Groundwater monitoring has been conducted in the area downgradient of SWMU 39 and can be implemented for the anticipated duration of the remediation period. The plume exists in an industrial area of the site, far from the downgradient base property line, and has shown no evidence of migrating downgradient. CAA-4 would have some adverse effects on natural resources associated with construction activity, including constructing the piping and wells associated with both groundwater systems.

6.2.4.3 Cost

The cost for this alternative, assuming a time to achieve CAOs of 30 years, is approximately $4,518,402 with a present worth of $4,540,372 as summarized in **Appendix B**.

6.3 Comparative Analysis of Alternatives

In **Section 6.2**, each of the CAAs for SWMU 39 was evaluated on an individual basis. This section provides a comparative analysis of the expected performance of each alternative relative to the other alternatives to identify their respective advantages and disadvantages.

6.3.1 Protection of Human Health and the Environment

Three of the four alternatives address each of the CAOs identified for the Site and offer similar protection of human health. Protection of human health is ensured through the use of ICs common to all alternatives until MCLs are achieved in groundwater. Years of groundwater sampling data indicate that under current conditions, the processes of MNA (Alternatives CAA-2, CAA-3, and CAA-4) are and will continue to mitigate the potential for COCs in groundwater. These alternatives will also mitigate the potential for COCs in groundwater discharging to surface water.

CAA-4 is expected to have a greater impact on the environment than both CAA-2 and CAA-3 due to the need to excavate and construct permanent treatment systems and respective piping for implementation of two pump-and-treat systems. These treatment system areas would need to be maintained throughout operation.

CAA-2 would entail use of hazardous chemicals that could present risks to operators or others in the area if not handled correctly.

6.3.2 Performance and Reliability

The historical sampling results show that the processes of natural attenuation are reducing concentrations of PCE, TCE and its daughter products in groundwater at the Site. Accordingly, alternatives CAA-2, CAA-3, and CAA-4 rely partially on these processes (mainly biodegradation) to achieve the CAOs for groundwater. The success of the injection component of Alternatives CAA-2, CAA-3, and CAA-4 will be dependent on the hydraulic conductivity and variable geology of the aquifer. The performance of CAA-4 will also depend on the ability to induce a gradient and enhance groundwater flushing throughout the target area.

All three alternatives incorporate groundwater monitoring on periodic intervals to track the progress of remediation and confirm that enhanced attenuation is effectively managing impacted groundwater. During the periodic reviews, data are available to determine whether aquifer restoration has been achieved and the site can be closed. Alternatives CAA-2, CAA-3 and CAA-4 incorporate groundwater monitoring to evaluate the effectiveness of enhanced attenuation in reducing groundwater contaminant concentrations below the respective contaminant MCLs.

6.3.3 Implementability

Implementation of CAA-2, CAA-3, and CAA-4 is highly dependent on whether the required volume for each remedy can be injected within the appropriate treatment zones. Slug test data indicate that it may be difficult to inject solution into the ground successfully.

A network of monitor wells is currently in place, which would be supplemented with additional monitor wells, to track aquifer restoration. Groundwater monitoring and ICs are equally implementable for all three alternatives.

6.3.4 Cost

CAA-3 presents the lowest cost and will meet the CAOs for the site. Periodic monitoring will provide the data needed to demonstrate aquifer restoration. CAA-4 presents the highest cost. CAA 4 is implementable. However, the high capital cost to build both a shallow extraction system and a deep extraction and reinjection system and the significant construction effort make this alternative less implementable than CAA-2 and CAA-3. **Appendix B** provides a cost comparison for the corrective action alternatives.

7. Proposed Remedy

Based on the analyses presented, Alternative CAA-3 is selected as the preferred remedy. CAA-3 consists of LUCs to prevent use of groundwater as potable water, monitoring of the ongoing natural attenuation in the shallow and deep zones, LNAPL recovery via absorbent socks, LUCs to prevent exposure to impacted soil including periodic assessments to ensure the concrete cap is maintained, and enhanced reductive dechlorination of deep zone source mass via injection of a carbon substrate. CAA-3 is the lower cost alternative and would have less impact on Army operations. CAA-3 is most likely to be effective in reducing source mass since the remedy enhances the ongoing reductive dechlorination processes at the Site.

