL 6, BUILDING 817/WSA, BUILDING 775, AND AOC 9" (EEEPC 2006). SCREEN INTERVAL DEPTH TO BE 40 TO 60 FEET BGS.
7. CONTRACTOR SHALL PROVIDE 11B772-L-M LOCKS BY BEST ACCESS CO. FOR WELLS AND CONTROL PANEL ENCLOSURE. ALL LOCKS SHALL BE KEYED ALIKE WITH BX-1 CORE. CONTRACTOR SHALL PURCHASE LOCKS FROM THE GRIFFISS LOCAL DEVELOPMENT CORPORATION (CONTACT REGAN JOHNSON, 315-338-0393). CONTRACTOR SHALL PROVIDE PROJECT MANAGER WITH A COMPLETE SET OF KEYS.

SUBMERSIBLE PUMPS:

1. CONTRACTOR SHALL FURNISH AND INSTALL 4" DIAMETER 60 HZ STANDARD CAPACITY SUBMERSIBLE WELL PUMPS.
2. PUMPS SHALL BE CAPABLE OF CONTINUOUS OPERATION WITHIN THE WORKING LIMITS OF THE MOTOR AS RECOMMENDED BY THE MANUFACTURER.
3. PUMPS SHALL BE SUPPLIED WITH BUILT IN STAINLESS STEEL CHECK VALVE.
4. PUMP MOTOR SHALL BE NEMA RATED, CORROSION RESISTANT STAINLESS STEEL CONSTRUCTION WITH STAINLESS STEEL SPLINED SHAFT AND HERMETICALLY SEALED WINDINGS.
5. PROVIDE AND INSTALL PUMPS COMPLETE WITH ESSEX MODEL 2410 PUMP CONTROLLER AND SUBMERSIBLE PRESSURE TRANSDUCER TO TURN PUMPS ON AND OFF AT PROGRAMMABLE GROUNDWATER LEVELS.
6. PROVIDE AND INSTALL A STAINLESS STEEL PUMP RETRACTION CABLE. CABLE SHALL BE CAPABLE OF 3,600 LB WORKING LOAD. ATTACH THE CABLE TO THE PUMP. CABLE LENGTH SHALL BE A MINIMUM 10 FEET LONGER THAN FROM THE SUSPENDED PUMP TO THE WELL ENCLOSURE OR WELL HEAD. NEATLY COIL THE 10 FEET OF EXTRA CABLE INSIDE THE WELL ENCLOSURE OR WELL HEAD.

PUMP TESTING:

1. CONTRACTOR SHALL PERFORM PUMP TESTING AS DESCRIBED HEREIN TO VERIFY PUMP SELECTION AND DESIGN FLOW RATE.
2. AFTER PUMPING WELL COMPLETION, CONTRACTOR SHALL ALLOW 48 HOURS BEFORE DEVELOPING PUMPING WELLS. DEVELOP NEW WELLS UNTIL A TURBIDITY OF 50 NTU AND THE PH AND CONDUCTIVITY OF THE GROUNDWATER STABILIZE. A MINIMUM OF FIVE WELL VOLUMES SHALL BE REMOVED.
3. AFTER COMPLETION OF PUMPING WELL DEVELOPMENT, CONTRACTOR SHALL PERFORM PUMP TESTING TO DETERMINE THE WELL YIELD AND OPTIMUM PUMPING RATE AND VERIFY A RADIUS OF INFLUENCE TO CAPTURE GROUNDWATER WITHIN THE 50 UG/L CONTOUR PROVIDED ON SHEET 3. PUMP TESTING SHALL CONSIST OF A STEP TEST AND A CONSTANT-RATE TEST.

PUMP TESTING (CONTINUED):

4. GROUNDWATER LEVELS SHALL BE COLLECTED AT THE PUMPING WELL AND AT EXISTING MONITORING WELLS, INCLUDING 775VMW-4, 775VMW-28 AND 775VMW-10, AT A MINIMUM. THE USE OF PRESSURE TRANSDUCERS AND DATALOGGERS ARE ACCEPTABLE. THE FREQUENCY OF MEASUREMENT SHALL BE IN ACCORDANCE WITH TABLE 1 ON THIS SHEET. CONTRACTOR SHALL PERFORM WATER LEVEL MEASUREMENTS USING A PORTABLE WATER LEVEL INDICATOR AT A FREQUENCY OF AT LEAST ONCE PER HOUR TO CONFIRM DATA FROM TRANSDUCERS.
5. STEP TESTING SHALL BE PERFORMED BY PROGRESSIVELY INCREASING THE FLOW RATE AT 1-HOUR INTERVALS. STEP TESTING SHALL BE PERFORMED FOR FIVE STEPS, INCLUDING 5 GPM, 10 GPM, 15 GPM, 25 GPM AND 50 GPM. CONTRACTOR SHALL SUBMIT PLOTS OF DRAWDOWN-VERSUS-TIME ON A SEMILOGARITHMIC SCALE GRAPH FOR EACH STEP TO DETERMINE A FLOW RATE.
6. CONSTANT RATE PUMP TESTING SHALL BE PERFORMED AFTER THE PUMPING WELL HAS FULLY RECOVERED FROM THE STEP TEST. GROUNDWATER LEVEL MEASUREMENTS SHALL BE COLLECTED AT THE PUMPING WELL AND AT EXISTING MONITORING WELLS, INCLUDING 775VMW-4, 775VMW-28 AND 775VMW-10, AT A MINIMUM. THE FREQUENCY OF MEASUREMENT SHALL BE IN ACCORDANCE WITH TABLE 1 ON THIS SHEET. CONTRACTOR SHALL PERFORM WATER LEVEL MEASUREMENTS USING A PORTABLE WATER LEVEL INDICATOR AT A FREQUENCY OF AT LEAST ONCE PER HOUR TO CONFIRM DATA FROM TRANSDUCERS. THE FLOW RATE SHALL BE SELECTED BY THE PROJECT MANAGER.
7. CONSTANT RATE PUMP TESTING SHALL BE PERFORMED UNTIL A STRAIGHT-LINE TREND IS OBSERVED ON A PLOT OF DRAWDOWN-VERSUS- TIME ON A LOGARITHMIC SCALE. ASSUME A 72-HOUR PUMP TEST IS REQUIRED.
8. AFTER COMPLETION OF THE CONSTANT RATE PUMP TEST, RECORD RECOVERY DATA AT THE SAME TIME INTERVAL SPECIFIED ABOVE UNTIL APPROXIMATELY 90% RECOVERY.
9. IF A SUFFICIENT RADIUS OF INFLUENCE IS NOT ACHIEVED AT EW-1, CONTRACTOR SHALL INSTALL CONTINGENCY PUMPING WELL EW-2 AT THE LOCATION INDICATED AND PERFORM ADDITIONAL PUMP TESTING AS DESCRIBED IN NOTES 1-7 TO DETERMINE THE RADIUS OF INFLUENCE OF EW-2.
10. WATER GENERATED DURING PUMP TESTING SHALL BE HANDLED AS DIRECTED BY THE PROJECT MANAGER.
11. CONTRACTOR SHALL COORDINATE HANDLING AND DISCHARGE OF WATER GENERATED DURING PUMP TESTING WITH THE PROJECT MANAGER. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY TEMPORARY DISCHARGE PERMITS.

START-UP/BALANCING:

1. CONTRACTOR SHALL PERFORM START-UP TESTING AS RECOMMENDED BY EQUIPMENT MANUFACTURERS TO DEMONSTRATE THAT EQUIPMENT IS PROPERLY INSTALLED, READY FOR CONTINUOUS OPERATION AND IN COMPLIANCE WITH THE PROJECT REQUIREMENTS.

EFFLUENT METER:

1. CONTRACTOR SHALL PROVIDE AND INSTALL AN IN-LINE TURBINE TYPE EFFLUENT METER/TOTALIZER WITH ANALOG TYPE READOUT AT LOCATION INDICATED ON THE DRAWINGS.
2. CONTRACTOR SHALL PROVIDE AND INSTALL A NON-METALLIC LIGHTWEIGHT METER BOX WITH REMOVABLE LID AT THE LOCATION INDICATED ON THE DRAWINGS.

TABLE 1 – TIME INTERVALS FOR MEASURING DRAWDOWN

ELAPSED TIME SINCE START OR STOP OF TEST	INTERVALS BETWEEN MEASUREMENTS
0 – 5 SECONDS	0.5 SECONDS
5 – 20 SECONDS	1 SECOND
20 – 120 SECONDS	5 SECONDS
2 – 10 MINUTES	30 SECONDS
10 – 100 MINUTES	2 MINUTES
>100 MINUTES	5 MINUTES

MATERIALS – "K-CRETE" CONCRETE:

THE LIGHTWEIGHT CONCRETE AGGREGATE SHALL HAVE A SPECIFICATION CORRESPONDING TO THE FOLLOWING.

		PER CUBIC YARD	SSD WT	SOL. VOL		
CONCRETE CLASS:	PIPE BACKFILL	WATER	465	7.45	UNIT WT.:	129.27 PCF
W/C RATIO:	2.07	CEMENT	225	1.145	DESIGN STRENGTH	400 PSI
SUMP:	8-10"	AIR @ 6%		1.62		
PINE AGG NO.:	8-154F SP.GR. 2.65	PINE AGG (CORR SAND =85%	2359	14.226		
COARSE AGG No.:	8.9R.SP.GR:2.81	#1 STONE (SPLIT = 100%)	441	2.517		
		#2 STONE	0	0		
			3490	27.00 FT		

LEGEND:

SECTION LETTER OR DET NO.

B

SHT 5

DWG NO. ON WHICH SECTION OR DET APPEARS

SECTION DESIGNATION

Symbol	Description	Symbol	Description
OE	EXISTING OVERHEAD ELECTRIC LINE		EXISTING TREE LINE
X X	EXISTING FENCE LINE	470	TOPOGRAPHIC CONTOUR LINE (5 FOOT INTERVAL)
W	EXISTING WATER LINE		BUILDING LOCATION
S	EXISTING SANITARY DRAIN	775VMW-4	EXISTING MONITORING WELL
SS	EXISTING STORM DRAIN	EW-1	PROPOSED EXTRACTION WELL
	PROPOSED EXTRACTION WELL PIPING (FORCE MAIN)	775VMW-10	PERFORMANCE MONITORING WELL
	PROPOSED EXTRACTION WELL PIPING (FORCE MAIN) (CONTINGENCY)	775VMW-19R	PROPOSED PERFORMANCE MONITORING WELL TO BE INSTALLED
50 ------------ 50	MONITORING WELL TOTAL CHLORINATED VOC GROUNDWATER DATA IN µg/L FROM 2004 AND 2006		EXISTING POWER POLE
PL	PARCEL BOUNDARY	PERIMETER ROAD	EXISTING ROAD
			PROPOSED BOLLARD

ABBREVIATIONS:

A.C.	ASBESTOS CONCRETE	HZ	HERTZ	SOL. VOL	SOLID VOLUME
ACI	AMERICAN CONCRETE INSTITUTE	ID	INSIDE DIAMETER	SP. GR.	SPECIFIC GRAVITY
AFRPA	AIR FORCE REAL PROPERTY AGENCY	INV	INVERT	SSD	SATURATED SURFACE DRY
AGG	AGGREGATE	lb	POUND	SS	STAINLESS STEEL
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS	MAX	MAXIMUM	ST	STORM
		MH	MANHOLE	STM	STEAM
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	MIN	MINIMUM	TF	TOP OF FRAME
		NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION	TYP	TYPICAL
BGS	BELOW GROUND SURFACE			US	UNITED STATES
CB	CATCH BASIN	NO	NUMBER	USACE	U.S. ARMY CORPS OF ENGINEERS
℄	CENTERLINE	NTS	NOT TO SCALE		
CONC.	CONCRETE	NYCRR	NY CODES, RULES, AND REGULATIONS	W/	WITH
EEEPC	ECOLOGY AND ENVIRONMENT ENGINEERING P.C.	NYSDOT	NYS DEPARTMENT OF TRANSPORTATION	W/C	WATER TO CEMENT
		O.C.	ON CENTER	WT	WEIGHT
EL	ELEVATION	OD	OUTSIDE DIAMETER	ø	DIAMETER
FT	FEET	OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION	±	PLUS OR MINUS
GAFB	GRIFFISS AIR FORCE BASE	PCF	POUNDS PER CUBIC FOOT	'	FEET
GAL	GALLONS	PSI	POUNDS PER SQUARE INCH	"	INCHES
GLDC	GRIFFISS LOCAL DEVELOPMENT CORPORATION	PVC	POLYVINYL CHLORIDE	#	NUMBER
GPM	GALLONS PER MINUTE	PVMT	PAVEMENT	@	AT
HASP	HEALTH AND SAFETY PLAN	SCH	SCHEDULE	µg/L	MICROGRAMS PER LITER
		SHT	SHEET		

REFERENCE DRAWINGS

DWG NO.	DATE	DESCRIPTION

REVISIONS

NO.	DATE	DWN	APP'D	DESCRIPTION
O	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
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E	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
D	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW
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B	7/16/07	KMK	DJM	ISSUED FOR FOR AFRPA/USACE REVIEW
A	6/12/07	KMK	DJM	ISSUED FOR 30% DESIGN FOR PARSONS REVIEW

ecology and environment engineering p.c.

DESIGNED BY	CHECKED BY
JJ KOHLER	AM MURPHY P.E.
DRAWN BY	**APPROVED BY**
KM KRAJEWSKI/WA BAYLES	DJ MILLER P.E.

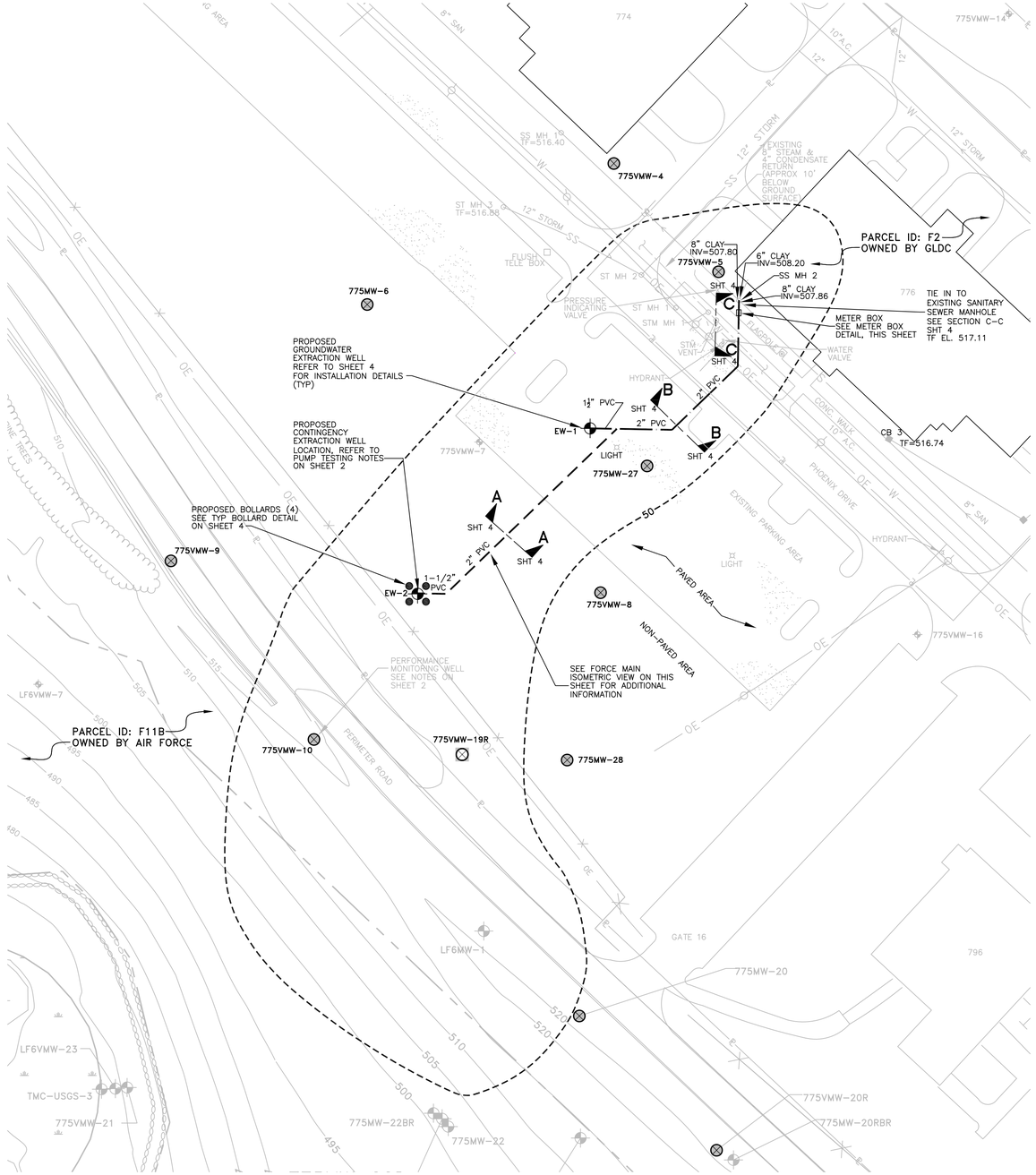
FORMER GRIFFISS AIR FORCE BASE

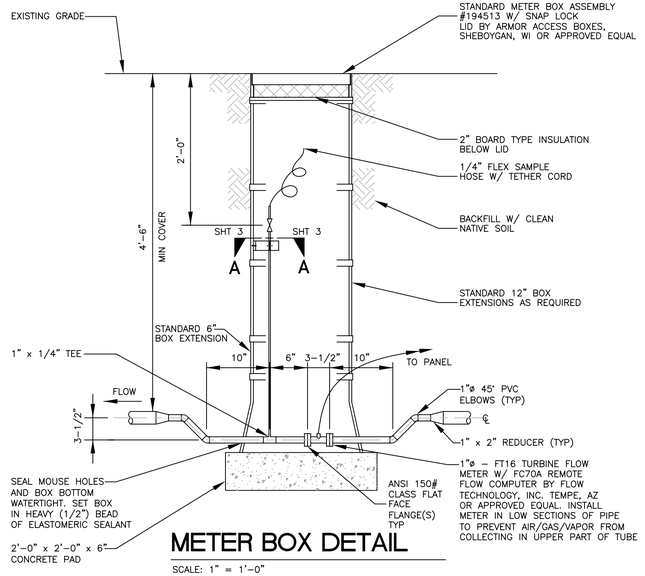
ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 775
GENERAL NOTES, LEGEND AND ABBREVIATIONS