7.1 Source Remedy

The proposed source area treatment with ERD would be via injection of EVO. Site data show the presence of dehalogenation daughter products, which indicate naturally occurring biological degradation is ongoing. ERD will serve to enhance these processes further to achieve treatment objectives. Since VOC concentrations are approximately 1 ppm in the source area, it is likely that multiple injection events will be required. The injection wells will be oriented in transects across the footprint of the source area. To minimize impacts to the busy and access limited FST-39 area, temporary infrastructure (i.e., mixing tanks, above-grade conveyance lines, injection pumps) will be used to inject the EVO which can be easily removed following each injection event.

The proposed injection substrate, EVO, serves as a long-term electron donor source. EVO is comprised of soybean oil, emulsifiers, and water that behave like a soluble carbon source and can be delivered into the target formation via the proposed injection well network. Performance monitoring will be conducted to confirm VOC treatment and track the overall longevity of the EVO substrate to guide the timing and need for subsequent injections. TOC within the active treatment area would be maintained at no less than 20 mg/L. Additional injection events would be necessary after TOC concentrations fall below 20 mg/L. The performance monitoring program will include semiannual sampling for TOC, VOCs and light gases (methane, ethane, and ethene).

7.2 PAHs in Soil

The soil where the low level PAHs were detected is currently capped by 12 inches of concrete preventing direct exposure to the soil or leaching to groundwater. PAHs were

not detected in the groundwater. Based on the concrete cap, and the low levels detected in soil, maintenance of the current concrete cap and continued use restrictions are recommended for PAHs. As per the proposed LUCs, an inspection of the area will be completed semi-annually as part of the site visit to confirm the site conditions and area use have not changed as part of the land use restrictions.

7.3 LNAPL Recovery

Sorbent socks will be installed and maintained through routine change-outs to evaluate the LNAPL recovery rate. The LNAPL levels in the wells will be routinely gauged to evaluate the performance. If the recovery rate is high enough to require frequent removal events, a skimming system that operates on solar power (i.e. solar sipper) will be installed to optimize the total LNAPL recovery while reducing maintenance time on site. No additional actions are anticipated as current groundwater concentrations in the area of LNAPL are below the MCLs for constituents related to the type of LNAPL present. Additional groundwater monitoring for this area will be completed as part of the overall site groundwater monitoring program.

7.4 Monitoring of Natural Attenuation

In addition to performance monitoring, a semi-annual groundwater MNA monitoring program will be conducted for the low level diffuse chlorinated solvent plume using wells within the monitoring network.

Dissolved arsenic, which is above the MCL in two monitor wells, will be monitored during remedial action implementation. Data trends will be presented in CAP progress reports and recomendations will be made for remedial actions if necessary.

7.5 Land Use Controls

LUCs are remedial actions that include any type of physical, legal, or administrative mechanism that restricts the use of property in accordance with a remedial decision. LUCs, as applied to real property, refer to any restriction or control that limits the use of any portion of that property, including water resources, arising from the need to protect human health and the environment. LUCs are used to mitigate risks associated with exposure to in-place residual contamination instead of eliminating those risks through removal actions or implementation of other remedial measures. LUCs are included as part of the selected remedy at SWMU 39, because residual impacts may remain in place in the soil and groundwater.

7.5.1 Physical LUCs

Part of SWMU 39, including the entire area with soil impacted above regulatory limits, is located within a fenced compound. For the purpose of these LUCs, SWMU 39 includes the DSMF fenced area and groundwater impacts identified to the south and east of the fenced area. In addition, Fort Stewart is an active military facility with active and passive security measures currently in place, the installation of additional access controls at the site is not required. Access is restricted around the perimeter of the entire installation by a combination of physical barriers such as gates controlled by Fort Stewart personnel, fencing, and natural obstructions such as forest and wetlands. Since SWMU 39 is located within an access controlled area, the only physical LUC feature that will be added to the existing LUC features is the placement of signage to warn potential trespassers of the SWMU. The intent of the signage is to provide additional notification of the past usage of the site as well as to provide contact information for anyone who may have questions regarding the site. Signs will be placed at locations used for entrance and exit from the area. Approximately four signs are anticipated. The signs will be inspected annually and documentation of the inspection will be included in the subsequent performance report.