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
NTS	6/12/07	Cover Sheet.dwg	Sheet 2 of 5	0

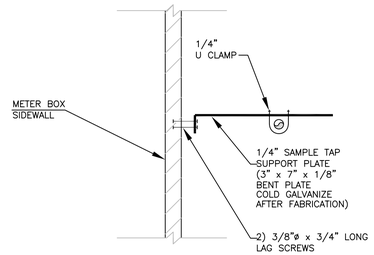
F:\Griffiss\2007 P&T\Building 775\Construction Issue\Cover Sheet.dwg
BUFFplot: 5/1/08 KMK





METER BOX DETAIL

SCALE: 1" = 1'-0"

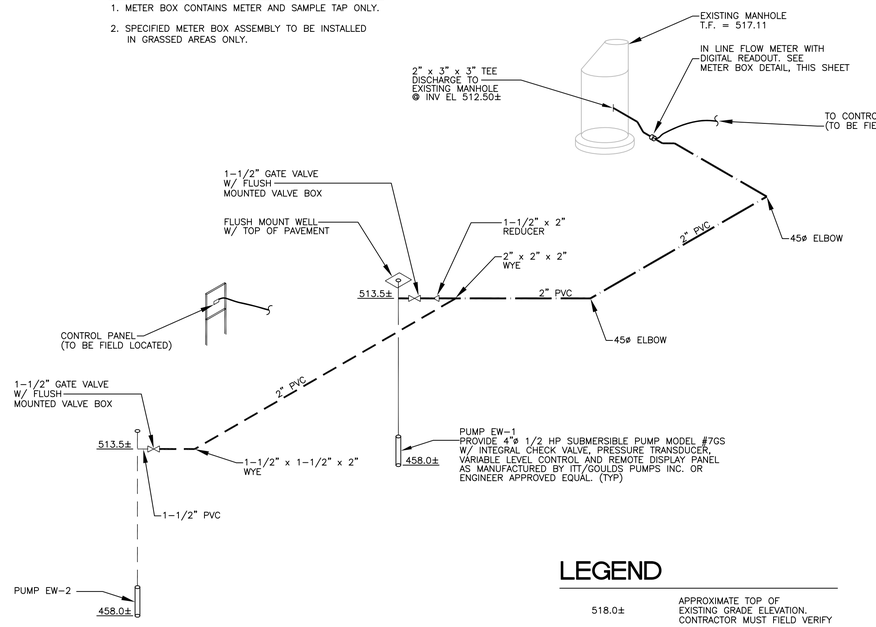


METER BOX SECTION A-A

SCALE: 6" = 1'-0"

NOTE:

1. METER BOX CONTAINS METER AND SAMPLE TAP ONLY.
2. SPECIFIED METER BOX ASSEMBLY TO BE INSTALLED IN GRASSED AREAS ONLY.



LEGEND

518.0±	APPROXIMATE TOP OF EXISTING GRADE ELEVATION. CONTRACTOR MUST FIELD VERIFY

FORCE MAIN ISOMETRIC VIEW

NOT TO SCALE

SCALE IN FEET

0 50 100 150

DWG NO.	DATE	DESCRIPTION
BL775_NEWMXD	3/14/07	PROPERTY OWNER INFO FROM CATHY JERRARD (AFRPA)
BL775_Feb27.shp	2/27/07	PARCEL BOUNDARY PER FPM GROUP
ACAD-04C02R0-FINAL	7/12/06	LF 6 SURVEY SUPPLIED BY LAFAVE, WHITE & MCGIVERN L.S.,P.C.
GR1216r-pn-17	9/1/98	SITE FEATURES SUPPLIED BY WOOLPERT CONSULTANTS
TOPO.DWG	2/11/99	BASE TOPOGRAPHY SUPPLIED BY WOOLPERT CONSULTANTS

REFERENCE DRAWINGS

NO.	DATE	DWN	APP'D	DESCRIPTION
0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
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REVISIONS

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KM KRAJEWSKI/WA BAYLES	DJ MILLER P.E.

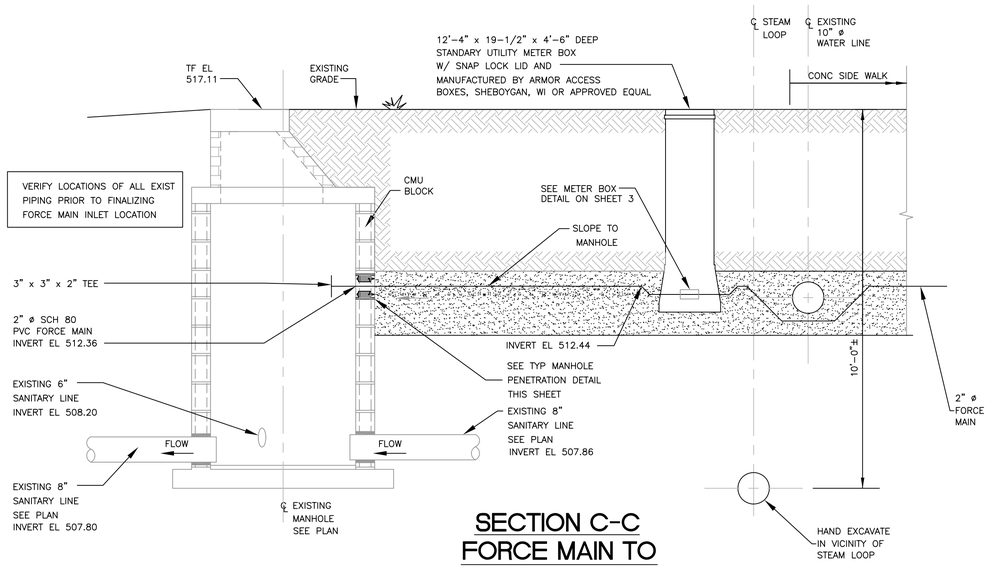
FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 775
EXTRACTION WELL PLAN

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
1"= 50'	6/12/07	3.dwg	Sheet 3 of 5	0

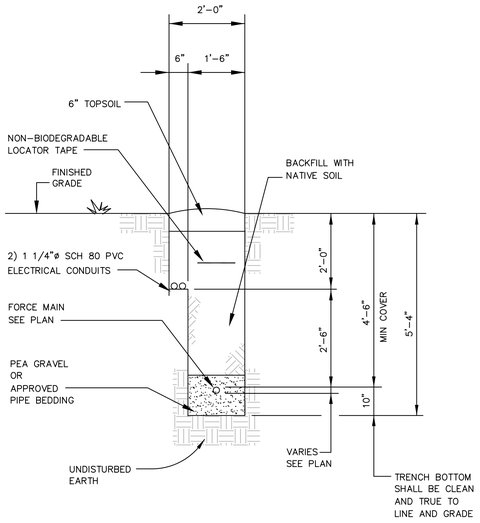
F:\Griffiss\2007 P&T\Building 775\Construction Issue\3.dwg
BUFFplot: 5/1/08 KMK



SECTION C-C FORCE MAIN TO EXISTING MANHOLE DETAIL

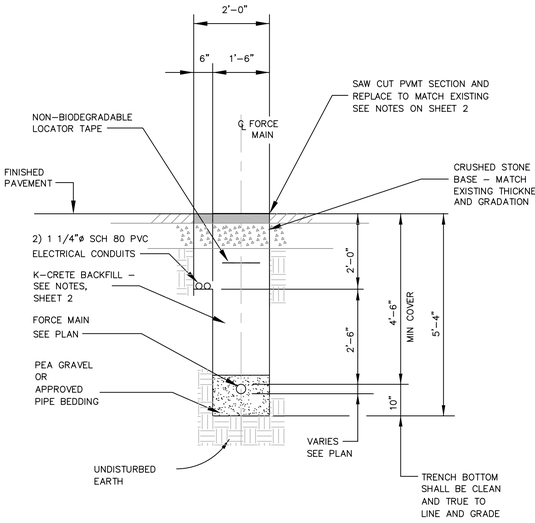
SCALE: 1/2" = 1'-0"

NOTE:
1. MANHOLE DIMENSIONS UNKNOWN. CONTRACTOR TO VERIFY ACTUAL DIMENSIONS.



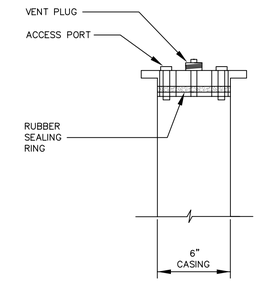
SECTION A-A

SCALE: 1/2" = 1'-0"



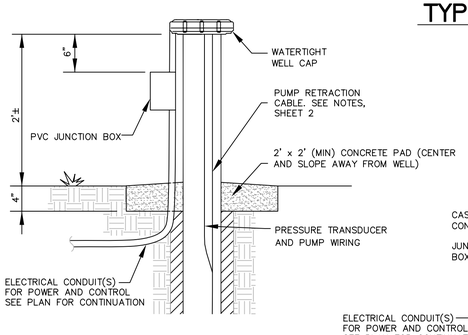
SECTION B-B

SCALE: 1/2" = 1'-0"



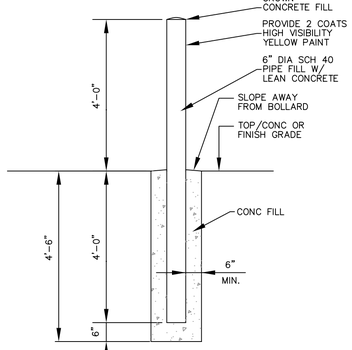
EW-1 WELL SEAL DETAIL

(WHEN SPECIFIED)



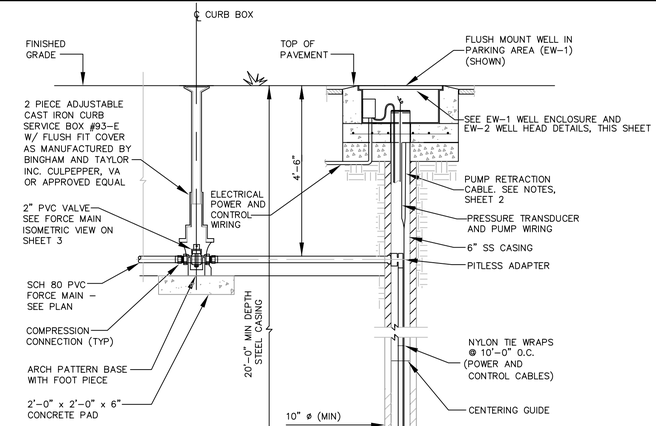
EW-2 WELL HEAD DETAIL

SCALE: 1" = 1'-0"



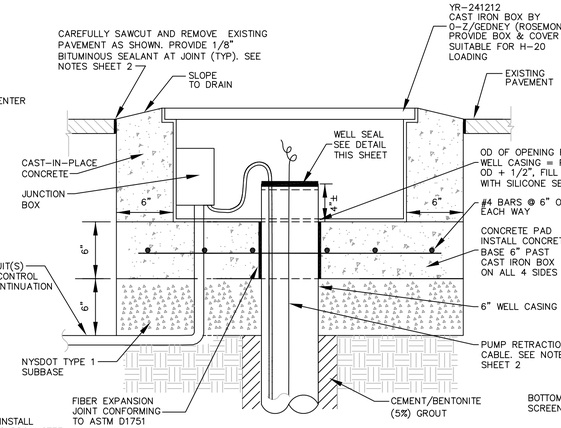
TYP BOLLARD DETAIL

SCALE: 1/2" = 1'-0"



TYP EXTRACTION WELL

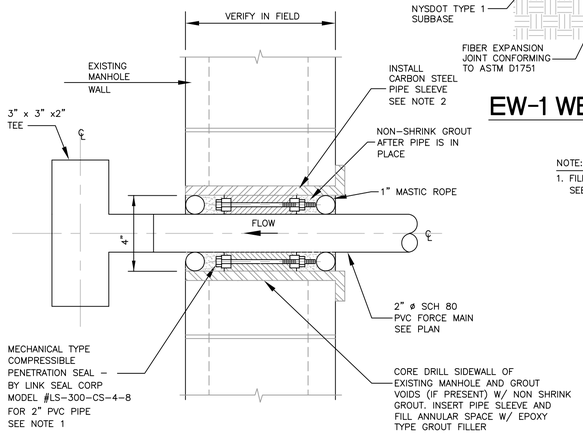
SCALE: 1/2"= 1'-0"



EW-1 WELL ENCLOSURE DETAIL

SCALE: 1-1/2" = 1'-0"

NOTE:
1. FILL VOIDS AT WELL ENCLOSURE WITH K-CRETE BACKFILL. SEE NOTES, SHEET 2.



NOTES:
1. INSTALL COMPRESSIBLE SEAL IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
2. SLEEVE DIMENSIONS SHALL BE AS REQUIRED PER MFRS RECOMMENDATION FOR PIPE MATERIALS AND COMPRESSIBLE SEAL SPECIFIED.

TYP MANHOLE PENETRATION DETAIL

SCALE: 3" = 1'-0"

APPROX WELL DEPTHS AND INTAKE INTERVALS

NORTHING	EASTING	WELL NUMBER AND LOCATION	APPROXIMATE DEPTH (ft bgs)	SCREEN LEVEL (ft bgs)	
				SCREEN TOP	SCREEN BOTTOM
1173031.89	1135795.07	EW-1	70	49	69
1172909.97	1135667.90	EW-2 (CONTINGENCY WORK)	60	34	59

DWG NO.	DATE	DESCRIPTION
07-E01-RO	10/9/07	SITE MAP OF BUILDING 775 AREA, LaFAVE, WHITE & McGIVERN, L.S., P.C.

REFERENCE DRAWINGS

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REVISIONS

ecology and environment engineering p.c.

DESIGNED BY	CHECKED BY
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FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 775
SECTIONS AND DETAILS

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
NOTED	6/12/07	4.dwg	Sheet 4 of 5	0

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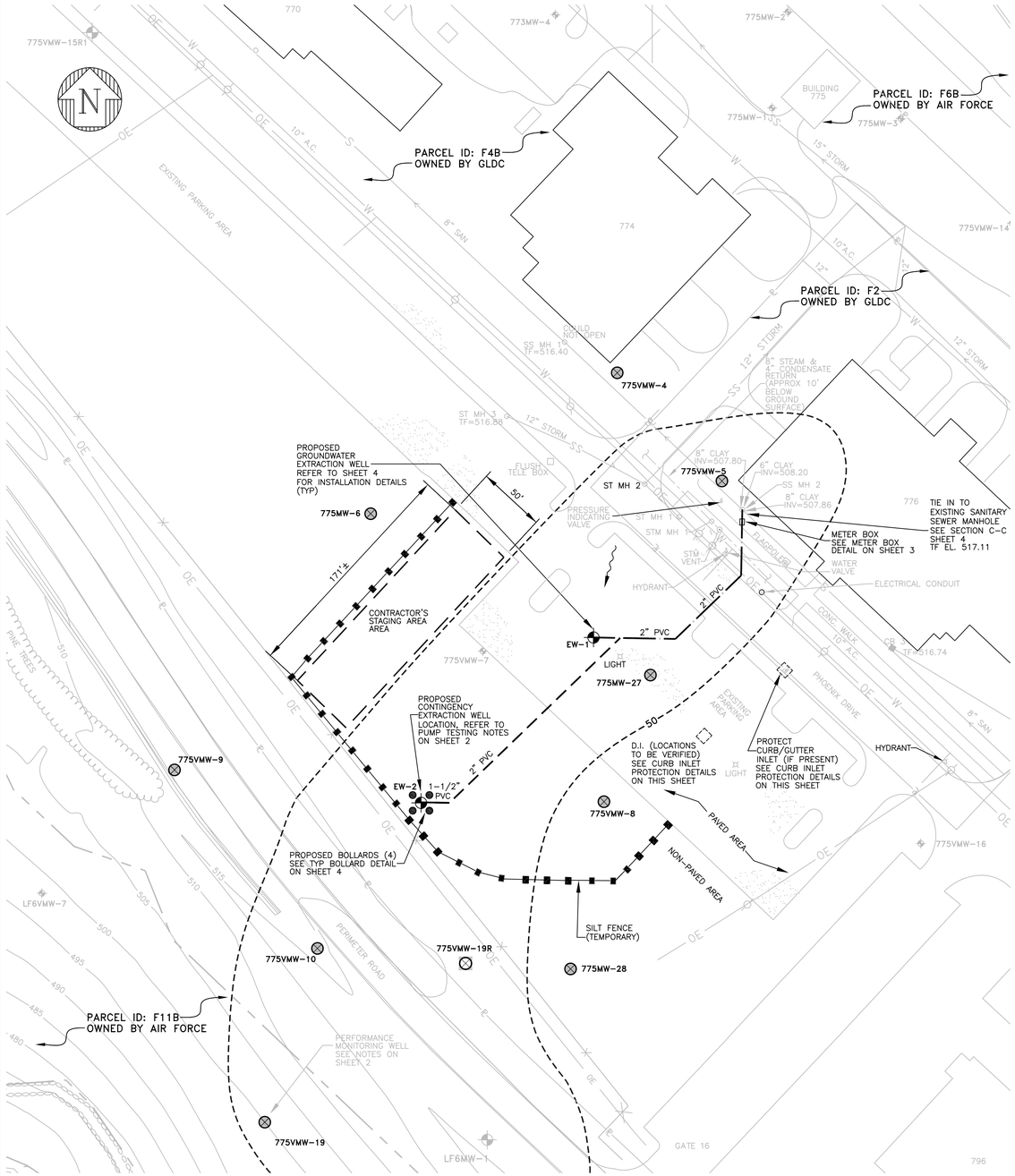
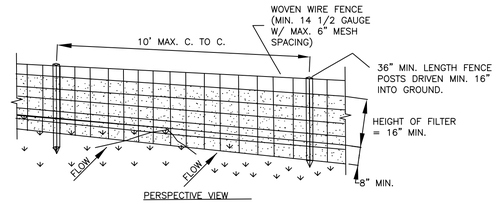
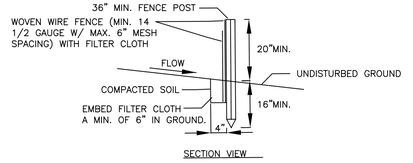