7.5.2 Administrative LUCs

The routine management and its associated compliance with LUCs will involve utilization of Fort Stewart's existing Installation project planning process. Projects or activities that may alter real property or Federal lands must be coordinated with the Directorate of Public Works for appropriate Installation evaluation. Included in this overarching DPW-managed process is an environmental impact evaluation. This step ensures projects / activities are planned in accordance with the National Environmental Policy Act (NEPA) [42 U.S.C. §4321-4347)] and 32 CFR Part 651, *Environmental Analysis of Army Actions*. The NEPA process allows for an environmental review of potential consequences that may result from the proposed action and to identify the protection measures necessary to avoid and minimize harm to sensitive resources, including the development of alternatives. Sensitive resources that are evaluated through the NEPA process include but are not limited to wetlands, threatened and endangered species, and restoration sites. The IRP Manager will determine if there is a potential impact to the SWMU and will provide comments or restrictions to protect or prevent improper disturbance in accordance with the Permit.

Based on the environmental impact analysis, the NEPA Coordinator will determine if the proposed action meets the screening criteria specified in 32 CFR 651.33 and if it qualifies for a categorical exclusion as provided in Appendix B to 32 CFR 651. A majority of the day-to-day actions occurring on Fort Stewart land qualify for a categorical exclusion, which are actions that normally do not require an Environmental Assessment (EA) or an Environmental Impact Statement (EIS), and do not individually or cumulatively have a substantial effect on the human environment. When an action qualifies for a CX, typically a Record of Environmental Consideration (REC) is prepared and briefly documents that an Army action has received environmental review. The REC must be signed by the project proponent and includes site-specific conditions, restrictions, and mitigations required to protect the environment as is necessary to maintain compliance with Federal, state, and local environmental requirements. .

An EA briefly provides the decision maker with sufficient evidence and analysis for determining whether a Finding of No Significant Impact (FNSI) or an EIS should be prepared. An EA is routinely used as a planning document to evaluate environmental impacts, develop alternatives and mitigation measures, and allow for agency and public participation. A FNSI is a document that briefly states why an action (not otherwise excluded) will not significantly affect the environment, and, therefore, that an EIS will not be prepared.

An EIS is a detailed written statement for major Federal actions significantly affecting the quality of the environment. The Record of Decision (ROD) is a concise public document summarizing the findings in the EIS and the basis for decision. The ROD is required after the completion of an EIS and it identifies mitigations which were important in supporting decisions, such as those mitigations which reduce otherwise significant impacts, and ensure that appropriate monitoring procedures are implemented.

The Fort Stewart IRP Manager will play a role along with the NEPA Coordinator to verify that the conditions summarized in final NEPA documentation is understood by project proponents and those responsible for preparing construction contracts or Army training plans.

The Installation's project planning and NEPA analysis processes, along with controlled access at SWMU 39 as part of the physical LUCs and periodic inspections, will assure that no unauthorized activities are conducted at SWMU 39.

Specifically, this administrative LUC for consideration will be designed and implemented to prevent the following:

- Breaching of the SWMU 39 surface cover in impacted soil areas;
- Withdrawal of groundwater; and,
- Residential use or residential development of the property.

Land use controls will also be set up to include areas where subsurface soil is currently not accessible due to existing structures. Land use controls will include a restriction of subsurface activities beneath Building 1163. In the event that Building 1163 is demolished, the site restrictions will include a requirement for additional investigation of the subsurface soil. Land disturbing activities, such as excavation, soil borrow, human consumption of groundwater, and groundwater well installation within the limits of the SWMU will be prevented through utilization of Ft. Stewart's existing installation planning process.

Emergency conditions that arise and require immediate response will be documented and formally reported immediately upon remedy of the emergency situation while minimizing environmental damage to the maximum degree practicable. If possible, notification will be provided to the IRP Manager as soon as practicable during emergency conditions. Post-remedy documentation will be evaluated to determine if there are any negative environmental impacts as a result of the emergency condition. Should disturbance of the SWMU be necessary in response to an emergency condition, the area should be restored to its original condition as determined by the IRP Manager.

Both the RCRA Permit and the Installation project planning / NEPA review processes are currently utilized as administrative LUCs. No additional administrative LUCs are necessary in order to be in compliance with the selected remedy.

7.6 Baseline Sampling

Since site monitor wells have not been sampled since 2011, a baseline sampling event is recommended prior to implementation of the selected corrective actions. Water level and depth-to product measurements will be collected from all groundwater monitor wells. The most impacted monitor wells will be included in the baseline sampling for analysis of USEPA Method 8260. Monitor wells which previously had dissolved arsenic above the tapwater RSL will also be analyzed for total and dissolved arsenic.

The proposed monitoring wells to be sampled are provided in the following table:

Monitoring Wells	Analytical Parameters
Shallow	
G4MW010, G4MW011, G4MW013, G4MW014, G4MW016, G4MW017, G4MW018, G4MW019, G4MW022, G4MW023, G4MW024, G4MW025, G4MW027, G4MW029, G4MW033, G4MW035, G4MW043, G4MW044, G4MW046, G4MW048	USEPA Method 8260 (VOCs)
G4MW014, G4MW017, G4MW054	Total and Dissolved Arsenic
Deep	
G4MW032, G4MW036, G4MW040, G4MW041, G4MW047, G4MW051, G4MW052, G4MW055, G4MW056, G4MW057	USEPA Method 8260 (VOCs)
G4MW050, G4MW051, G4MW052, G4MW053	Total and Dissolved Arsenic

The baseline sampling is tentatively scheduled for Spring 2016 pending GAEPD approval.

7.7 LNAPL Recover Test

An evaluation of LNAPL mobility and recoverability is also recommended prior to implementation of the selected corrective actons, An LNAPL baildown test would be conducted in all monitor wells with LNAPL during the baseline water levels. Historically, G4MW001 and G4MW002 have been the only wells manifesting LNAPL. The following procedure defines the requirements for conducting an LNAPL Bail Down Test in the monitoring wells. The purpose of this procedure is to measure the thickness and depth to free product in the well as it recovers. The results of these tests are analyzed in accordance with techniques described in “How to Effectively Recover Free Product at Leaking Underground Storage Tank Sites,” (EPA 510-R-96-001) to assist choice of potential free product recovery methods. The following steps will be used:

1. Measure the depth to LNAPL and groundwater.

2. Use a weighted disposal bailer to remove as much LNAPL from the well as possible.

3. Use a hydrocarbon probe is to measure the recovery rate of free product and groundwater. Record the LNAPL thickness and recovery time in the well at regular intervals until the recovery rate has stabilized.

4. Determine 80% of the maximum LNAPL recovery thickness.

5. Interpolate the recovery time for 80% recovery.

6. Compute gallons per foot of LNAPL thickness in the well screen.

7. Compute the average recovery rate in gallons per day to 80% recovery.

8. References

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Tables

Table 2-1
May 2011 and May 2015 Water and Product Levels
SWMU-39
Fort Stewart, Georgia