LEGEND:

- FLOW DIRECTION
- SILT FENCE
- PROPOSED STAGING AREA
- LIMIT OF DISTURBED AREA



PERSPECTIVE VIEW



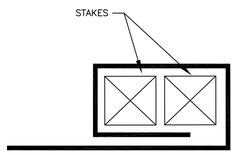
SECTION VIEW

CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 12 1/2 GAUGE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE MIRAFI 100X OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE ENVIROFENCE OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

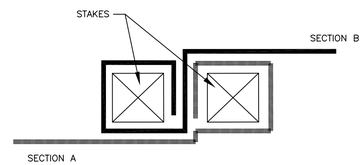
SILT FENCE

NOT TO SCALE



END STAKE

NOT TO SCALE

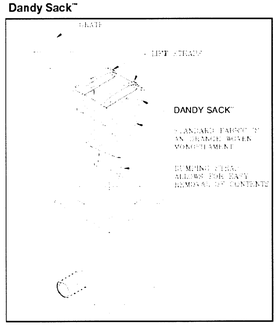


ADJOINING SECTIONS

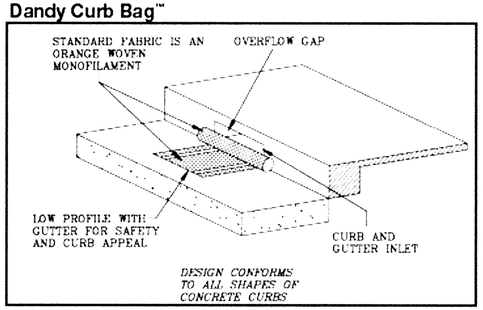
NOT TO SCALE

1. POSITION POSTS TO OVERLAP AS SHOWN ABOVE, MAKING CERTAIN THAT FABRIC FOLDS AROUND EACH POST AT LEAST ONE FULL TURN
2. DRIVE POSTS TIGHTLY TOGETHER AND SECURE TOPS OF POSTS BY TYING OFF WITH CORD OR WIRE TO PREVENT FLOW-THROUGH OF BUILT-UP SEDIMENT AT JOINT

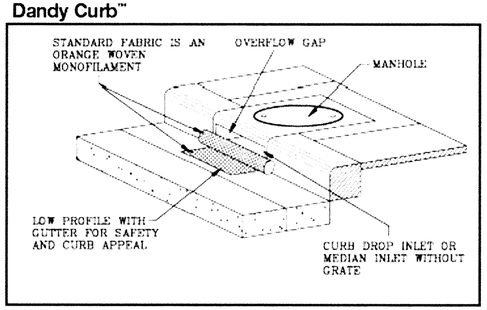
Dandy Sack™



Dandy Curb Bag™



Dandy Curb™



CONSTRUCTION SPECIFICATIONS

1. PRODUCT SHALL BE MIRAFI DANDY CURB BAG™, DANDY CURB™ OR DANDY SACK™ OR APPROVED EQUIVALENT TO FIT EXISTING SEWER INLET.
2. INSTALL PRODUCT PER MANUFACTURERS RECOMMENDATION IN INLETS THAT ACCEPT STORM WATER FROM DISTURBED PROJECT AREAS.
3. PERFORM OPERATION AND MAINTENANCE PER MANUFACTURERS RECOMMENDATION.

CURB INLET PROTECTION DETAILS

NOT TO SCALE

REFERENCE DRAWINGS

DWG NO.	DATE	DESCRIPTION
BL775_NEWMXD	3/14/07	PROPERTY OWNER INFO FROM CATHY JERRARD (AFRPA)
BL775_Feb27.shp	2/27/07	PARCEL BOUNDARY PER FPM GROUP
ACAD-04C02R0-FINAL	7/12/06	LF 6 SURVEY SUPPLIED BY LAFAVE, WHITE & MCGIVERN L.S.,P.C.
GR1216r-pn-17	9/1/98	SITE FEATURES SUPPLIED BY WOOLPERT CONSULTANTS
TOPO.DWG	2/11/99	BASE TOPOGRAPHY SUPPLIED BY WOOLPERT CONSULTANTS

REVISIONS

NO.	DATE	DWN	APP'D	DESCRIPTION
0	5/1/08	KMK	DJM	ISSUED FOR CONSTRUCTION
F	2/27/08	WAB	DJM	ISSUED FOR REGULATORY REVIEW
E	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
D	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW
C	9/20/07	KMK	DJM	ISSUED FOR REGULATORY REVIEW
B	7/16/07	KMK	DJM	ISSUED FOR FOR AFRPA/USACE REVIEW
A	6/12/07	KMK	DJM	ISSUED FOR 30% DESIGN FOR PARSONS REVIEW

ecology and environment engineering p.c.

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KM KRAJEWSKI	DJ MILLER P.E.

FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN
BUILDING 775
EROSION AND SEDIMENT CONTROL PLAN

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
NOTED	6/12/07	5.dwg	Sheet 5 of 5	0

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SECTION 8

NOSEDOCKS/APRON 2 SITE ACTIVITIES

8.1 SITE ACTIVITIES

The recommended remedy for the Nosedocks/Apron 2 site consists of the installation of three (3) additional monitoring wells. A Performance Monitoring Work Plan will be issued by FPM to document the field sampling and analysis procedures required to collect the data needs identified in the RDWP. Performance monitoring will be conducted and a LTM Plan will be developed.

This RAWP will detail the requirements for installation and development of monitoring wells 782VMW-84D, 782VMW-121, and 782VMW-121D. These wells will be installed at least one month prior to the start of the first round of sampling.

8.2 SITE MOBILIZATION

Mobilization activities will commence upon the receipt of all required permits and authorizations as discussed in Section 4. Mobilization activities will consist of the following tasks:

- Mark out of the proposed monitoring well locations.
- Coordination of utility clearances for all drilling locations.
- Site access coordination with AFRPA and GLDC personnel (if applicable) on a daily basis to obtain access and approval.
- Mobilization of surveyors, licensed in NY to, locate and set lines, levels, and contours to perform the work.
- Mobilization of one drilling contractor to support the monitoring well installation activities;

8.2.1 Temporary Facilities

Temporary facilities will be available for use during the remedial constructions activities as discussed in Section 9.

8.2.2 Permits and Approvals

As discussed in Section 4, all permits and approvals must be obtained prior to the start of remediation activities. Appropriate property approvals will be obtained prior to the initiation of work activities, including utilities identification, coordination with Griffiss Air Force personnel, GLDC and Oneida County representative.

8.3 MONITORING WELLS

8.3.1 Installation

One month prior to the first round of groundwater sampling, monitoring wells 782VMW-84D, 782VMW-121, and 782VMW-121D will be installed. Screen depths for 782VMW-84D, located at 1174797.08N and 1138002.90E are to be 430-420 feet (ft) AMSL. Screen depths for 782VMW-121 (1174777.45N and 1138757.64E) and 782VMW-121D (1174761.05N and 1138753.62E) are 440-430 ft AMSL and 430-420 ft AMSL, respectively. Screen intervals may be adjusted based on conditions observed during drilling.

Monitoring well installation and well development will be conducted in accordance to the procedures and methods listed in Section 10.

8.4 SAMPLING

The performance monitoring includes collection of groundwater and surface water samples. Sampling will be conducted in accordance with the Final RDWP (EEEPC 2007) and the Performance Monitoring Work Plan will be prepared by FPM.

8.5 SITE RESTORATION

All areas that were disturbed, including but not limited to asphalt, will be returned to their pre-construction state as described in Section 11.

8.6 CONTINGENCY PLAN

The contingency plan for Nosedocks/Apron 2 is discussed in Section 12.

8.7 NOSEDOCKS/APRON 2 SITE VERIFICATION CHECKLIST

To ensure that all aspects of the Nosedocks/Apron 2 construction remediation efforts have been accounted for a verification checklist has been prepared. This checklist identifies the steps and requirements associated with the Nosedocks/Apron 2 site activities. This checklist (located at the end of the section) is to be used in conjunction with the Monitoring Well Verification Checklist (See Section 10) and maintained in the project files following completion. These checklists are designed are to be used in addition to the project field log and can be modified if necessary to better document project requirements.

NOSEDOCKS/APRON 2 SITE
VERIFICATION CHECKLIST

HEALTH AND SAFETY

APP/HASP updated yes/no ☐

AHA Prepared and Reviewed title

1 _____ 4 _____
2 _____ 5 _____
3 _____ 6 _____

SITE MOBILIZATION

Dig Safely New York Contacted	Date	☐	Griffiss Local Development Agency Contacted	Date	☐
Utilities Marked and Cleared	Date	☐	Access Confirmed		
Survey Conducted	Date	☐	Site Facilities Prepared	yes/no	☐
Decontamination Area	yes/no	☐	Equipment/Supplies Staging Area	yes/no	☐
Drilling Contractor Mobilized	yes/no	☐			

Monitoring Well Installation Completed (Attach additional sheet)

782VMW-84D	yes/no	☐
782VMW-121	yes/no	☐
782VMW-121D	yes/no	☐
Ground water samples collected	yes/no	☐
Surface water samples collected	yes/no	☐
Site Restored to Existing Condition	yes/no	☐

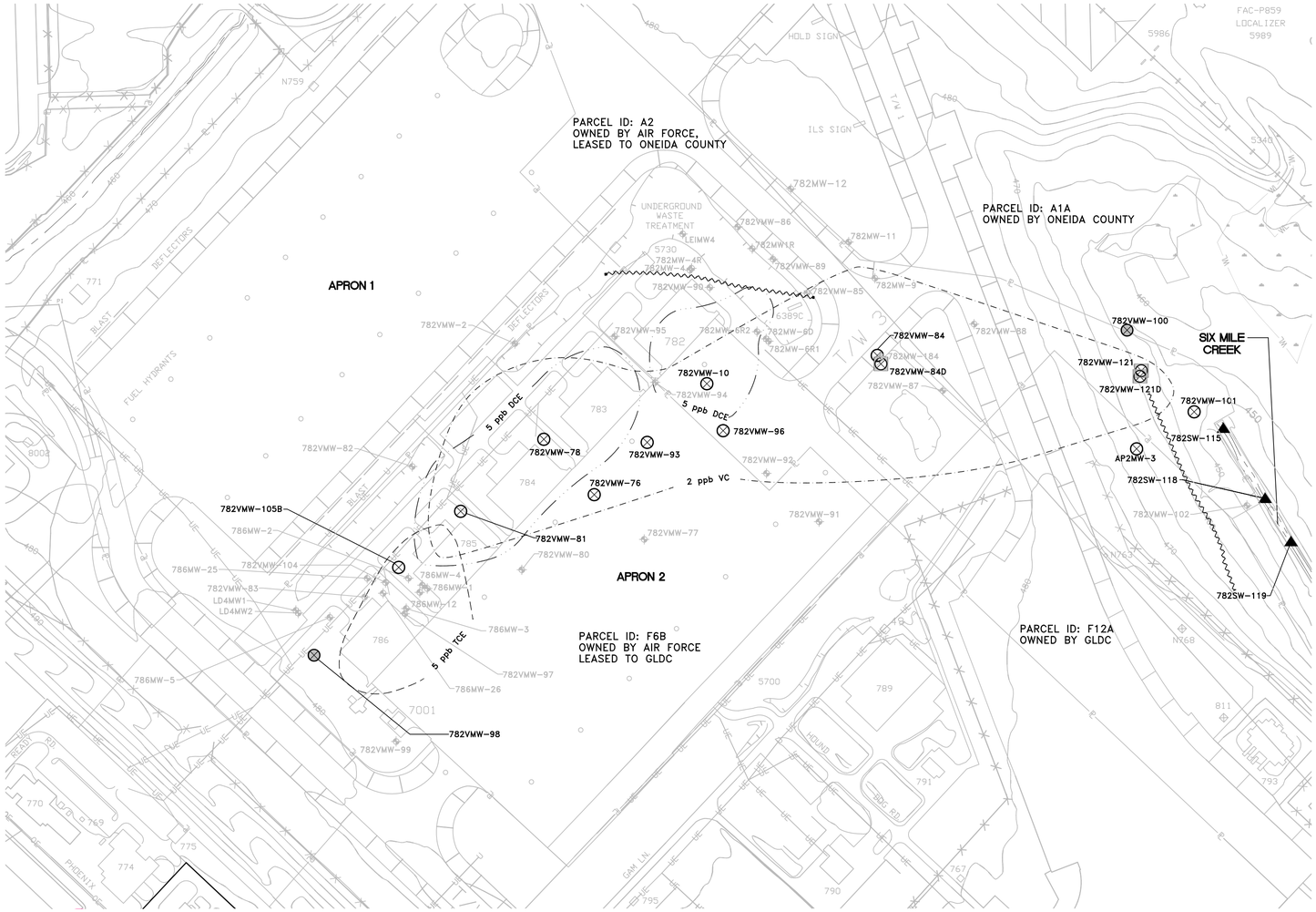
Comments:

_____

_____

_____

_____



LEGEND:

- BUILDING LOCATION
- DELINEATED WETLAND
- FENCE LINE
- OVERHEAD ELECTRIC LINE
- TOPOGRAPHIC CONTOUR LINE (5 FOOT INTERVAL)
- UNDERGROUND ELECTRIC LINE
- EXISTING MONITORING WELL
- SURFACE WATER SAMPLE LOCATION
- PERFORMANCE MONITORING WELL
- PERFORMANCE AND LONG-TERM MONITORING WELL
- PROPOSED PERFORMANCE AND LONG-TERM MONITORING WELL TO BE INSTALLED
- EDGE OF WATER OF SIX MILE CREEK
- PARCEL BOUNDARY
- APPROXIMATE LOCATION OF EXISTING HORIZONTAL AIR SPARGE BARRIER
- 5 ppb TCE — TCE PLUME BASED ON MONITORING WELL DATA FROM 2004 AND 2006
- 5 ppb DCE — DCE PLUME BASED ON MONITORING WELL DATA FROM 2004 AND 2006
- 2 ppb VC — VC PLUME BASED ON MONITORING WELL DATA FROM 2004 AND 2006

PROPOSED MONITORING WELL INSTALLATION SUMMARY

DESIGNATION	NORTHING	EASTING	SCREEN INTERVAL (NOTE 2)
782VMW-84D	1174797.08	1138002.90	430-420 FEET AMSL
782VMW-121	1174777.45	1138757.64	440-430 FEET AMSL
782VMW-121D	1174761.05	1138753.62	430-420 FEET AMSL

NOTES:

GENERAL:

1. INSTALL AND DEVELOP MONITORING WELLS 782VMW-84D, 782VMW-121, AND 782VMW-121D AT LEAST 1 MONTH PRIOR TO FIRST SAMPLING ROUND. WELLS TO BE CONSTRUCTED AS DESCRIBED IN THE "FINAL WORK PLAN PREDESIGN INVESTIGATIONS AT LANDFILL 6, BUILDING 817/WSA, BUILDING 775, AND AOC 9" (EEEPC 2006). SCREEN INTERVAL DEPTH FOR 782VMW-84D IS 430-420 FEET AMSL, 782VMW-121 IS 440-430 FEET AMSL, AND 782VMW-121D IS 430-420 FEET AMSL.
2. MEASURE THE CURRENT GROUND SURFACE ELEVATIONS AT THE PROPOSED MONITORING WELL LOCATION PRIOR TO INSTALLATION. THE SCREEN INTERVAL SHALL BE ADJUSTED BASED ON CONDITIONS OBSERVED DURING DRILLING.
3. CONTACT GRIFFISS AIRPARK FLIGHT LINE PERSONNEL A MINIMUM OF 1 MONTH PRIOR TO DRILLING ACTIVITIES TO COORDINATE ACCESS TO THE FLIGHTLINE.
4. SAMPLING FREQUENCY AND ANALYSIS SHALL BE PERFORMED AS DESCRIBED IN THE "FINAL REMEDIAL DESIGN WORK PLAN" (EEEPC 2008).
5. UTILITY INFORMATION IS APPROXIMATE. VERIFY ALL UTILITIES, LOCATION, AND CONDITIONS WITH PROPERTY OWNERS PRIOR TO START OF FIELD ACTIVITIES.
6. PARCEL BOUNDARIES OBTAINED FROM AFRPA VIA FPM (MARCH 2007), AND WERE NOT VERIFIED IN THE FIELD.
7. CONTACT "DIG SAFELY NEW YORK" TO LOCATE UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION ACTIVITIES. REGULATIONS PERTAINING TO THE PROTECTION OF UNDERGROUND FACILITIES IN NEW YORK STATE ARE GOVERNED BY NEW YORK CODES, RULES, AND REGULATIONS. HOWEVER, OTHER PRIVATELY OWNED UTILITIES AT THE SITE MAY EXIST THAT ARE NOT MEMBERS OF THE UTILITY LOCATOR SERVICE. COORDINATE ALL INTRUSIVE WORK WITH THE PROPERTY OWNER(S) TO IDENTIFY ANY OTHER POTENTIAL PRIVATELY OWNED UTILITIES PRESENT IN THE REMEDIAL CONSTRUCTION AREA.
8. EEEPC SHALL NOT BE RESPONSIBLE FOR CONTRACTOR MEANS AND METHODS, INCLUDING DESIGN AND IMPLEMENTATION OF FUTURE CONTINGENCY MEASURES.

ABBREVIATIONS:

AFRPA	AIR FORCE REAL PROPERTY AGENCY
AMSL	ABOVE MEAN SEA LEVEL
EEEPC	ECOLOGY AND ENVIRONMENT ENGINEERING P.C.
GLDC	GRIFFISS LOCAL DEVELOPMENT CORPORATION

SCALE IN FEET
0 200 400 600

DWG NO.	DATE	DESCRIPTION
APRON2_NEWMXD	3/14/07	PROPERTY OWNER INFO
Apron2_Feb27.shp	2/27/07	PARCEL BOUNDARY PER FPM GROUP
F06_VR_WT-ARS	11/1/06	WETLANDS DELINEATION PER ECOLOGY AND ENVIRONMENT, INC.
GR1216r-pn-17	9/1/98	SITE FEATURES SUPPLIED BY WOOLPERT CONSULTANTS
TOPO.DWG	2/11/99	BASE TOPOGRAPHY SUPPLIED BY WOOLPERT CONSULTANTS

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E	12/13/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR AFRPA/USACE REVIEW
D	11/21/07	WAB	DJM	ISSUED FOR 90% DESIGN FOR PARSONS REVIEW
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B	7/16/07	KMK	DJM	ISSUED FOR FOR AFRPA/USACE REVIEW
A	6/12/07	KMK	DJM	ISSUED FOR 30% DESIGN FOR PARSONS REVIEW

REVISIONS

ecology and environment engineering p.c.