Monitoring Well ID	TOC Elevation (feet amsl)	Depth to Product (feet btoc)	Depth to Water (feet btoc)	Water Elevation (feet amsl) (Calculated)*	Product Elevation (feet amsl)	Product Thickness (feet)
			May 2011			
G4MW001	74.82	5.79	6.44	68.97	69.03	0.65
G4MW002	74.33	4.94	8.20	69.06	69.39	3.26
G4MW003	74.57	ND	5.10	69.47	NA	NA
G4MW004	74.51	ND	4.93	69.58	NA	NA
G4MW005	74.29	ND	NM	NM	NA	NA
G4MW006	74.38	ND	5.67	68.71	NA	NA
G4MW007	74.74	ND	6.21	68.53	NA	NA
G4MW008	74.36	ND	6.00	68.36	NA	NA
G4MW009	74.75	ND	5.54	69.21	NA	NA
G4MW010	74.23	ND	5.39	68.84	NA	NA
G4MW011	74.08	ND	5.95	68.13	NA	NA
G4MW012	74.27	ND	5.82	68.45	NA	NA
G4MW013R	74.70	ND	6.17	68.53	NA	NA
G4MW014	74.96	ND	4.46	70.50	NA	NA
G4MW015	74.82	ND	4.50	70.32	NA	NA
G4MW016	72.28	ND	4.58	67.70	NA	NA
G4MW017	71.84	ND	5.24	66.60	NA	NA
G4MW018	74.27	ND	4.94	69.33	NA	NA
G4MW019	74.76	ND	4.61	70.15	NA	NA
G4MW020	74.64	ND	4.51	70.13	NA	NA
G4MW021	74.18	ND	4.87	69.31	NA	NA
G4MW022	72.59	ND	8.40	64.19	NA	NA
G4MW023	75.58	ND	8.61	66.97	NA	NA
G4MW024	74.41	ND	6.10	68.31	NA	NA
G4MW025	74.52	ND	4.75	69.77	NA	NA
G4MW026	76.01	ND	9.71	66.30	NA	NA
G4MW027	76.50	ND	5.78	70.72	NA	NA
G4MW028	82.91	ND	5.65	77.26	NA	NA
G4MW029	84.07	ND	7.23	76.84	NA	NA
G4MW030	67.64	ND	7.01	60.63	NA	NA
G4MW031	78.96	ND	NM	NM	NA	NA
G4MW032	74.27	ND	4.47	69.80	NA	NA
G4MW033	74.23	ND	4.43	69.80	NA	NA
G4MW034	70.19	ND	3.00	67.19	NA	NA
G4MW035	70.52	ND	5.55	64.97	NA	NA
G4MW036	83.62	ND	7.93	75.69	NA	NA
G4MW037	82.47	ND	5.60	76.87	NA	NA
G4MW038	85.12	ND	7.67	77.45	NA	NA
G4MW039	86.02	ND	8.52	77.50	NA	NA
G4MW040	72.21	ND	7.72	64.49	NA	NA
G4MW041	84.24	ND	7.12	77.12	NA	NA
G4MW042	77.24	ND	9.21	68.03	NA	NA
G4MW043	72.58	ND	9.31	63.27	NA	NA
G4MW044	75.64	ND	11.55	64.09	NA	NA
G4MW045	75.44	ND	11.33	64.11	NA	NA
G4MW046	77.15	ND	5.85	71.30	NA	NA
G4MW047	77.09	ND	5.51	71.58	NA	NA
G4MW048	84.93	ND	12.75	72.18	NA	NA
G4MW049	84.86	ND	12.64	72.22	NA	NA
G4MW050	83.26	ND	6.31	76.95	NA	NA
G4MW051	84.02	ND	6.73	77.29	NA	NA
G4MW052	83.78	ND	7.99	75.79	NA	NA
G4MW053	74.78	ND	6.95	67.83	NA	NA
G4MW054	71.59	ND	7.87	63.72	NA	NA
22-07R	75.38	ND	5.16	70.22	NA	NA
22-08	75.79	ND	6.14	69.65	NA	NA
			May 2015			
G4MW001	74.82	5.46	5.54	69.35	69.36	0.08
G4MW002	74.33	4.33	5.45	69.89	70.00	1.12

Notes:
*Water level compensated for the presence of Light Non-Aqueous Phase Liquids (LNAPL) if detected.
NA = Not Applicable.
ND = Not Detected.
NM = Not Measured.
amsl = above mean sea level.
btoc = below top of casing

Table 3-1
April 2010 Surface Water Analytical Data
SWMU 39
Fort Stewart, Georgia

		Location ID Sample Date	F39SW-01 4/8/2010	F39SW-01-DUP 4/8/2010	F39SW-02 4/8/2010	F39SW-03 4/8/2010	F39SW-04 4/8/2010	F39SW-05 4/8/2010	F39SW-06 4/8/2010	F39SW-07 4/8/2010
Chemical Name	Tapwater RSL[2]	IWQS [1]								
VOCs - USEPA Method 8260 (µg/L)										
1,1,1-Trichloroethane	8000		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,2,2-Tetrachloroethane	0.076	4	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	55000		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1,2-Trichloroethane	0.28	16	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1-Dichloroethane	2.7		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,1-Dichloroethene	260	7100	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2,4-Trichlorobenzene	1.1	70	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dibromo-3-chloropropane (DBCP)	0.00033		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dibromoethane	0.0075		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichlorobenzene	300	1300	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichloroethane	0.17	37	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,2-Dichloropropane	0.44	15	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,3-Dichlorobenzene		960	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
1,4-Dichlorobenzene	0.48	190	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
2-Butanone	5600		< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
2-Hexanone	38		< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
4-Methyl-2-pentanone	1200		< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Acetone	14000		1.7 UB	**3.1 J**	4 UB	5.9 UB	3.8 UB	7.5 UB	**14**	7.6 UB
Benzene	0.45	51	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Benzene, 1-methylethyl	450		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromodichloromethane	0.13	17	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromoform	3.3	140	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Bromomethane	7.5	1500	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ	< 0.5 UJ
Carbon disulfide	810		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Carbon tetrachloride	0.45	1.6	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
CFC-11	1100		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
CFC-12	200		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chlorobenzene	78	1600	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chloroethane	21000		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chloroform	0.22	470	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Chloromethane	190		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
cis-1,2-Dichloroethene	36		**1.1**	**0.4 J**	**0.86**	**1.1**	**0.43 J**	**0.74**	**0.23 J**	**0.63**
cis-1,3-Dichloropropene			< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Cyclohexane	13000		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Dibromochloromethane	0.17	13	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Ethylbenzene	1.5	2100	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Methyl acetate	20000		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Methylcyclohexane			< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Methylene chloride	11	590	0.23 UB	**0.21 J**	0.22 UB	0.2 UB	0.22 UB	0.25 UB	0.21 UB	0.22 UB
Styrene	1200		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
tert-Butyl methyl ether	14		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Tetrachloroethene	11	3.3	**0.12 J**	**1**	**0.14 J**	**0.21 J**	**1.1**	**1.3**	**0.61**	**0.81**
Toluene	1100	5980	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
trans-1,2-Dichloroethene	360	10000	**0.11 J**	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	**0.1 J**
trans-1,3-Dichloropropene			< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Trichloroethene	0.49	30	**1.5 J**	**4.3 J**	**1.5**	**2**	**4.5**	**4.8**	**2.3**	**3.3**
Vinyl chloride	0.019	2.4	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
Xylenes (total)	190		< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U

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Table 3-1
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Fort Stewart, Georgia

		Location ID	F39SW-01	F39SW-01-DUP	F39SW-02	F39SW-03	F39SW-04	F39SW-05	F39SW-06	F39SW-07
		Sample Date	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010
Chemical Name	Tapwater RSL[2]	IWQS [1]								
SVOCs - USEPA Method 8270 (µg/L)										
1,1'-Biphenyl	0.83		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2,4,5-Trichlorophenol	1200		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2,4,6-Trichlorophenol	4	2.4	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2,4-Dichlorophenol	46	290	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2,4-Dimethylphenol	360	850	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2,4-Dinitrophenol	39	5300	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
2,4-Dinitrotoluene	0.24	3.4	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
2,6-Dinitrotoluene	0.048		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
2-Chloronaphthalene	750	1600	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2-Chlorophenol	91	150	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2-Methyl-4,6-dinitrophenol	1.5	280	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
2-Methylnaphthalene	36		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2-Methylphenol	930		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
2-Nitrobenzenamine	190		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
2-Nitrophenol			< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
3,3'-Dichlorobenzidine	0.12	0.028	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
3-Nitrobenzenamine			< 2 R	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
4-Bromophenyl phenyl ether			< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
4-Chloro-3-methylphenol	1400		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
4-Chlorobenzenamine	0.36		< 1 R	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
4-Chlorophenyl phenyl ether			< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
4-Methylphenol	1900		< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
4-Nitrobenzenamine	3.8		< 2 UJ	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
4-Nitrophenol			< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Acenaphthene	530	990	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Acenaphthylene			< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Acetophenone	1900	3700	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Anthracene	1800	40000	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Atrazine	0.3		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Benz(a)anthracene	0.012	0.018	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Benzaldehyde	1900		< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Benzo(a)pyrene	0.0034	0.018	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Benzo(b)fluoranthene	0.034	0.018	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Benzo(ghi)perylene			< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Benzo(k)fluoranthene	0.34	0.018	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bis(2-chloroethoxy)methane	59		< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bis(2-chloroethyl) ether	0.014	0.53	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bis(2-chloroisopropyl) ether	0.36	65000	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Bis(2-ethylhexyl)phthalate	5.6	2.2	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Butyl benzyl phthalate	16	1900	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ	< 5 UJ
Caprolactam	9900		< 5 U	**2.3 J**	< 5 U	**1.6 J**	**2.6 J**	**1.9 J**	< 5 U	**1.9 J**
Carbazole			< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Chrysene	3.4	0.018	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Dibenz(a,h)anthracene	0.0034	0.018	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Dibenzofuran	7.9		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Diethyl phthalate	15000	44000	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Dimethyl phthalate		1100000	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Di-n-butyl phthalate	900	4500	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Di-n-octylphthalate	200		< 5 UJ	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Fluoranthene	800	140	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Fluorene	290	5300	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Hexachlorobenzene	0.0098	0.00029	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Hexachlorobutadiene	0.14	18	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Hexachlorocyclopentadiene	0.41	1100	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Hexachloroethane	0.33	3.3	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Indeno(1,2,3-cd)pyrene	0.034	0.018	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ

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		Location ID	F39SW-01	F39SW-01-DUP	F39SW-02	F39SW-03	F39SW-04	F39SW-05	F39SW-06	F39SW-07
		Sample Date	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010
Chemical Name	Tapwater RSL[2]	IWQS [1]								
SVOCs continued - USEPA Method 8270 (µg/L)										
Isophorone	78	960	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Naphthalene	0.17		< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Nitrobenzene	0.14	690	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
N-Nitroso-di-n-propylamine	0.011	0.51	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
N-Nitrosodiphenylamine	12	6	< 1 UJ	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Pentachlorophenol	0.04	3	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Phenanthrene			< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Phenol	5800	857000	< 1	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Pyrene	120	4000	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ	< 1 UJ
Metals - USEPA Method 6010/7470 (µg/L)										
Arsenic	0.052	150	< 10 U	16 UB	6 UB	< 10 U	17 UB	19 UB	19 UB	**22**
Barium	3800		**40**	**47**	**38**	**43**	**47**	**49**	**49**	**47**
Cadmium		0.15	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U	< 2 U
Chromium		11	< 5 U	**4.2 J**	< 5 U	**2.2 J**	**3.3 J**	< 5 U	< 5 U	**3.9 J**
Lead	15	1.2	**3.1 J**	**7.5 J**	**3.9 J**	**6.7 J**	**9.2 J**	**6.7 J**	**4.6 J**	**5.1 J**
Selenium	100	5	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U	< 10 U
Silver	94		0.52 UB	< 5	1.1 UB	< 5 U	< 5 U	< 5 U	< 5 U	< 5 U
Mercury	0.63	0.012	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	< 0.1 U	**0.084 J**	< 0.1 U	< 0.1 U

Notes:

[1]	Georgia Environmental Protection Division Instream Water Quality Standards (IWQS) as of 2011.
[2]	USEPA tap water RSL as of June 2015.
3.1	Constituent concentration exceeds the IWQS, or the RSL if no IWQS is available.
µg/L	Micrograms per liter.
U	Constituent concentration was qualified as nondetect.
J	Constituent concentration was estimated.
VOCs	Volatile Organic Compounds.
SVOCs	Semi-volatile Organic Compounds.
NA	Not analyzed.
B	Detected in method blank.

Table 3-2
April 2010 Sediment Analytical Data
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Fort Stewart, Georgia

	Location ID Sample Date	F39SED001 4/8/2010	F39SED002 4/8/2010	F39SED003 4/8/2010	F39SED004 4/8/2010	F39SED005 4/8/2010	F39SED006 4/8/2010	F39SED007 4/8/2010	F39SED008 4/8/2010
Chemical Name	Residential RSL[1]								
VOCs - USEPA Method SW8260 (mg/kg)									
1,1,1-Trichloroethane	8100	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,1,2,2-Tetrachloroethane	0.6	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	40000	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,1,2-Trichloroethane	1.1	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,1-Dichloroethane	3.6	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,1-Dichloroethene	230	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,2,4-Trichlorobenzene	24	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,2-Dibromo-3-chloropropane (DBCI	0.0053	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,2-Dibromoethane	0.036	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,2-Dichlorobenzene	1800	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,2-Dichloroethane	0.46	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,2-Dichloropropane	1.0	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,3-Dichlorobenzene		< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
1,4-Dichlorobenzene	2.6	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
2-Butanone	27000	< 0.062 U	< 0.019 U	< 0.014 U	< 0.013 U	< 0.014 U	< 0.011 U	< 0.0095 U	< 0.0099 U
2-Hexanone	200	< 0.062 U	< 0.019 U	< 0.014 U	< 0.013 U	< 0.014 U	< 0.011 U	< 0.0095 U	< 0.0099 U
4-Methyl-2-pentanone	5300	< 0.062 U	< 0.019 U	< 0.014 U	< 0.013 U	< 0.014 U	< 0.011 U	< 0.0095 U	< 0.0099 U
Acetone	61000	< 0.12 U	< 0.038 U	**0.02 J**	**0.047**	**0.086**	**0.035**	**0.13**	**0.094**
Benzene	1.2	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Benzene, 1-methylethyl	1900	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Bromodichloromethane	0.29	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Bromoform	19	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Bromomethane	6.8	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Carbon disulfide	770	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Carbon tetrachloride	0.65	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
CFC-11	730	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
CFC-12	87	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Chlorobenzene	280	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Chloroethane	14000	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Chloroform	0.32	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Chloromethane	110	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
cis-1,2-Dichloroethene	160	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	**0.003 J**	**0.002 J**	**0.0015 J**	< 0.005 U
cis-1,3-Dichloropropene		< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Cyclohexane	6500	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Dibromochloromethane	0.75	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Ethylbenzene	5.8	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Methyl acetate	78000	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Methylcyclohexane		< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U