DESIGNED BY	CHECKED BY
KM POWELL	T HEINS P.E.
DRAWN BY	APPROVED BY
KM KRAJEWSKI/WA BAYLES	DJ MILLER P.E.

FORMER GRIFFISS AIR FORCE BASE

ROME NEW YORK

ON-BASE GROUNDWATER REMEDIAL DESIGN NOSEDOCKS/APRON 2 PROPOSED MONITORING PLAN

SCALE	FIRST ISSUED	C.A.D. FILE NO.	DRAWING NO.	REV.
1"=200'	6/12/07	1.dwg	Sheet 1 of 1	0

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BUFFplot: 5/1/08 KMK

SECTION 9

CONTROL PLANS

9.1 SITE FACILITIES

Temporary facilities will be available for use during the Landfill 6, Building 817/WSA, Building 775 and Nosedocks/Apron 2 site remediation activities. These facilities will include a break trailer, portable toilets, equipment storage, and will be available for authorized personnel.

An office trailer/break room will be set up at a convenient area near the work site, and shall have a complete set of site-specific documents including project plans and drawings. It is anticipated that the field trailer will be located at Apron 2 location. However, prior to start of construction the field trailer location will be finalized with AFRPA and coordination with GLDC and additional utility contractors (as necessary) will be conducted to provide the necessary utilities. All utilities required to perform the work will be secured including, but not limited to electricity, lighting, heat, ventilation, telephone service, water, sanitary facilities, and fire protection.

In accordance with the APP (bound under separate cover), portable toilets will be provided and maintained in sufficient quantity based on crew size. Equipment decontamination facilities will be constructed as appropriate to include equipment decontamination area and personnel wash area (as necessary).

Approval for the use of Building 817 will be coordinated with appropriate Griffiss personnel prior to the start of construction. Building 817 used to store equipment, supplies and chemicals required as part of the injection activities. Backfill will be staged near Building 775 during the trench excavation. The excavated soil will be screened for VOCs using a Photo Ionization Detector (PID). Any soil identified as contaminated will be segregated, placed on polyethylene sheeting and covered pending waste characterization sampling that will be conducted to determine disposal options. Soil that is not contaminated will be used as backfill following the force main installation. Parsons anticipates around 150 cubic yards of soil staged during Building 775 Site activities.

9.2 SITE SECURITY PLAN

The Landfill 6, Building 817/WSA, Building 775, and Nosedocks/Apron 2 sites are located in different areas of the former GAFB. All these areas are accessible to the general public.

Temporary orange fencing or equal, will be used to demarcate the work zones around open excavation or drilling areas. Open excavations or holes will be backfilled or barricaded at the end of the workday.

It will be the responsibility of all field workers to report any security breaches to the SM. The SM will initiate an appropriate response, which may consist of escorting the violator out of the work area or calling the police, if necessary.

At the end of each workday, the site will be inspected to insure the site is left in a safe and secure condition during periods of inactivity.

9.3 TRAFFIC CONTROL PLAN

Some of the remediation construction activities will disrupt traffic flow and alter road conditions. Any interruptions to normal traffic patters and parking conditions will marked with cones, signs, flashers, and barricades to the protect the public.

Improvement to the access road located between Perimeter Road and the Landfill 6 site will be conducted prior to the start of construction activities. Improvements to the road will include, but are not limited to, the addition of geotextiles and gravel. All efforts will be taken not to extend the work activities into the wetlands as delineated in the Landfill 6, Design Drawing Sheet 3 of 5.

Traffic control procedures are included in the APP, Appendix A- Site-Wide Health and Safety Plan (Parsons, 2006).

9.4 EXCAVATION PLAN

9.4.1 Excavation Planning

Prior to excavating, the location of utilities will be identified and marked. This will be done by coordinating with site representatives and Dig Safely New York (Section 4.1) 10 days prior to excavating to obtain work clearance approvals (dig permits). Paved areas will be saw cut in neat lines. The extent of the excavation areas will take into account the existing pavement, walkways, light fixtures, utilities or other structures adjacent to the work area. Traffic control devices and warning signs will be provided to protect pedestrians and motorists.

9.4.2 Excavation Procedures

All excavation activities will be performed in accordance with requirements set for in OSHA 1926.650 Excavations. Excavation activities will be completed with mechanical equipment consisting of, but not limited to hydraulic excavators, trenchers, and loaders. The work will consist of mainly trench excavation in the Building 775 site location for the force main layout. All excavation operations will be confined to the immediate work area. All areas, including paved areas, located outside of the immediate work area will be kept free of mud, soil, or other debris. Existing drainage structures, electrical distribution cables and other utilities present in the area will be protected during the required subgrade excavation.

All waste material will be promptly removed from the site. All borrowed materials and excavated material will be stockpiled at locations designated by the SM. Dust control methods will be employed during excavation and material handling. Temporarily stockpiled borrow and excavated materials will be placed on a polyurethane material, and covered to minimize erosion and wind blown dust.

Additional details regarding the excavation activities and general information is found in the Accident Prevention Plan, Appendix A- SSHP (Parsons 2006).

9.4.3 Dewatering Procedures

All excavations and trenching activities shall remain relatively dry. If necessary, dewatering activities will occur to manage excess water. Water will not be discharged into or through excavations. All water that is removed from the excavation will be stored, tested if required, transported, and disposed of by approved methods. Areas that have been disturbed from dewatering activities must be restored to their original state.

9.4.4 Backfilling Procedures

Backfill material will be stored in the appropriate staging areas as determined by the SM and will not be placed on surfaces that are muddy, frozen, or covered with ice. Clean earthen fill will be placed in 6-inch lifts and compacted until correct subgrade elevations are reached in non-paved areas. Any clean native soil removed during excavation and trenching activities may be utilized as backfill. For paved traffic areas backfill will be performed in accordance with New York State Department of Transportation (NYSDOT) requirements 203-3.12, which requires 95% of Standards Proctor Maximum Density completed in 6-inch lifts. In all other areas backfill will be placed in one-foot lifts and compacted with a walk behind tamping machine. "K-Crete" will be installed under all paved areas. To ensure compliance, a qualified independent testing laboratory will be utilized to collect four (4) cylinders of concrete for every day of placement. The cylinders will be submitted for compression test at 7, 14, and 28 days.

In any areas where settling of the grade has occurred prior to the completion of the project, the finishing surfaces will be removed, and the area will be backfilled and compacted with additional material and resurfaced.

All finished surfaces, walkways, and pavements will be restored to match the previously existing condition.

9.5 SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN

9.5.1 Oil Pollution Plan

Oils stored on site are subject to 40 CFR 112, Oil Pollution Prevention. If the total volume of vegetable oil stored on site is greater then 1,320 gallons, Spill Prevention, Control, and Countermeasure (SPCC) Plan regulations apply under 40 CFR 112 Subpart C. Under this subpart, an SPCC plan would need to be developed as well as considerations given to drainage of secondary containment systems.

The anticipated total volume of vegetable oil for the injection activities at both Landfill 6 and Building 817/WSA is expected to be less than 1,000 gallons. If vegetable oil storage capacities exceed 1,320 gallons then a SPCC will be prepared under a separate cover. The plan would address the design, operation, and maintenance procedures established to prevent spills from occurring, include countermeasures to control, contain, cleanup, and mitigate the effects of an oil spill.

9.5.2 Bulk Chemical Storage Plan

The vegetable oil, the lactate, and the pH buffer are not considered hazardous substances as defined in New York State Bulk Chemical Storage Regulations (6 NYCRR Part 597) and therefore, the bulk chemical regulations do not apply. The chemicals will be stored under cover when not in use and in accordance to manufactures directions. Materials and equipment will be stored in Building 817 following coordination and approval with the Griffiss Air Force Base Personnel.

9.5.3 Additional Hazardous Waste/Material

There may be other hazardous materials, which may be brought to the site as identified by the Hazard Communication Program and details of their properties can be found in the MSDS catalog maintained at the job trailer.

9.5.4 Categorization of Levels of Spills and Discharges

The SM will assess all spills and discharges. Spills will be categorized by the source from which they came.

All petroleum spills (e.g., oil, gasoline, kerosene, etc.) that occur within New York State must be reported to the NYSDEC Spill Response (1-800-457-7362) within two hours of discovery, except spills which meet all of the following criteria:

- The quantity is known to be less than five gallons;
- The spill is contained and under the control of the spiller;
- The spill has not and will not reach the State's water or any land; and
- The spill is cleaned up within two hours of discovery.

A spill is considered to have not impacted land if it occurs on a paved surface such as asphalt or concrete. A spill in a dirt or gravel parking lot is considered to have impacted land and is reportable.

9.5.5 Control Procedures and Protective Measures

The spill prevention plan includes the diking/berming of all storage of contaminated liquids and/or fuel, the following of operating procedures to include spill prevention design, and the training of employees in spill prevention and control techniques.

In the event of accidental spillage, the following spill response measures will be implemented:

A. First aid will be administered to injured/contaminated persons. Any employee observing a spill will act immediately to remove and/or protect injured/ contaminated persons from any life-threatening situation without endangering himself or herself. Emergency Services (911) will be contacted, if necessary and first aid and/or decontamination procedures will be implemented as appropriate.

B. Warn unsuspecting person/vehicle of the hazard. Personnel will act to prevent any unsuspecting persons from coming in contact with spilled material by alerting other nearby persons and by obtaining assistance of other personnel who are familiar with spill control cleanup techniques.

C. Stop the spill at the source, if possible. Without taking unnecessary risks, personnel will attempt to stop the spill at the source. This may involve activities such as uprighting a drum, closing a valve, or temporarily sealing a hole with a plug. Personnel will not expend more than a brief effort prior to notifying the project supervisor.

D. Notify the Site Manager. Utilizing available personal radio communications or other rapid communication procedures, the SM will be notified of the spill, including information on material spilled, quantity, personal injuries, and any immediate life-threatening hazards.

E. Spill assessment and primary containment. The SM will make a rapid assessment of the spill and direct primary containment measures. Depending upon the nature of the spill, primary containment measures may include, but are not limited to:

- Construction of a temporary containment berm utilizing on-site clay absorbent earth.
- The spill area shall be staked and isolated with the hazard tape to keep the general public away from the containment area.
- Digging a sump, installing a polyethylene liner, and diverting the spilled material to the sump.
- Placing drums under the leak to collect the spilling material before it flows over the ground.
- Transferring the material from its original container to another container.

F. Notify the Project Manager. The SM will notify the PM of the spill and steps taken to institute primary containment.

G. Spill Cleanup Procedures. The SM will develop a spill cleanup procedure taking into consideration associated hazards, quantity of spilled material, disposal methods and costs. The spill cleanup plan will be reviewed for acceptance by the PM.

H. Spill Cleanup. Personnel will clean up all spills in accordance with the spill cleanup plan developed by the project supervisor. The SM will supervise the spill cleanup. Most equipment, material, and supplies necessary to clean up a spill will be immediately available on-site. Such items may include, but are not limited to front-end loader, shovels, rakes, clay absorbent earth, polyethylene, personal safety equipment, steel drums, pumps, and miscellaneous hand tools.

I. Spill cleanup inspection. The PM and the SM jointly will inspect the spill site to determine that the spill has been adequately cleaned up.

9.6 WETLANDS MITIGATION PLAN

Wetlands have been identified in the vicinity of Three Mile Creek. Prior to the start of Landfill 6 remedial activities, the location of the wetlands, as indicated on Landfill 6, Design

Drawing Sheet 3 of 5, will be marked out. No construction work will occur within five feet of the wetlands. Additionally, a silt fence may be installed to protect the wetlands from run off as needed. A still fence will be installed as part of any excavation requirements.

If construction activities result in the disturbance of the wetlands, then a wetlands mitigation plan will be developed and submitted under a separate cover to the NYSDEC for approval. All efforts will be taken to protect the wetlands.

9.7 STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

Landfill 6, Building 817/WSA, Building 775, and Nosedocks/Apron 2 site activities are not expected to disturb more than an acre of soil as a result of the remedial construction. However, storm water will be managed in accordance with the NYSDEC state pollutant discharge elimination system general permit for construction activities. Best Management Procedures (BMP) will be used to control erosion and sediment run-off.

A silt fence will be constructed prior to the start of remediation construction at the Building 775 site. The silt fence will be placed along the northwest side of the staging area, along the south west work zone and then north east to the paved area as shown in Building 775 Design Drawing Sheet 5 of 5. Maintenance of the silt fences will occur as necessary and material will be replaced when "bulges" develop in the fence.

Prefabricated units such as Envirofence, or an approved equivalent, may also be used for erosion and sediment control.

In addition to constructing and maintaining a silt fence, the adjacent manholes, curbs and gutter inlets, grates, and curb drop inlets will be protected from potential run-off. As shown in the Building 775, Curb Inlet Protection Details (Building 775, Design Drawing Sheet 5 of 5), Dandy Sack TM, Dandy Curb Bag TM, or Dandy Curb TM products (or equivalent) will be utilized as appropriate. Additional erosion control measures will be used as necessary under direction of the SM. Actual placement of these control devices will depend upon existing terrain and weather conditions as work proceeds.

9.8 HEALTH AND SAFETY PLAN

Work will be done in accordance with the approved site APP (Parsons, 2006). The APP has been prepared in accordance with the Parsons Safety, Health, and Risk Program (SHARP) and USACE Health and Safety Requirements Manual EM 385-1-1. It is anticipated that all work will be done in Level D protection. The APP will be updated prior to the start of remediation construction and will address any conditions that may be encountered during the duration of work. This may include excavation hazards, electrical hazards, chemical hazards, emergency contact information, routes to hospital, and use of personal protection equipment (PPE) for various site activities. Additional site hazards not listed here are described in the APP (bound separately).

9.9 PERFORMANCE EVALUATION

9.9.1 Performance Monitoring Work Plan and Long Term Monitoring Work Plan

A Performance Monitoring Work Plan will be prepared and implemented for Landfill 6, the Building 817/WSA, Building 775, and Nosedocks/Apron 2 sites. The plan will establish the monitoring well network, the sampling frequency, and the sampling parameters that will be implemented at each location in accordance with the requirements identified in the RDWP (EEEPC, 2007). A Long Term Monitoring (LTM) Work Plan will be prepared to monitor, sample and collect the required data at each site to support the annual performance report. LTM will continue until the remediation goals have been reached.

9.9.2 Data Evaluation

To measure the effectiveness of the remediation effort and ensure that the remedial goals are being met, specific performance criteria for each remediation site have been developed. Following the monitoring and sampling efforts, a data review will be conducted and performance reports will be prepared and submitted annually to the NYSDEC, USEPA, AFRPA, and USACE.

The performance reports will include a summary of site activities, evaluation of new sampling data, and comparison to previous data. Tables, graphs, figures, progress, recommendations, and evaluation of the current efforts as appropriate for each site will also be included in the reports. These annual evaluation reports will determine if any subsequent remediation phases or contingency phases will be required.

9.10 DEMOBILIZATION AND INTERIM REMEDIAL ACTION COMPLETION REPORT

9.10.1 Demobilization

The SM will coordinate the removal of all temporary facilities (e.g., field trailer, portable toilets, erosion control measures, site security measures) and construction equipment. Telephones and power will be disconnected, as appropriate. Construction equipment will be decontaminated and loaded onto vehicles for return to the vendor.

9.10.2 Interim Remedial Action Completion Report

An Interim Remedial Action Completion Report documenting the work activities will be prepared and submitted to AFRPA and USACE. The report will include a description of the work, daily field reports, photographic logs, as-built drawings, material tickets, and field changes. The Interim Remedial Action Completion Report will also detail maintenance procedures, start up, operation, and maintenance procedures, and environmental monitoring requirements as applicable to the Landfill 6, the Building 817/ WSA, the Building 775, and the Nosedocks/Apron 2 sites.

SECTION 10

REMEDIATION PROCEDURES

10.1 GROUNDWATER MONITORING WELL

10.1.1 Installation

Groundwater monitoring wells designated to be installed at Landfill 6, Building 775, and Nosedocks/Apron 2 site locations will be installed using a mobile/ATV drill rig and advancing 4¼-inch ID augers and installing the 2-inch diameter monitoring wells through the augers. Split-spoon samples shall not be collected during well drilling. Monitoring wells shall be constructed as follows:

Monitoring Well Casing and Screen

Each well casing will consist of new, two-inch ID, threaded, flush-joint PVC pipe. The riser pipe will conform to ASTM D1785 standards for Schedule 40 pipe. Each well casing will extend to a height of 2 feet above grade. Well screens will consist of 10 to 20 feet of new, two-inch ID, commercially fabricated, threaded, flush-joint, factory slotted (0.010 inch) PVC screen. A threaded PVC plug will be placed on the bottom of each well. All well material will be certified as "clean" by the vendor and sealed in plastic prior to installation. Figure 10-1 illustrates typical monitoring well construction.

Monitoring Well Filter Pack

A sand filter pack will be installed in the annular space between the boring and well screen. The filter pack will consist of clean, chemically inert, non-carbonated, well-sorted silica sand (Moiré #0 or equivalent). Care will be taken to prevent bridging by continuously probing and measuring the thickness of the filter pack as it is placed. The sand filter pack will be tremied into place. The sand filter pack will be placed from the bottom of the well screen to a minimum of two feet above the top of the well screen. In addition, one foot of fine sand (Moiré #00 or equivalent) will be placed above the Moiré #0 or equivalent filter pack.

Monitoring Well Seal

The sand pack will be capped with thick pelletized bentonite seal, depending on the amount of space between the top of the screen and the ground surface. The drill rig geologist will determine the appropriate length of the bentonite seal, dependent on the depth of the well and best judgment. The bentonite seal will be hydrated with clean potable water from a USACE-approved source on base. After the bentonite seal has hydrated for the manufacturers recommended duration, a 5% bentonite/ cement grout will be installed between the top of the sodium-bentonite seal and the ground surface. The grout will be placed using a tremie pipe and will stop within three feet of ground surface.

Plumbness and Alignment

All risers and screens will be set round, plumb, and true to line. The well assembly must be hung in the borehole prior to the placement of the filter pack and not allowed to rest on the bottom of the hole so as to keep the well assembly straight and plumb. A centralizer will be installed at the bottom of wells greater than 20 feet in depth. Centralizers will be stainless steel and attached to the well casing via stainless-steel fasteners or strapping. Centralizers will not be attached to the well screen or the part of the well casing exposed to the granular filter or bentonite seal.

Well Completion Details

All monitoring wells will be completed two feet above ground surface. The aboveground completion for monitoring wells will consist of a painted, six-inch diameter, locking, protective steel casing. Prior to installation of the steel casing, a four-inch diameter PVC sleeve will be placed around the two-inch ID casing from the top of the grout seal to one foot above ground surface to allay frost heave. Cement will be placed in the annular space between the edge of the borehole and the four-inch PVC sleeve. The steel casing will then be placed in the cement. The casing will then be surrounded by a 2-foot x 2-foot x 4-inch thick concrete drainage pad. A weep hole will be drilled in the base of the protective casing, just above the concrete pad, and a vented PVC slip-on well cap will be placed on the inner casing. If the above-grade well is in a location accessible to vehicular traffic, concrete filled, three-inch diameter protective steel posts (bollards) set two feet bgs in concrete and three feet above grade will be installed around the perimeter of the well in order to protect it. A well lock (BX-1) will be used to secure the well.

Well Identification

Wells will be identified by brass survey marker. The survey marker will be embedded in the cement well pad. A metal identification tag (Brainard-Kihnan TC-350 or equivalent) will also be placed in each well casing. The tags will be labeled with an inscription pen and attached to the well caps with braided wire.

The tags will contain the following information:

- Establishing company, location and location coordinates;
- Well ID;
- Date installed;
- Well depth;
- Casing depth and diameter;
- Screened interval;
- Sand interval;
- Bentonite interval;
- Grout interval;

- Static water level; and,
- Top of well casing elevation and ground surface.

Logs will be prepared in the field, as borings are drilled, by a qualified, experienced geologist, or geotechnical engineer. Each log will be signed by the preparer and developed on the hazardous, toxic, and radioactive waste (HTRW) drill log form included as Figure 10-2.

10.1.2 Well Development

Each new monitoring well will be developed no sooner than 48 hours after final grouting of the well. Development will be performed using a submersible development pump until pH, temperature, conductivity, oxidation reduction potential (ORP) and dissolved oxygen (DO) have stabilized, and turbidity of the discharge is 50 NTUs or less. Development will be performed according to the procedure described below.

Equipment and Supplies

- Electronic water level indicator;
- DO, pH, temperature, and ORP probe (or equivalent) display instrumentation, and flow-through cell (QED Model MP20 or equivalent) and associated calibration solutions (pH buffers 4 and 7, and redox standard solution);
- Pump controller (QED Model 3013 or equivalent);
- Gasoline-powered compressor (QED Model 41000 or equivalent); and
- 55-gallon drums (if deemed necessary).

Development Procedures

- Measure static water level;
- Measure total depth of well;
- Calculate volume of water in well casing/screen and filter pack using the following equation:

$$1 \text{ well volume (gal)} = [H_1 \times 0.16 \text{ gal/ft}] + \{0.30 \times [(H_2 \times 2.95 \text{ gal/ft}) - (H_2 \times .16 \text{ gal/ft})]\}$$

Where:

H_1 = total height of the water column in the well

H_2 = height of the saturated sand pack

This equation is based on the following assumptions:

- 2-inch well diameter;
- 30% sand filter pack porosity; and
- 8.5-inch borehole diameter.

The pump shall be placed in the lower part of the screen and moved up and down the entire screen length throughout the well development phase. This will properly develop the aquifer facing the screen. During well sampling operation the pump shall be placed above the screen. Lower the pump to the top of the well screen and begin pumping.

Develop the well until a minimum of three to five well volumes is removed and three times the volume of water added to the well during drilling (if applicable). Surge the pump up and down and pump during removal of at least three to five well volumes. Then discontinue surging, and continue pumping until pH, temperature, conductivity, ORP, and DO are stable, turbidity is less than 50 NTUs, and a minimum of one additional well volume plus three to five times the volume of water added to the well during drilling is removed (if necessary). The readings are considered stable when they are within the following guidelines derived from USEPA low-flow purging.

- ± 0.1 for pH,
- ± 3% for specific conductivity, and
- ± 10% for turbidity and DO.

If these conditions are not achieved within a 4-hour period, USACE will be notified. If the well is purged dry during development, the well will be allowed to recharge prior to continuing development. If recharge is slow, USACE will be notified and a modification of development procedures will be discussed.

The development record will include the following:

- Physical characteristics of the development water (i.e., pH, temperature, conductivity, DO, and turbidity) will be recorded on the well development record form (Figure 10-3) at 5-minute intervals for the first 30 minutes and 10-minute intervals for the remainder of the purge cycle;
- Total quantity of water removed;
- Static water level before and after development;
- A 35-mm color photo or digital photo of the final development water in a clear glass jar;
- Management of development water; and
- If dedicated pumps are not used for development, decontaminate development pump and hose according to appropriate procedures.

10.2 EQUIPMENT DECONTAMINATION

The drill rig and all appurtenances must be decontaminated with high-pressure steam prior to arrival to the site and prior to leaving the site. All equipment will be decontaminated again upon arrival to the site to remove road dirt only. The appropriate PPE will be worn by personnel performing equipment decontamination. The supervising drill rig geologist shall observe all equipment decontamination to ensure adequate compliance with the procedures.

Decontamination of drilling equipment will be performed prior to and after each well location. The drilling subcontractor will construct a decontamination pad, which will consist of wood and plastic sheeting, bermed on all sides, and include a high-pressure steam cleaner and a sump for water collection and pumping. Metal saw horses or pallets shall be used to keep equipment to be decontaminated off the floor of the pad. Specific attention will be given to the drilling assembly and augers. Drilling decontamination will consist of:

- High-pressure steam cleaning;
- Scrubbing with brushes if soil remains on equipment; and
- Steam rinsing.

The back end of the drill rig, and all associated drilling equipment (i.e., hollow-stem augers) will be decontaminated before and after use at each monitoring well location. Once clean, no equipment may touch the ground prior to use. The equipment must be stored on the drill rig, support truck, or on plastic sheeting. A sample of the decontamination water shall be collected from the decontamination pad and analyzed for waste characteristics prior to disposal. If no contamination is detected, the decontamination water will be discharged to the ground surface. If contamination is detected the decontamination water will be placed in 55-gallon drums and labeled accordingly.

Decontamination of groundwater field testing instruments:

- Rinse flow-through cell and pH, temperature, conductivity, DO, and ORP probes with deionized water between each use.

Decontamination of well development pump and discharge hose by following method:

- Disassemble pump intake and use brush to clean inside of pump with alconox solution;
- Reassemble the pump and immerse the pump and discharge hose in a polyethylene drum (or equivalent) of alconox solution;
- Pump alconox solution through the pump and hose for five minutes;
- Remove pump and hose and immerse in a polyethylene drum (or equivalent) of clean potable water;
- Pump clean water through the pump and hose for five minutes; and
- Drain pump and hose and place in a clean plastic bag.

10.3 INVESTIGATION-DERIVED WASTE (IDW)

Drill cuttings from well installations, decontamination water, and well development water will be disposed of in accordance with New York State Technical and Administrative Guidance Memorandum (TAGM) HWR-89-4032 issued by NYSDEC on November 21, 1989. The decontamination water and soil cuttings will be placed in 55-gallon drums and labeled accordingly. All drums will be temporarily staged in a secure area on site. A registry of all

drums, a description of their sources and contents, and documentation of the analytical results from tests (if required) on the containerized solids will be available.

The contents of drums from sites that are suspected to be contaminated, or determined to be contaminated based on analytical results from the associated AOC, may need to be characterized by toxicity characteristic leaching procedure (TCLP). TCLP VOCs will be analyzed and if required by the offsite disposal company, additional analysis such as corrosivity, ignitability, and reactivity may be needed to determine the suitability of subsequent disposal methods. Off-site disposal of contaminated materials involves hauling drummed cuttings and water to a commercial disposal facility.

Groundwater generated during the extraction well EW-1 pump test at the Building 775 site is expected to be of significant volume. The water will be contained in a large vessel (i.e. Frac Tank or equivalent) with sufficient capacity to hold the expected volume. Prior to the performance of the EW-1 pump test the proper permitting and approval to discharge the Building 775 site effluent groundwater will be attained from the City of Rome WPCF. Following the completion of the pump test, a representative sample of the generated water will be collected and tested for the constituents required for the discharge permit. If the levels of contamination of concern are below the requirements of the permit, the water from the storage vessel can be metered and discharged through the existing sanitary manhole located at the site. If contaminant levels exceed the required discharge limits, arrangements will be made to transport the water off site for appropriate treatment and disposal.

In addition, soils removed as part of the force main installation at the Building 775 site will be staged and used for backfill. If contamination is evident then the soil will managed appropriately based on volume (i.e. drums, stockpiles, etc.) and disposed of off site.

10.4 FIELD LOGBOOKS

All field activities will be carefully documented in field logbooks. Entries will be of sufficient detail that a complete daily record of significant events, observations, and measurements is obtained. The field books will provide a legal record of the activities conducted at the site. Accordingly:

- Field logbooks will be bound with consecutively numbered pages.
- Field logbooks will be controlled by the SM while fieldwork is in progress.
- Entries will be written with waterproof ink.
- Entries will be signed and dated at the conclusion of each day of fieldwork.
- Erroneous entries made while fieldwork is in progress will be corrected by the person that made the entries. Corrections will be made by drawing a line through the error, entering the correct information, and initialing the correction.
- Corrections made after departing the field will be made by the person who made the original entries. The correction will be made by drawing a line through the error, entering the correct information, and initialing and dating the time of the correction.

- The PM will control field logbooks when fieldwork is not in progress.

At a minimum, daily field logbook entries will include:

- Date and page number on each page or set of pages.
- Location of field activity.
- Date and time of entry.
- Names and titles of field team members.
- Names and titles of any site visitors and site contacts.
- Weather information: temperature, cloud coverage, precipitation, wind speed and direction.
- Purpose of field activity.
- A detailed description of the fieldwork conducted, observations and any measurements or readings. Where appropriate, a hand-drawn sketch map will also be included that identifies significant landmarks, features, sample locations, and utilities.
- When appropriate boring numbers, well numbers, sample point ID or key activities should be identified on the top of each page to facilitate retrieval of data at a later date.

10.5 WELL VERIFICATION CHECKLIST

To ensure that all aspects of the OBGW construction remediation efforts have been accounted for, a verification checklist has been prepared. The Well Verification Checklist (located at the end of this section) has been developed to document the monitoring well and extraction well installation, construction and completion efforts. This checklist is designed to be used with the site verification checklists.

WELL VERIFICATION CHECKLIST

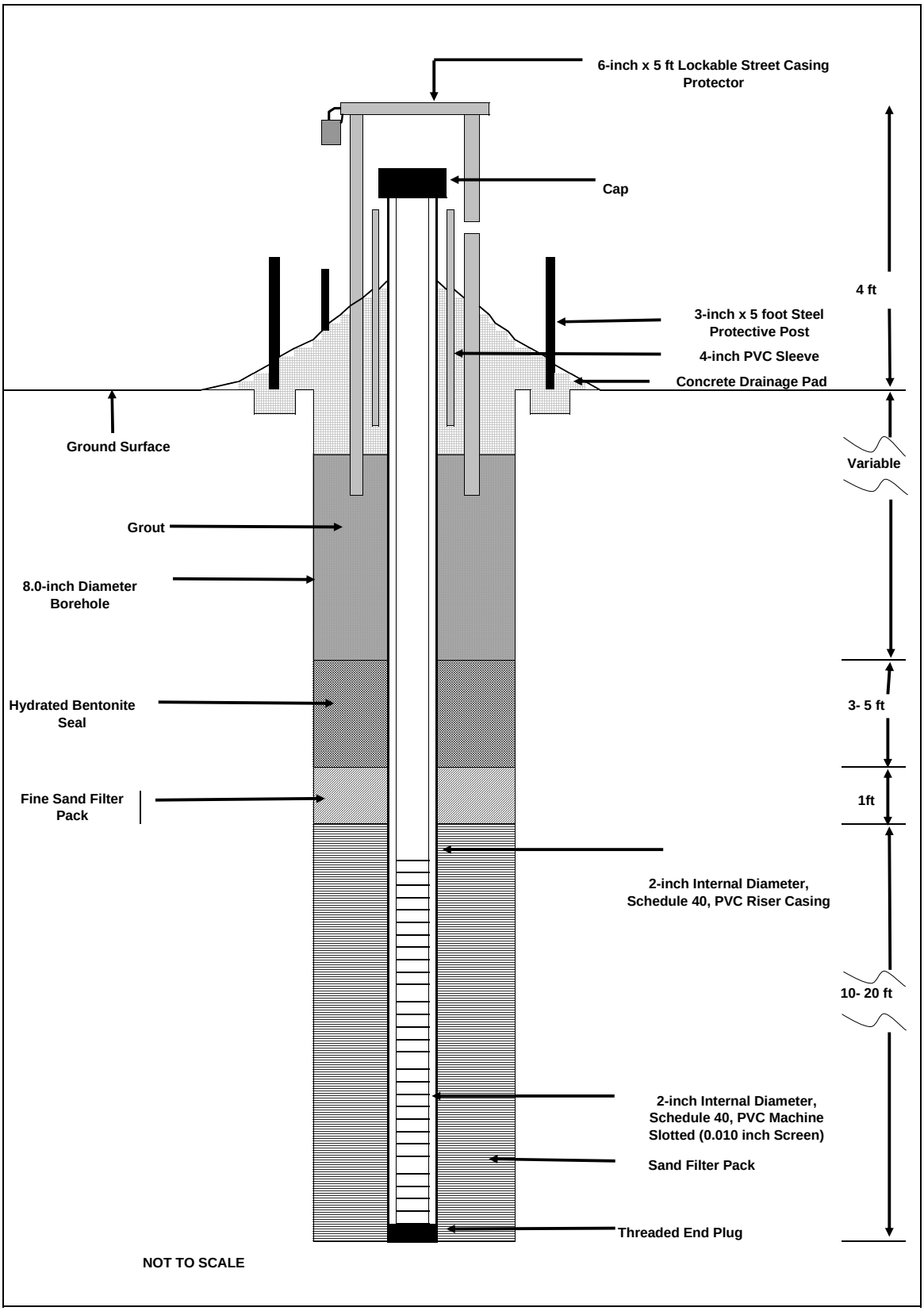
SITE LOCATION:

Landfill 6 Site	
Building 817/WSA Site	
Building 775 Site	
Nosedocks/Apron 2 Site	

WELL IDENTIFICATION	ID				
GENERAL INFORMATION					
Well Type	Monitoring				
	Extraction				
Installation Date	Start				
	Finish				
Well Development	Yes				
	No				
Well Testing	Falling Head Slug Test				
	Step Test				
	Constant Rate Pump Test				
Groundwater Sample Completed	Yes				
	No				
	NA				
Air Monitoring	Yes				
	No				
Drill cuttings Drummed	Yes				
	No				
INSTALLATION DETAILS					
Well Diameter	4.25 inch ID				
	10 inch ID				
Auger Refusal	Yes (depth)				
	No				
Casing Installation Depth	Depth				
Well Casing	Material				
Screen Depth	Interval Depth				
Well Filter Pack Installed	Yes				
	No				
Well Seal Installed	Yes				
	No				
Well Casing Installed	Yes				
	No				
Concrete Drainage Pad	Yes				
	No				
Protective Post/bollards installed	Yes				
	No				
Well Lock	Yes				
	No				

Comments:

Figure 10-1 Monitoring Well Construction



HTW DRILLING LOG

1. COMPANY NAME	2. DRILLING SUBCONTRACTOR	HOLE NO. SHEET 1 OF SHEETS
3. PROJECT	4. LOCATION	
5. NAME OF DRILLER	6. MANUFACTURER'S DESIGNATION OF DRILL	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	8. HOLE LOCATION	
	9. SURFACE ELEVATION	
	10. DATE STARTED / 11. DATE COMPLETED	
12. OVERBURDEN THICKNESS	15. DEPTH GROUNDWATER ENCOUNTERED	
13. DEPTH DRILLED INTO ROCK	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
14. TOTAL DEPTH OF HOLE	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h

HTW DRILLING LOG

PROJECT	INSPECTOR	HOLE NO.
		SHEET OF SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h

Figure 10-3 Well Development Record

WELL DEVELOPMENT RECORD
GROUNDWATER PURGING/SAMPLING RECORD

SITE NAME: _____
PROJECT NUMBER: _____

SAMPLE NUMBER: _____ **WEATHER:** _____
DATE: _____ **TIME:** _____

SAMPLERS: _____ of _____
_____ of _____

DESCRIPTION OF SAMPLING POINT

Sample Location: _____
Screen/Sample Depth: _____
Sampling Method: _____

GROUNDWATER PURGING

Initial Static Water Level: _____
One Well Volume: 3 Volumes

2-Inch Casing:	____	Feet of Water x 0.16 Gallons/Foot =	____	Gallons	____
3-Inch Casing:	____	Feet of Water x 0.36 Gallons/Foot =	____	Gallons	____
4-Inch Casing:	____	Feet of Water x 0.65 Gallons/Foot =	____	Gallons	____

Volume of groundwater purged: _____ Gallons
Purging Device: _____
Purge Water Disposition (e.g., contained): _____

SAMPLE DESCRIPTION

Color: _____
Odor: _____
Other: _____
Sample Analyzed for: _____
QC Samples at this Location: _____
QC Samples Analyzed for: _____

FIELD MEASUREMENTS

Temperature (C/F): _____ Dissolved Oxygen: _____
pH: _____ Eh (Redox Potential): _____
Conductivity (µohms/cm): _____
Turbidity (NTU): _____

SAMPLE CUSTODY

Chain of Custody Number: _____ Laboratory: _____
Shipped Via: _____ Airbill Number: _____

COMMENTS _____
_____

Figure 10-3 Well Development Record

WELL DEVELOPMENT RECORD

Page _____ of _____

GROUNDWATER PURGING/SAMPLING RECORD

SITE NAME: _____

PROJECT NUMBER: _____

Time	Total Vol		pH	Conductivity	Temp.	Turbidity	DO	Comments
	Gals.	Bore Vol..		(umhos/cm)	(Degrees C)	(NTUs)	mg/L	

SECTION 11

SITE RESTORATION

All areas that are disturbed, including but not limited to asphalt, by these remediation and construction activities will be returned to their pre-construction state.

Asphalt will be restored to the existing thickness with like materials and restored in accordance to NYSDOT standard specification. Joints between existing and new asphalt will be sealed with bituminous material meeting NYSDOT specification Section 702-0700.

Cast in place concrete shall be NYSDOT Class E and reinforcing in accordance with ASTM A615 and ASTM A185, as necessary. Concrete will be placed in accordance with ACI 304 and protected from temperatures below 50 degrees Fahrenheit. Newly placed concrete will be kept moist for a minimum of 72 hours. "K-Crete" will be placed beneath all paved areas and have the specifications as identified in Building 775, Design Drawing Sheet 2 of 5. The concrete will be collected daily by an independent laboratory for compression strength testing.

All grades will be restored to maintain existing surface water drainage patterns. Any topsoil imported will meet the following requirements:

- Organic loam, well drained, homogenous;
- pH between 4.5 and 7;
- Free of any vegetation (especially invasive species), debris or other objectionable materials; and,
- Free of stones or particles greater than 1-inch in diameter.

Approximately six-inches of topsoil will be placed on earth fill in any areas of soil disturbance and grass seed will be at a minimum of three pounds/1000 square feet. The grass seed will be a mixture of 30% annual ryegrass and 70% perennial ryegrass. The grass seed is to be spread by hand, hydro seed, or seed spread evenly on dry to moderately dry soil. Fertilizer (commercial grade 5-10-5 mixture) will be applied in accordance with manufacture written directions. Soil moisture will be maintained until young plants are well established.

All restored areas will be protected from traffic, erosion, and damage until surface is stabilized. The contractor will be responsible to repair or replace any restored areas damaged within six (6) months of project completion. The contractor will be responsible to cut and maintain any initial restoration grass growth in the first six weeks after restoration.

SECTION 12

CONTINGENCY PLANS

12.1 LANDFILL 6

As discussed in Section 5.5 Subsequent Remediation Activities, if necessary, several additional remediation options may be implemented at the Landfill 6 Site. Secondary injections may be performed no sooner than 2009, preferably 12 months after the first injection and more likely no sooner than 2010, 24 months after the first injections as referenced in the RDWP.

Depending on the results of the secondary injection, it may be necessary to implement the contingency plan. Figure 12-1 describes the decision process for implementation of the Landfill 6 contingency plan. This contingency plan would install an *in situ* bioreactor by extracting groundwater from the downgradient edge of the treatment area, amending it with additional organic substrate, and re-injecting it on the upgradient edge of the treatment area.

12.2 BUILDING 817/WSA

Figure 12-2 describes the decision process for the implementation of the contingency plan at Building 817/WSA site. The contingency plan would be implemented to address the migration of cis-1,2-DCE and VCE to Six Mile Creek. If the plan is implemented it would consist of the design and implementation of an air-sparge system.

An *in situ* air sparging wall would be installed approximately 300 feet upgradient of the culverted section of Six Mile Creek to treat the VOCs in the groundwater prior to introduction into the creek. The system would inject pressurize air into the groundwater. As the injected air travels through the groundwater, through the saturated zone, to the ambient air, the VOCS will change to vapor and be transported toward the surface and eventually discharge to the ambient air through the unsaturated zone. The concentrations of contaminants in the emitted air are estimated to be negligibly low, and thus, no off-gas treatment would be required. The need for a soil vapor extraction (SVE) system is not anticipated since the need to control and collect vapors would be unnecessary due to the absence of buildings or habitable structures in the vicinity of this portion of the creek.

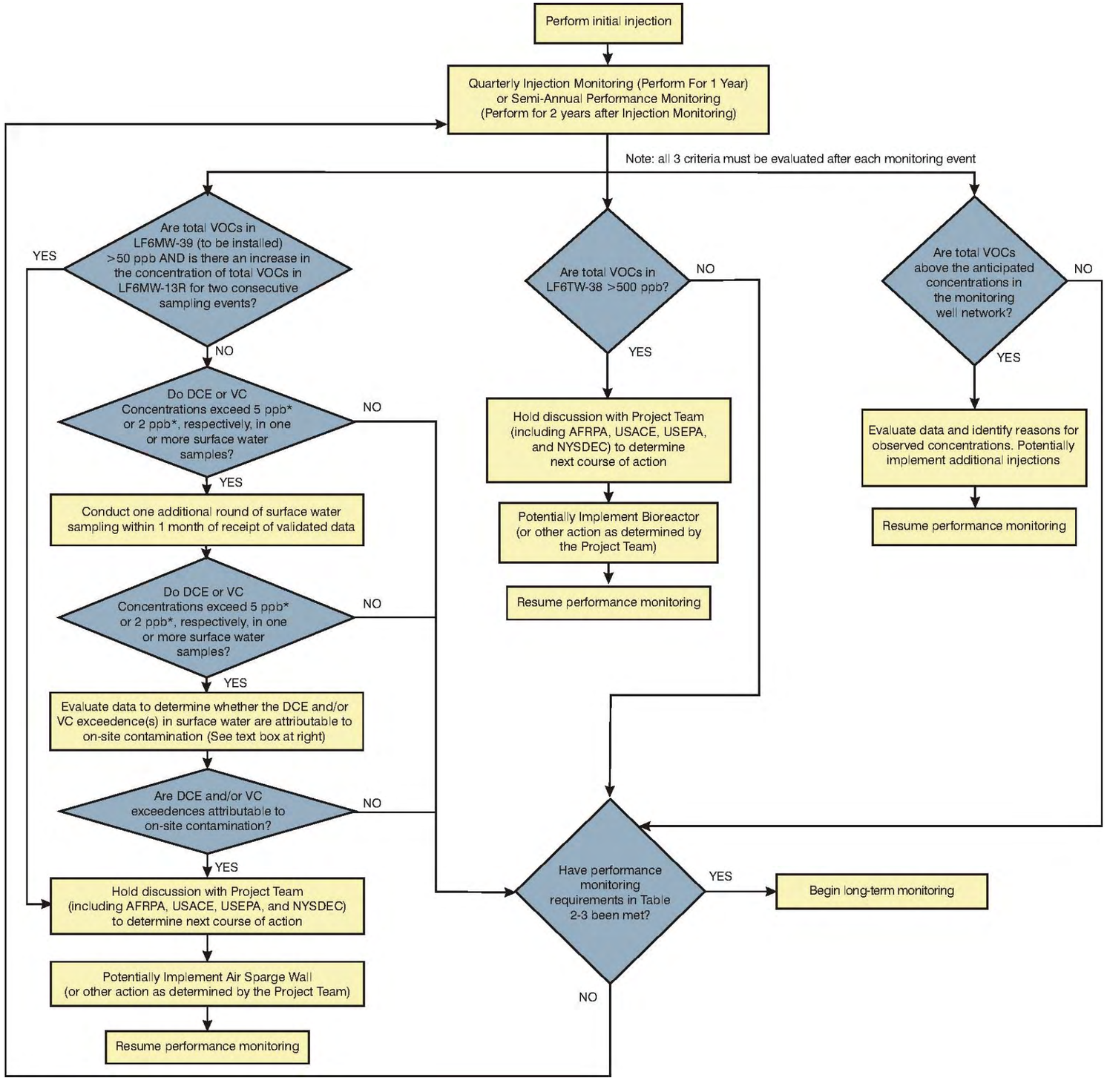
12.3 BUILDING 775

The contingency plan for the Building 775 site consists of the installation and implementation of additional extraction wells. The requirements for additional extraction wells installation will be determined upon completion of the required well development and testing requirements extraction well EW-1. Extraction well EW-2 will be installed only after the pumping test results from EW-1 have been evaluated. If it is necessary to expand the groundwater extraction area of influence based on the EW-1 pump test results, then EW-2 will be installed. Prior to the force main connection, the EW-2 pumping test results will be evaluated to determine the necessity for any additional extraction wells.

12.4 NOSEDOCKS/APRON 2

Natural attenuation is occurring at the site and the MNA remediation effort is anticipated to be successful. However, if the contaminated plume reaches Six Mile Creek then the contingency plan would be implemented. Figure 12-3 describes the decision process for implementation of the Apron 2 contingency plan.

This plan consists of an air sparge system installed immediately upgradient of Six Mile Creek to treat VOCs in the groundwater. The system would inject pressurize air into the groundwater. As the injected air travels through the groundwater, through the saturated zone, to the ambient air the VOCS will change to vapor and be transported toward the surface and would be eventually discharged to the ambient air through the unsaturated zone. The concentrations of contaminants in the emitted air are estimated to be negligibly low and, thus, no off-gas treatment would be required. The need for a SVE system is not anticipated since the need to control and collect vapors would be unnecessary due to the absence of buildings or habitable structures in the vicinity of this portion of the creek.



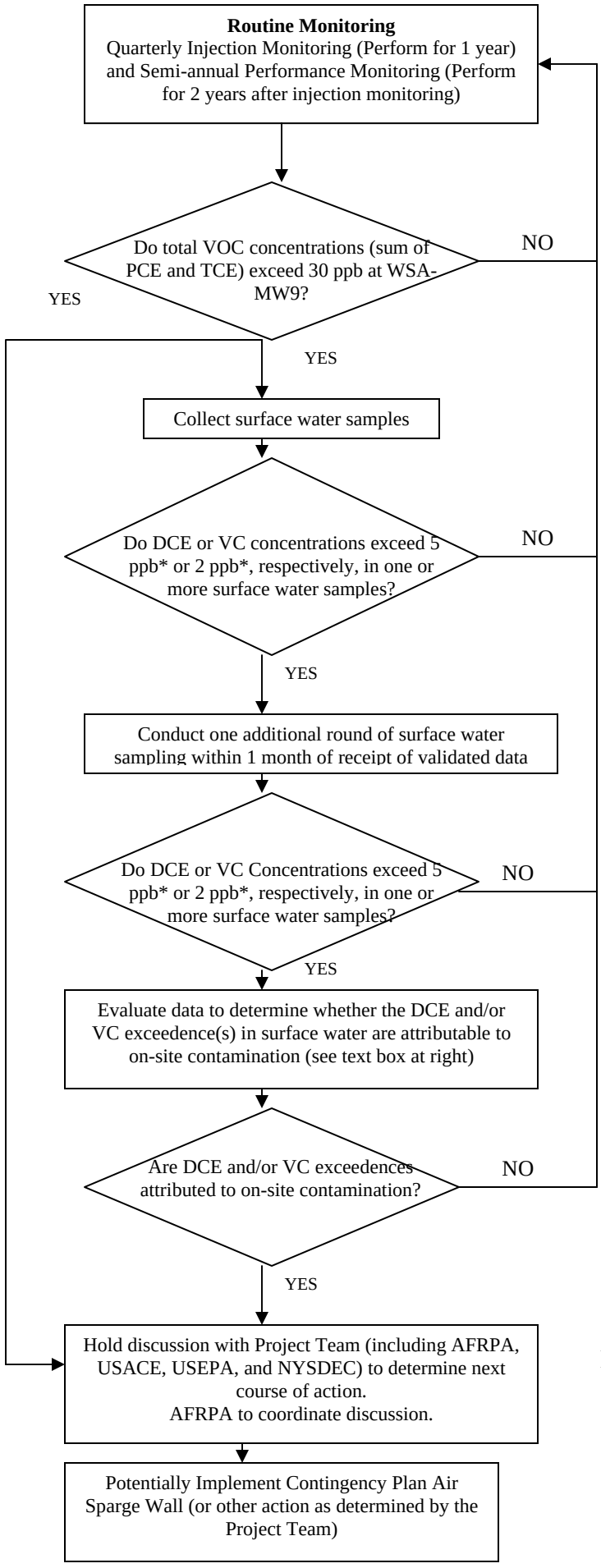
Data Evaluation Procedure for Surface Water Concentration Exceedences

If DCE or VC concentrations are exceeded in one or more surface water samples, a technical memorandum should be developed. In the memorandum, the following, at a minimum, should be evaluated:

- Compare exceedence(s) concentration and location (i.e. upstream, in-line with plume, downstream) with other surface water samples collected. Is there a correlation?
- How do VC concentrations in groundwater from nearby upgradient wells compare to the exceedence in surface water?
- Do water levels indicate site groundwater is discharging into Three Mile Creek?
- Compare surface water and groundwater data with previous sampling round(s).
- Consider sampling for VOCs in sediment samples co-located with surface water sample locations (where applicable).
- Discuss sediment sample results, if applicable, and how the data correlates with exceedences detected in surface water.

* NYSDEC Groundwater Standard, Class GA

Figure 12-1
Decision Process for Contingency Plan Implementation,
Landfill 6 Site



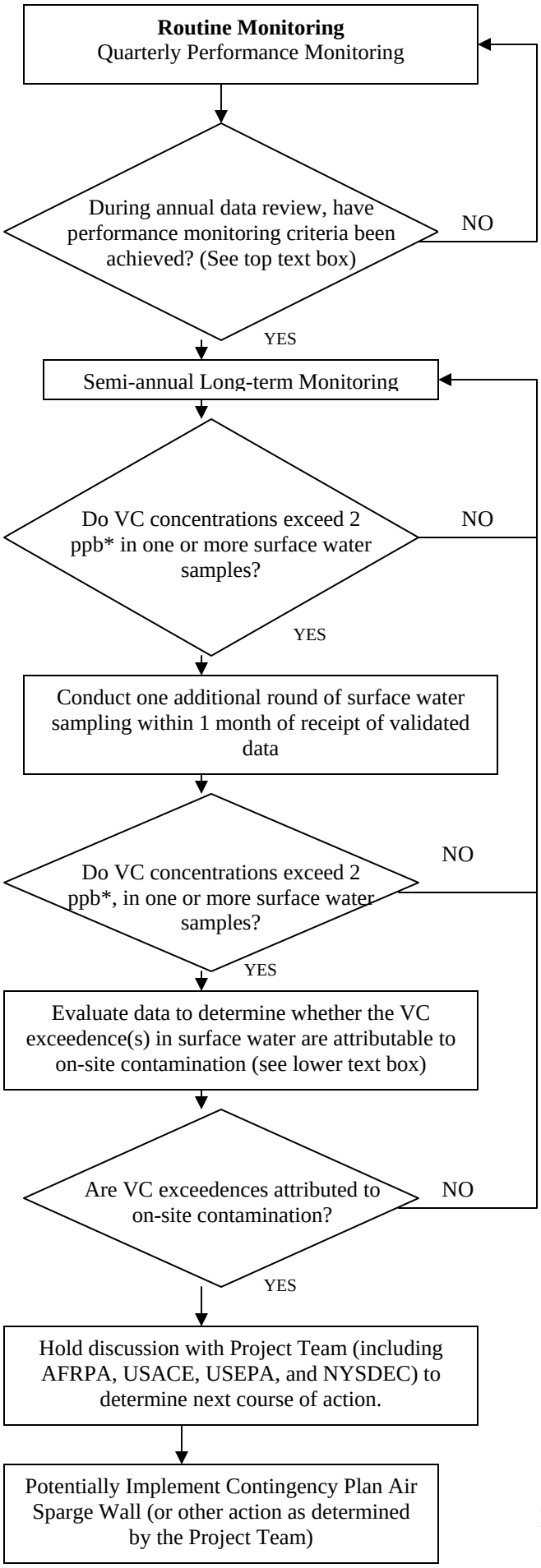
Data Evaluation Procedure for Surface Water Concentration Exceedences

If DCE or VC concentrations are exceeded in one or more surface water samples, a technical memorandum should be developed. In the memorandum, the following, at a minimum, should be evaluated:

- Compare exceedence(s) concentration and location (i.e., upstream, in-line with plume, downstream) with other surface water samples collected. Is there a correlation?
- How do VC concentrations in groundwater from nearby upgradient wells compare to the exceedences in surface water?
- Do water levels indicate site groundwater is discharging into Six Mile Creek?
- Compare surface water and groundwater data with previous sampling round(s).
- Consider sampling for VOCs in sediment samples collected with surface water sample locations (where applicable)
- Discuss sediment sample results, if applicable, and how the data correlates with exceedences detected in surface water.

* NYSDEC Groundwater Standard, Class GA

Figure 12-2
Decision Process for Contingency Plan Implementation
Building 817/WSA Site



Performance Monitoring Criteria

- There is a general decrease in TCE, DCE, and VC concentrations from groundwater monitoring well samples collected.
- Geochemcial data supports natural attenuation.
- There are no unexpected changes with site conditions that could impact implementation of natural attenuation at the site.

Data Evaluation Procedure for Surface Water Concentration Exceedences

If VC concentrations are exceeded in one or more surface water samples, a technical memorandum should be developed. In the memorandum, the following, at a minimum, should be evaluated:

- Compare exceedence(s) concentration and location (i.e., upstream, in-line with plume, downstream) with other surface water samples collected. Is there a correlation?
- How do VC concentrations in groundwater from nearby up gradient wells compare to the exceedences in surface water?
- Do water levels indicate site groundwater is discharging into Six Mile Creek?
- Compare surface water and groundwater data with previous sampling round(s).
- Consider sampling for VOCs from upgradient surface water locations (i.e., WSA-SW3PW as presented in the Building 817/WSA remedial efforts)
- Consider sampling for VOCs in sediment samples co-located with surface water sample locations.
- Discuss sediment sample results, if applicable, and how the data correlates with exceedences detected in surface water.

* NYSDEC Groundwater Standard, Class GA

Figure 12-3
Decision Process for Contingency Plan Implementation
Nosedocks/Apron 2 Site

SECTION 13

ANTICIPATED PROJECT SCHEDULE

13.1 INTRODUCTION

The anticipated project schedule is located in Appendix C. This schedule is consistent with the Task Order requirements specified by USACE. Significant project milestones directly associated with this Remedial Action Work Plan are summarized as follows:

- Preparation and approval of Remedial Action Work Plan- December 2007- July 2008
- Construction Mobilization- June 2008
- Landfill 6 Remediation Activities- July 2008 through August 2008
- Building 817/WSA Remediation Activities- July 2008 through August 2008
- Building 775 Remediation Activities- August 2008 through October 2008
- Apron 2 Remediation Activities- July 2008 through August 2008

SECTION 14

REFERENCES

Air Force Real Property Agency, 2007, *Final Proposed Plan On-Base Groundwater AOC at the Former Griffiss Air Force Base,* Rome, New York, September 2007.

Ecology and Environment Engineering, P.C. (EEEPC), 2008, *Final Remedial Design Work Plan and 90% Design Drawings, Former Griffiss Air Force Base,* Rome, New York, November 2007.

Ecology and Environment Engineering, P.C. (EEEPC), 2006c, *Final Work Plan Predesign Investigations at Landfill 6, Building 817/WSA, Building 775, and AOC9, Former Griffiss Air Force Base,* Rome, New York, September 2006.

FPM, Final Monitoring Report for Baseline and PDI2 Sampling at On-Base Groundwater AOCs, Griffiss Air Force Base, August 2007.

FPM, Final Baseline Letter Work Plan, On-Base Groundwater Areas of Concern, Former Griffiss Air Force Base, Rome, New York, November 2006.

Law Engineering and Environmental Services, Inc., Draft Final Primary Report, Remedial Investigation at Griffiss Air Force Base, December 1996.

Parsons, 2007, *Project Management Plan, On-Base Groundwater Remediation, Former Griffiss Air Force Base,* Rome, New York, February 2007.

Parsons, 2006, *Contractor Quality Management Plan, On-Base Groundwater Remediation, Former Griffiss Air Force Base,* Rome, New York, September 2006.

Parsons, 2006, *Accident Prevention Plan, On-Base Groundwater Remediation, Former Griffiss Air Force Base,* Rome, New York, July 2006.

Parsons, Quality Control Field Plan, On-Base Groundwater Remediation, Former Griffiss Air Force Base, Rome, New York, May 2008.

U.S. Army Corps of Engineers (USACE), 2006, *Quality Assurance Surveillance Plan, Former Griffiss Air Force Base,* Rome, New York, August 2006.

APPENDIX A

INJECTION WELL INVENTORY FORM

Type or print all information. See reverse for instructions.

Form Approved OMB No. 2040-0042

INVENTORY OF INJECTION WELLS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF GROUND WATER AND DRINKING WATER

(This information is collected under the authority of the Safe Drinking Water A

1. DATE PREPARED *(Year, Month, Day)*

YR MO DY

2. FACILITY ID NUMBER

PAPERWORK REDUCTION ACT NOTICE

The public reporting burden for this collection of information is estimated at about 1 hour per year, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, and to the Office of Management and Budget, Paperwork Reduction Project, Washington, DC 20503.

3. TRANSACTION TYPE *(Please mark one of the following)*

☐ Deletion ☐ First Time Entry
☐ Entry Change ☐ Replacement

4. FACILITY NAME AND LOCATION

A. NAME *(last, first, and middle initial)*

B. STREET ADDRESS/ROUTE NUMBER

C. LATITUDE DEG MIN SEC .

D. LONGITUDE DEG MIN SEC .

E. TOWNSHIP/RANGE

TOWNSHIP	RANGE	SECT	1/4 SECT

F. CITY/TOWN

G. STATE

H. ZIP CODE

I. NUMERIC COUNTY CODE

J. INDIAN LAND *(mark "x")* ☐ Yes ☐ No

5. LEGAL CONTACT:

A. TYPE *(mark "x")* ☐ Owner ☐ Operator

B. NAME *(last, first, and middle initial)*

C. PHONE *(area code and number)*

D. ORGANIZATION

E. STREET/P.O. BOX

F. CITY/TOWN

G. STATE

H. ZIP CODE

I. OWNERSHIP *(mark "x")*

☐ PRIVATE ☐ PUBLIC ☐ SPECIFY OTHER
☐ STATE ☐ FEDERAL _____

6. WELL INFORMATION:

A. CLASS AND TYPE		B. NUMBER OF WELLS		C. TOTAL NUMBER OF WELLS	D. WELL OPERATION STATUS				
		COMM	NON-COMM		UC	AC	TA	PA	AN

COMMENTS *(Optional):*

KEY:

DEG = Degree
MIN = Minute
SEC = Second

SECT = Section
1/4 SECT = Quarter Section

COMM = Commercial
NON-COMM = Non-Commercial

AC = Active
UC = Under Construction
TA = Temporarily Abandoned
PA = Permanently Abandoned and Approved by State
AN = Permanently Abandoned and not Approved by State

Instructions and Definitions

Section 1. Date Prepared: Enter date in order of year, month, and day.

Section 2. Facility ID Number: In the first two spaces, insert the appropriate U.S. Postal Service State Code. In the third space, insert one of the following one letter alphabetic identifiers:

D - DUNS Number,
G - GSA Number, or
S - State Facility Number.

In the remaining space, insert the appropriate nine digit DUNS, GSA, or State Facility Number. For example, A Federal facility (GSA - 123456789) located in Virginia would be entered as: VAG123456789.

Section 3. Transaction Type: Place an "x" in the applicable box. See below for further directions.

Deletion. Fill in the Facility ID Number.
First Time Entry. Fill in all the appropriate information.
Entry Change. Fill in the Facility ID Number and the information has changed.
Replacement.

Section 4. Facility Name and Location:

A. **Name.** Fill in the facility's official or legal name.
B. **Street Address.** Self Explanatory.
C. **Latitude.** Enter the facility's latitude (all latitudes assume North except for American Samoa).
D. **Longitude.** Enter the facility's longitude (all longitudes assume West except for Guam).
E. **Township/Range.** Fill in the complete township and range. The first 3 spaces are numerical and the fourth is a letter (N, S, E, W) specifying a compass direction. A township is North or South of the baseline, and a range is East or West of the principal meridian (e.g., 132N, 343W).
F. **City/Town.** Self Explanatory.
G. State. Insert the U.S. Postal Service State abbreviation.
H. **Zip Code.** Insert the five digit zip code plus any extension.
I. **Numeric Country Code.** Insert the numeric country code from the Federal Information Processing Standards Publication (FIPS Pub 6-1) June 15, 1970, U.S. Department of Commerce, National Bureau of Standards. For Alaska, use the Census Division Code developed by the U.S. Census Bureau.
J. **Indian Land.** Mark an "x" in the appropriate box (Yes or No) to indicate if the facility is located on Indian land.

Section 5. Legal Contact:

A. **Type.** Mark an "x" in the appropriate box to indicate the type of legal contact (Owner or Operator). For wells operated by lease, the operator is the legal contact.
B. **Name.** Self Explanatory.
C. **Phone.** Self Explanatory.
D. **Organization.** If the legal contact is an individual, give the name of the business organization to expedite mail distribution.
E. **Street/P.O. Box.** Self Explanatory.
F. **City/Town.** Self Explanatory.
G. **State.** Insert the U.S. Postal Service State abbreviation.
H. **Zip Code.** Insert the five digit zip code plus any extension.
I. **Ownership.** Place an "x" in the appropriate box to indicate ownership state.

Section 6. Well Information:

A. **Class and Type.** Fill in the Class and Type of injection wells located at the listed facility. User the most pertinent code (specified below) to accurately describe each type of injection well. For example, 2R for a Class II Enhanced Recovery Well, or 3M for a Class III Solution Mining Well, etc.
B. **Number of Commercial and Non-Commercial Wells.** Enter the total number of commercial and non-commercial wells for each Class/Type, as applicable.
C. **Total Number of Wells.** Enter the total number of injection wells for each specified Class/Type.
D. **Well Operation Status.** Enter the number of wells for each Class/Type under each operation status (see key on other side).

Injection Well Class and Type Codes

Class I Industrial, Municipal, and Radioactive Waste Disposal Wells used to inject waste below the lowermost Underground Source of Drinking Water (USDW).

Type 1I Non-Hazardous Industrial Disposal Well.
1M Non-Hazardous Municipal Disposal Well.
1H Hazardous Waste Disposal Well injecting below the lowermost USDW.
1R Radioactive Waste Disposal Well.
1X Other Class I Wells.

Class II Oil and Gas Production and Storage Related Injection Wells.

Type 2A Annular Disposal Well.
2D Produced Fluid Disposal Well.
2H Hydrocarbon Storage Well.
2R Enhanced Recovery Well.
2X Other Class II Wells.

Class III Special Process Injection Wells.

Type 3G *In Situ* Gassification Well.
3M Solution Mining Well.
3S Sulfur Mining Well by Frasch Process.
3T Geothermal Well.
3U Uranium Mining Well.
3X Other Class III Wells.

Class IV Wells that inject hazardous waste into/above USDWs.

Type 4H Hazardous Facility Injection Well.
4R Remediation Well at RCRA or CERCLA site.

Class V Any Underground Injection Well not included in Classes I through IV.

Type 5A Industrial Well.
5B Beneficial Use Well.
5C Fluid Return Well.
5D Sewage Treatment Effluent Well.
5E Cesspools (non-domestic).
5F Septic Systems (non-domestic).
5G Experimental Technology Well.
5H Drainage Well.
5I Mine Backfill Well.
5J Waste Discharge Well.

USEPA REGION II SUPPLEMENTAL INSTRUCTIONS FOR COMPLETING INVENTORY OF INJECTION WELLS

EPA FORM 7520-16 (Rev. 8-01)

SECTION 2. FACILITY ID NUMBER: Leave blank. EPA will assign an ID number.

SECTION 3. TRANSACTION TYPE: Check either First Time Entry or Entry Change. If this is the first time you have submitted this form for your injection wells(s), check First Time Entry and fill in all the appropriate information. If you are modifying information you sent in before, check Entry Change, fill in the Facility Name and Location and fill in the information that has changed. (Note: If the facility name has changed, in the blank space in the upper left hand corner write the prior facility name under which the form was first submitted, and the date it was submitted.)

SECTION 4. FACILITY NAME AND LOCATION: If you know the latitude and longitude of your facility, fill in line 4C and 4D. You do not need to fill in 4E, Township/Range. If you know the Numeric County Code, fill in line 4I, otherwise just write in the name of the County.

SECTION 5. LEGAL CONTACT: Under 5A, if the Legal Contact you are identifying owns the land, check Owner. If the Legal Contact owns and/or operates the business but someone else owns the land, check Operator. Under 5I, "Private" means privately owned. "Public" means owned by local/municipal government. "State" and Federal" mean owned by state/federal government.

SECTION 6. WELL INFORMATION: Under 6A CLASS AND TYPE, use the attached table "USEPA Region II List of Class V Injection Well Types" to determine the **CLASS V** "TYPE". Enter the appropriate Type Code in 6A (the Type Code does not have to fit within the two boxes on the Inventory Form). Select the Class V well type(s) that most accurately fit the well(s) at your facility. When reviewing the attached table and making your determination, be sure to consider all of the fluids entering the well or having the potential to enter the well. For example, Storm Water Drainage Wells located in industrial areas which are susceptible to spills, leaks or other chemical discharges are inventoried as Industrial Drainage Wells. If Cesspools and Septic Systems are receiving fluids other than sanitary waste (human excreta), that should be noted in the Additional Information below.

IMPORTANT: ADDITIONAL INFORMATION

In order to ensure that the **Class V** Well(s) at your facility are accurately inventoried you must also submit on a separate piece of paper: (1) a brief description characterizing your facility and the types of activities conducted; (2) a brief description of what you use each of your injection well(s) for; (3) a brief description of the types of fluids that enter, or have the potential to enter, each of your injection well(s). (Note: wells with the same information may be grouped).

If you require assistance, please contact EPA Region II at (212) 637-4232.

USEPA REGION II LIST OF
CLASS V INJECTION WELL TYPES

TYPE CODE	NAME	DESCRIPTION
INDUSTRIAL/COMMERCIAL/UTILITY DISPOSAL WELLS		
5X28	MOTOR VEHICLE WASTE DISPOSAL WELLS	- wells that receive or have received fluids from vehicular repair or maintenance activities, such as an auto body repair shop, automotive repair shop, new and used car dealership, specialty repair shop (e.g., transmission and muffler repair shop), or any facility that does any vehicular repair work.
5W20	INDUSTRIAL PROCESS WATER & WASTE DISPOSAL WELLS	- used to dispose of a wide variety of wastes and wastewater from industrial, commercial, or utility processes. Industries include refineries, chemical plants, smelters, pharmaceutical plants, laundromats and dry cleaners, tanneries, carwashes, laboratories, funeral homes, etc. Specify industry and waste stream.
5A19	COOLING WATER RETURN FLOW WELLS	- used to inject water which was used in a cooling process.
DRAINAGE WELLS		
5D4	INDUSTRIAL DRAINAGE WELL	- wells located in industrial areas which primarily receive storm water runoff but are susceptible to spills, leaks, or other chemical discharges.
5D2	STORM WATER DRAINAGE WELLS	- receive storm water runoff from paved areas, including parking lots, streets, residential subdivisions, building roofs, highways, etc.
5F1	AGRICULTURAL DRAINAGE WELLS	- receive irrigation tailwaters, other field drainage, animal yard, feedlot, or dairy runoff, etc.
5D3	IMPROVED SINKHOLES	- receive storm water runoff from developments located in karst topographic areas.
5G30	SPECIAL DRAINAGE WELLS	- used for disposing water from sources other than direct precipitation–such as landslide control drainage wells, potable water tank overflow drainage wells, swimming pool drainage wells, and lake level control drainage wells.

DOMESTIC WASTEWATER DISPOSAL WELLS		
5W9	UNTREATED SEWAGE WASTE DISPOSAL	- receive raw sewage wastes from pumping trucks or other vehicles which collect such wastes from single or multiple sources. (No treatment)
5W10	LARGE CAPACITY CESSPOOLS	- large capacity cesspools including multiple dwelling, community or regional cesspools, or other devices that receive sanitary wastes, containing human excreta, which have an open bottom and sometimes perforated sides. Includes non-residential cesspools which receive solely sanitary waste and have the capacity to serve greater than or equal to 20 persons a day. DOES NOT apply to single family residential cesspools.
5W11	SEPTIC SYSTEM (UNDIFFERENTIAT-ED DISPOSAL METHOD)	- used to inject the waste or effluent from a multiple dwelling, business establishment, community or regional business establishment septic tank to an undetermined final discharge point. Includes non-residential septic systems which receive solely sanitary waste and have the capacity to serve greater than or equal to 20 persons a day. DOES NOT apply to single family residential septic systems. (Primary Treatment)
5W31	SEPTIC SYSTEMS (WELL DISPOSAL METHOD)	- used to inject the waste or effluent from a multiple dwelling, business establishment, community or regional business establishment septic tank to a well-- examples of wells include dry wells, seepage pits, cavitettes, etc. The largest surface dimension is less than or equal to the depth dimension. Includes non-residential septic systems which receive solely sanitary waste and have the capacity to serve greater than or equal to 20 persons a day. DOES NOT apply to single family residential septic systems. (Primary Treatment)
5W32	SEPTIC SYSTEMS (DRAIN FIELD DISPOSAL METHOD)	- used to inject the waste or effluent from a multiple dwelling, business establishment , community or regional business establishment septic tank to a drainfield--examples of drainfields include drain or tile lines, and trenches. Includes non-residential septic systems which receive solely sanitary waste and have the capacity to serve greater than or equal to 20 persons a day. DOES NOT apply to single family residential septic systems. (Primary Treatment)
5W12	DOMESTIC WASTEWATER TREATMENT PLANT EFFLUENT DISPOSAL	- dispose of treated sewage or domestic effluent from small package plants up to large municipal treatment plants. Final discharge points may include drywells or leachfields. (Secondary or further treatment)

GEOTHERMAL REINJECTION WELLS		
5A5	ELECTRIC POWER REINJECTION WELLS	- reinject geothermal fluids used to generate electric power.
5A6	DIRECT HEAT REINJECTION WELLS	- reinject geothermal fluids used to provide heat for large buildings or developments.
5A7	HEAT/PUMP/AIR CONDITIONING RETURN FLOW WELLS	- reinject groundwater used to heat or cool a building in a heat pump system.
5A8	GROUNDWATER AQUACULTURE RETURN FLOW WELLS	- reinject groundwater or geothermal fluids used to support aquaculture. Non-geothermal aquaculture disposal wells are also included in this category (e.g., Marine aquariums in Hawaii use relatively cool sea water).
RECHARGE WELLS		
5R21	AQUIFER RECHARGE WELLS	- used to recharge depleted aquifers and may inject fluids from a variety of sources such as lakes, streams, domestic wastewater treatment plants, other aquifers, etc.
5B22	SALINE WATER INTRUSION BARRIER WELLS	- used to inject water into fresh water aquifers to prevent intrusion of salt water into fresh water aquifers.
5S23	SUBSIDENCE CONTROL WELLS	- used to inject fluids into a non-oil or gas producing zone to reduce or eliminate subsidence associated with overdraft of fresh water and not used for the purpose of oil or natural gas production.
OIL FIELD PRODUCTION WASTE DISPOSAL WELLS		
5X17	AIR SCRUBBER WASTE DISPOSAL WELLS	- inject waste from air scrubbers used to remove sulfur from crude oil which is burned in steam generation for thermal oil recovery projects. (If injection is used directly for enhanced recovery and not just disposal it is a Class II well.)
5X18	WATER SOFTENER REGENERATION BRINE DISPOSAL WELLS	- inject regeneration waste from water softeners which are used to improve the quality of brines used for enhanced recovery. (If injection is used directly for enhanced recovery and not just disposal it is a Class II well.)

MINERAL AND FOSSIL FUEL RECOVERY RELATED WELLS		
5X13	MINING, SAND, OR OTHER BACKFILL WELLS	- used to inject a mixture of water and sand, mill tailings, and other solids into mined out portions of subsurface mines whether what is injected is radioactive waste or not. Also includes special wells used to control mine fires and acid mine drainage wells.
5X14	SOLUTION MINING WELLS	- used for in situ solution mining in conventional mines, such as slopes leaching.
5X15	IN-SITU FOSSIL FUEL RECOVERY WELLS	- used for in situ recovery of coal, lignite, oil shale, and tar sands.
5X16	SPENT BRINE RETURN FLOW WELLS	- used to reinject spent brine into the same formation from which it was withdrawn after extraction of halogens or their salts.
MISCELLANEOUS WELLS		
5X25	EXPERIMENTAL TECHNOLOGY WELL	- wells used in experimental or unproven technologies such as pilot scale in situ solution mining wells in previously unmined areas.
5X26	AQUIFER REMEDIATION RELATED WELLS	- wells used to prevent, control, or remediate aquifer pollution, including but not limited to Superfund sites.
5X29	ABANDONED DRINKING WATER WELLS	- used for disposal of fluids. Specify well purpose and injected fluids.
5X27	OTHER WELLS	- any other unspecified Class V wells. Specify well type/purpose and injected fluids.

SOURCE: Prepared by EPA Region II. Based on 1987 *Report to Congress* on Class V Wells; and 40 C.F.R. §144.81.

May 11, 2004 (3:47pm)G:/User/Share/DECADIV\DECA-WCB\GWCS\Well Class Type Table for Inventory Form5.wpd

APPENDIX B

STANDARD OPERATING PROCEDURES FOR SLUG TESTS

SLUG TESTS

SOP#: 2046
DATE: 10/03/94
REV. #: 0.0

1.0 SCOPE AND APPLICABILITY

This procedure is applicable to determine the horizontal hydraulic conductivity of distinct geologic horizons under in-situ conditions. The hydraulic conductivity (K) is an important parameter for modeling the flow of groundwater in an aquifer.

These are standard (i.e. typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limimtations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (U.S. EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

A slug test involves the instantaneous injection or withdrawal of a volume or slug of water or solid cylinder of known volume. This is accomplished by displacing a known volume of water from a well and measuring the artificial fluctuation of the groundwater level.

The primary advantages of using slug tests to estimate hydraulic conductivities are numerous. First, estimates can be made in-situ, thereby avoiding errors incurred in laboratory testing of disturbed soil samples. Second, tests can be performed quickly at relatively low costs because pumping and observation wells are not required. And lastly, the hydraulic conductivity of small discrete portions of an aquifer can be estimated (e.g., sand layers in a clay).

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING AND STORAGE

This section is not applicable to this standard operating procedure (SOP).

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

Limitations of slug testing include: 1) only the hydraulic conductivity of the area immediately surrounding the well is estimated which may not be representative of the average hydraulic conductivity of the area, and 2) the storage coefficient, S, usually cannot be determined by this method.

5.0 EQUIPMENT/APPARATUS

The following equipment is needed to perform slug tests. All equipment which comes in contact with the well should be decontaminated and tested prior to commencing field activities.

- C Tape measure (subdivided into tenths of feet)
- C Water pressure transducer
- C Electric water level indicator
- C Weighted tapes
- C Steel tape (subdivided into tenths of feet)
- C Electronic data-logger (if transducer method is used)
- C Stainless steel slug of a known volume
- C Watch or stopwatch with second hand
- C Semi-log graph paper (if required)
- C Water proof ink pen and logbook
- C Thermometer
- C Appropriate references and calculator
- C Electrical tape
- C 21X micrologger
- C Compact portable computer or equivalent with Grapher installed on the hard disk

6.0 REAGENTS

No chemical reagents are used in this procedure; however, decontamination solvents may be necessary. If decontamination of the slug or equipment is required, refer to the Sampling Equipment Decontamination SOP and the site specific work plan.

7.0 PROCEDURES

7.1 Field Procedures

The following general procedures may be used to collect and report slug test data. These procedures may be modified to reflect site specific conditions:

1. When the slug test is performed using an electronic data-logger and pressure transducer, all data will be stored internally or on computer diskettes or tape. The information will be transferred directly to the main computer and analyzed. A computer printout of the data shall be maintained in the files as documentation.

   If the slug test data is collected and recorded manually, the slug test data form (Figure 1, Appendix A) will be used to record observations. The slug test data form shall be completed as follows:

   - Site ID - Identification number assigned to the site.
   - Location ID - Identification of location being tested.
   - Date - The date when the test data was collected in this order: year, month, day (e.g., 900131 for January 31, 1990).
   - Slug volume (ft^3) - Manufacturers specification for the known volume or displacement of the slug device.
   - Logger - identifies the company or person responsible for performing the field measurements.
   - Test method - The slug device is either injected or lowered into the well or withdrawn or pulled-out from the monitor well. Check the method that is applicable to the test situation being run.
   - Comments - Appropriate observations or information for which no other blanks are provided.
   - Elapsed time (min) - Cumulative time readings from beginning of test to end of test, in minutes.
   - Depth to water (ft) - Depth to water recorded in tenths of feet.

2. Decontaminate the transducer and cable.

3. Make initial water level measurements on monitor wells in an upgradient to downgradient sequence, if possible.

4. Before beginning the slug test, information will be recorded and entered into the electronic data-logger. The type of information may vary depending on the model used. When using different models, consult the operator's manual for the proper data entry sequence to be used.

5. Test wells from least contaminated to most contaminated, if possible.

6. Determine the static water level in the well by measuring the depth to water periodically for several minutes and taking the average of the readings.

7. Cover sharp edges of the well casing with duct tape to protect the transducer cables.

8. Install the transducer and cable in the well to a depth below the target drawdown estimated for the test but at least two feet from the bottom of the well. Be sure the depth of submergence is within the design range stamped on the transducer. Temporarily tape the transducer cable to the well to keep the transducer at a constant depth.

9. Connect the transducer cable to the electronic data-logger.

10. Enter the initial water level and transducer design range into the recording device according to manufacturers instructions (the transducer design range will be stamped on the side of the transducer). Record the initial water level on the recording device.

11. "Instantaneously" introduce or remove a

known volume or slug of water to the well. Another method is to introduce a solid cylinder of known volume to displace and raise the water level, allow the water level to restabilize and remove the cylinder. It is important to remove or add the volumes as quickly as possible because the analysis assumes an "instantaneous" change in volume is created in the well.

12. At the moment of volume addition or removal assigned time zero, measure and record the depth to water and the time at each reading. Depths should be measured to the nearest 0.01 foot. The number of depth-time measurements necessary to complete the test are variable. It is critical to make as many measurements as possible in the early part of the test. The number and intervals between measurements will be determined from earlier previous aquifer tests or evaluations.

13. Continue measuring and recording depth-time measurements until the water level returns to equilibrium conditions or a sufficient number of readings have been made to clearly show a trend on a semi-log plot of time versus depth.

14. Retrieve slug (if applicable).

Note: The time required for a slug test to be completed is a function of the volume of the slug, the hydraulic conductivity of the formation and the type of well completion. The slug volume should be large enough that a sufficient number of water level measurements can be made before the water level returns to equilibrium conditions. The length of the test may range from less than a minute to several hours.

If the well is to be used as a monitoring well, precautions should be taken that the wells are not contaminated by material introduced into the well. If water is added to the monitoring well, it should be from an uncontaminated source and transported in a clean container. Bailers or measuring devices should be cleaned prior to the test. If tests are performed on more than one monitor well, care must be taken to avoid cross contamination of the wells.

Slug tests shall be conducted on relatively undisturbed wells. If a test is conducted on a well that has recently been pumped for water sampling purposes, the measured water level must be within 0.1 foot of the water level prior to sampling. At least one week should elapse between the drilling of a well and the performance of a slug test.

7.2 Post Operation Procedures

When using an electronic data-logger use the following procedure:

1. Stop logging sequence.

2. Print data.

3. Send data to computer by telephone.

4. Save memory and disconnect battery at the end of the day's activities.

5. Review field forms for completeness.

8.0 CALCULATIONS

The simplest interpretation of piezometer recovery is that of Hvorslev (1951). The analysis assumes a homogenous, isotropic medium in which soil and water are incompressible. Hvorslev's expression for hydraulic conductivity (K) is:

$$K = \frac{r^2 \ln (L/R)}{2 L T_0} \quad \text{for } L/R > 8$$

where:

K	=	hydraulic conductivity [ft/sec]
r	=	casing radius [ft]
L	=	length of open screen (or borehole) [ft]
R	=	filter pack (borehole) radius [ft]
T_0	=	Basic Time Lag [sec]; value of t on semi-logarithmic plot of $H-h/H-H_0$ vs. t, where $H-h/H-H_0 = 0.37$
H	=	initial water level prior to removal of slug
H_0	=	water level at t = 0
h	=	recorded water level at t > 0

(Hvorslev, 1951; Freeze and Cherry, 1979)

The Bower and Rice method is also commonly used for K calculations. However, it is much more time consuming than the Hvorslev method. Refer to Freeze and Cherry or Applied Hydrogeology (Fetter) for a discussion of these methods.

9.0 QUALITY ASSURANCE/ QUALITY CONTROL

The following general quality assurance procedures apply:

1. All data must be documented on standard Chain of Custody records, field data sheets, or within personal/site logbooks.

2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation, and they must be documented.

The following specific quality assurance activity will apply:

1. Each well should be tested at least twice in order to compare results.

10.0 DATA VALIDATION

This section is not applicable to this SOP.

11.0 HEALTH AND SAFETY

When working with potential hazardouse materials, follow U.S. EPA, OSHA and corporate health and safety procedures.

12.0 REFERENCES

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APPENDIX A

Slug Test Data Form

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FIGURE 1. Slug Test Data Form

DATE: _____

SITE ID: _____ SLUG VOLUME (ft^3): _____

LOCATION ID: _____ LOGGER: _____

TEST METHOD: __ SLUG INJECTION __ SLUG WITHDRAWAL

COMMENTS: _____

_____

_____

Time Beginning of Test #1 _____ Time Beginning of Test #2 _____

Time End of Test #1 _____ Time End of Test #2 _____

ELAPSED TIME (MIN)	DEPTH TO WATER (FT)	ELAPSED TIME (MIN)	DEPTH TO WATER (FT)

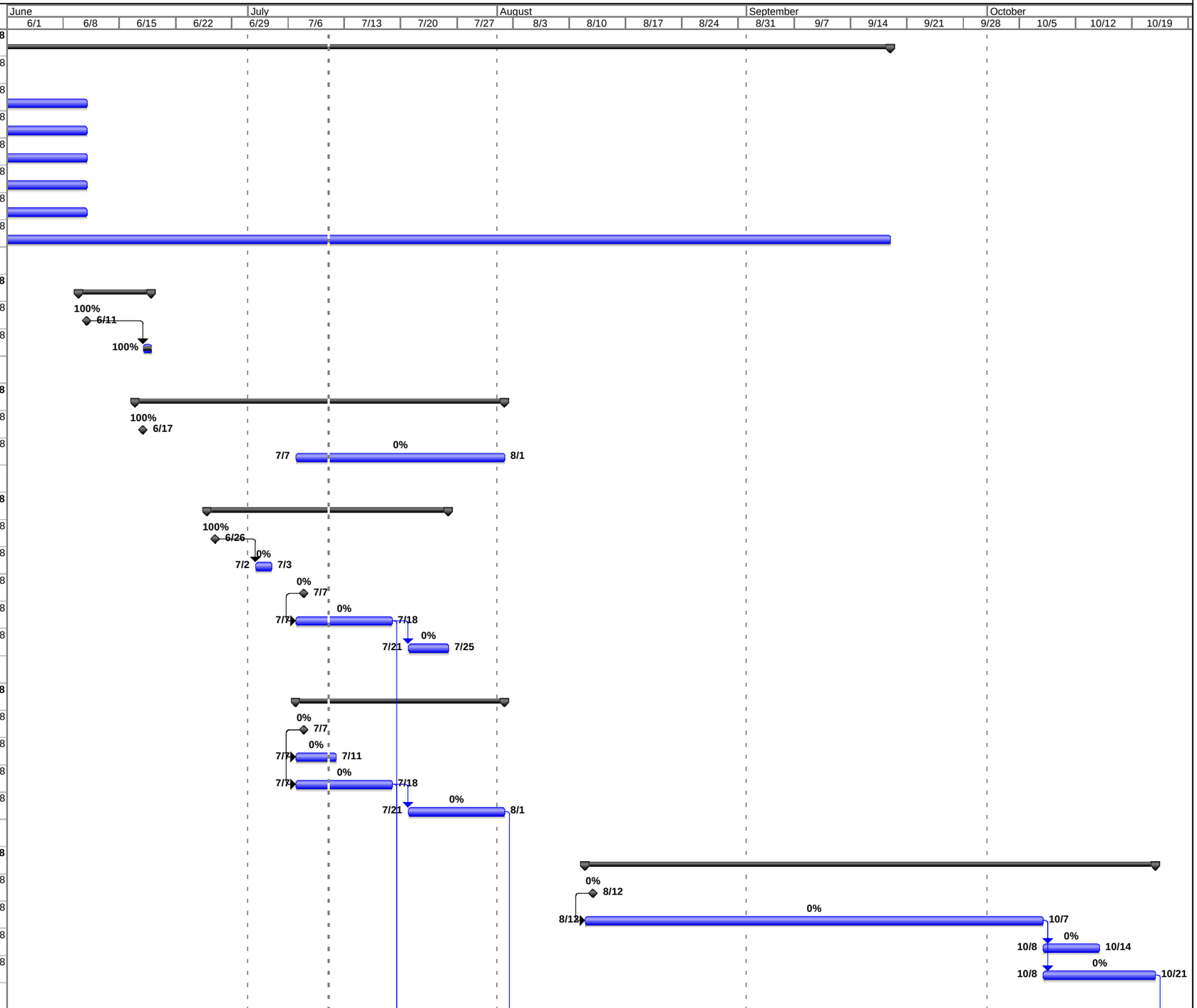
APPENDIX C

PRELIMINARY CONSTRUCTION SCHEDULE

Preliminary Construction Schedule

Griffiss On-Base Groundwater Remediation

ID	Task Name	Duration	Start	Finish
1	**CONSTRUCTION MOBILIZATION AND DEMOBILIZATION**	**98 days**	**Thu 5/1/08**	**Thu 9/18/08**
2	Construction Kick Off Meeting	0 days	Thu 5/1/08	Thu 5/1/08
3	Temporary Facilities/Decon/Area Set-up	1 mon	Tue 5/13/08	Tue 6/10/08
4	Building 817 Storage Use Approval	1 mon	Tue 5/13/08	Tue 6/10/08
5	City of Rome DPW-Hydrant Use Approval	1 mon	Tue 5/13/08	Tue 6/10/08
6	Rome WPCF Effluent Discharge Approval	1 mon	Tue 5/13/08	Tue 6/10/08
7	GAFB Property Access Approval	1 mon	Tue 5/13/08	Tue 6/10/08
8	Submit EPA Well Inventory Form	90 days	Tue 5/13/08	Thu 9/18/08
9				
10	**SURVEY TASK**	**7 days**	**Tue 6/10/08**	**Wed 6/18/08**
11	Submit Coordinate Data & Area Information to Surveyor	1 day	Tue 6/10/08	Wed 6/11/08
12	Surveying - Well Locations	1 day	Wed 6/18/08	Wed 6/18/08
13				
14	**SLUG TESTING**	**33 days**	**Tue 6/17/08**	**Fri 8/1/08**
15	Initial Slug Test on LF6MW-28; LF6MW-30; WSA-MW8; WSA-MW18	1 day	Tue 6/17/08	Tue 6/17/08
16	Slug Test on LF6MW-28; LF6MW-30; WSA-MW8; WSA-MW18-during Veg Oil Injection	20 days	Mon 7/7/08	Fri 8/1/08
17				
18	**DRILLING TASK**	**21 days**	**Thu 6/26/08**	**Fri 7/25/08**
19	Call Dig Safe (for all areas)	1 day	Thu 6/26/08	Thu 6/26/08
20	Dig Safe NY (markout for all areas)	2 days	Wed 7/2/08	Thu 7/3/08
21	Project Orientation and Safety Meeting Drillers	1 day	Mon 7/7/08	Mon 7/7/08
22	Mobilize Drilling Contractor and Install Monitoring Wells (5 monitoring wells, 1 extraction wells) & develop wells	2 wks	Mon 7/7/08	Fri 7/18/08
23	Pump Test - Bldg 775 Extraction Well	1 wk	Mon 7/21/08	Fri 7/25/08
24				
25	**VEGETABLE OIL INJECTION TASK**	**20 days**	**Mon 7/7/08**	**Fri 8/1/08**
26	Project Orientation and Safety Meeting Injection Crew	1 day	Mon 7/7/08	Mon 7/7/08
27	Road Improvement Task	1 wk	Mon 7/7/08	Fri 7/11/08
28	Landfill 6 Set up System and Perform Vegetable Oil Injection	10 days	Mon 7/7/08	Fri 7/18/08
29	Building 817/WSA Set up System and Perform Vegetable Oil Injection	2 wks	Mon 7/21/08	Fri 8/1/08
30				
31	**BUILDING 775 CONSTRUCTION TASK**	**50 days**	**Tue 8/12/08**	**Tue 10/21/08**
32	Project Orientation and Safety Meeting-Subcontractors	1 day	Tue 8/12/08	Tue 8/12/08
33	Mobilize Subcontractor to Install Pump & Treat System	2 mons	Tue 8/12/08	Tue 10/7/08
34	As-Built Survey - Bldg 775	1 wk	Wed 10/8/08	Tue 10/14/08
35	Start Up/ Shut Down	2 wks	Wed 10/8/08	Tue 10/21/08
36				



Preliminary Construction Schedule

Griffiss On-Base Groundwater Remediation

ID	Task Name	Duration	Start	Finish
37	**REMEDY IN PLACE**	**66 days**	**Fri 7/18/08**	**Tue 10/21/08**
38	Landfill 6 Remedy in Place	0 days	Fri 7/18/08	Fri 7/18/08
39	Building 817/WSA Remedy in Place	0 days	Fri 8/1/08	Fri 8/1/08
40	Nosedocks/Apron 2 Remedy in Place	0 days	Fri 7/18/08	Fri 7/18/08
41	Building 775 Remedy in Place	0 days	Tue 10/21/08	Tue 10/21/08
42				
43	Performance Monitoring Work Plan	1 day?	Thu 7/31/08	Thu 7/31/08
44	Long Term Monitoring Work Plan	1 day?	Mon 1/3/11	Mon 1/3/11