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Table 3-2
April 2010 Sediment Analytical Data
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Fort Stewart, Georgia

	Location ID Sample Date	F39SED001 4/8/2010	F39SED002 4/8/2010	F39SED003 4/8/2010	F39SED004 4/8/2010	F39SED005 4/8/2010	F39SED006 4/8/2010	F39SED007 4/8/2010	F39SED008 4/8/2010
Chemical Name	Residential RSL[1]								
VOCs continued - USEPA Method SW8260 (mg/kg)									
Methylene chloride	57	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Styrene	6000	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
tert-Butyl methyl ether	47	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Tetrachloroethene	24	< 0.031 U	< 0.0095 U	< 0.0072 U	**0.011**	**0.019**	< 0.0053 U	< 0.0048 U	< 0.005 U
Toluene	4900	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
trans-1,2-Dichloroethene	1600	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
trans-1,3-Dichloropropene		< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Trichloroethene	0.94	< 0.031 U	< 0.0095 U	**0.0029 J**	**0.019**	**0.038**	**0.017**	**0.012**	< 0.005 U
Vinyl chloride	0.059	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
Xylenes (total)	650	< 0.031 U	< 0.0095 U	< 0.0072 U	< 0.0067 U	< 0.0072 U	< 0.0053 U	< 0.0048 U	< 0.005 U
SVOCs - USEPA Method SW8270 (mg/kg)									
1,1'-Biphenyl	47	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
2,4,5-Trichlorophenol	6300	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
2,4,6-Trichlorophenol	49	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
2,4-Dichlorophenol	190	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
2,4-Dimethylphenol	1300	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
2,4-Dinitrophenol	130	< 0.45 UJ	< 0.46 U	< 0.44 U	< 0.41 U	< 0.41 U	< 0.44 U	< 0.42 U	< 0.53 U
2,4-Dinitrotoluene	1.7	< 0.18 U	< 0.18 U	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.16 U	< 0.21 U
2,6-Dinitrotoluene	0.36	< 0.18 U	< 0.18 U	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.16 U	< 0.21 U
2-Chloronaphthalene	4800	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
2-Chlorophenol	390	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
2-Methyl-4,6-dinitrophenol	5.1	< 0.45 U	< 0.46 U	< 0.44 U	< 0.41 U	< 0.41 U	< 0.44 U	< 0.42 U	< 0.53 U
2-Methylnaphthalene	240	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	**0.14**
2-Methylphenol	3200	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
2-Nitrobenzenamine	630	< 0.18 U	< 0.18 U	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.16 U	< 0.21 U
2-Nitrophenol		< 0.18 U	< 0.18 U	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.16 U	< 0.21 U
3,3'-Dichlorobenzidine	1.2	< 0.45 U	< 0.46 U	< 0.44 U	< 0.41 U	< 0.41 U	< 0.44 U	< 0.42 U	< 0.53 U
3-Nitrobenzenamine		< 0.18 U	< 0.18 U	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.16 U	< 0.21 U
4-Bromophenyl phenyl ether		< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
4-Chloro-3-methylphenol	6300	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
4-Chlorobenzenamine	2.7	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
4-Chlorophenyl phenyl ether		< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
4-Methylphenol	6300	< 0.18 U	**0.16 J**	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.16 U	< 0.21 U
4-Nitrobenzenamine	27	< 0.18 U	< 0.18 U	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.16 U	< 0.21 U
4-Nitrophenol		< 0.45 U	< 0.46 U	< 0.44 U	< 0.41 U	< 0.41 U	< 0.44 U	< 0.42 U	< 0.53 U
Acenaphthene	3600	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Acenaphthylene		< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Acetophenone	7800	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Anthracene	18000	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U

Footnotes appear on last page.

Table 3-2
April 2010 Sediment Analytical Data
SWMU 39
Fort Stewart, Georgia

Chemical Name	Location ID Sample Date Residential RSL[1]	F39SED001 4/8/2010	F39SED002 4/8/2010	F39SED003 4/8/2010	F39SED004 4/8/2010	F39SED005 4/8/2010	F39SED006 4/8/2010	F39SED007 4/8/2010	F39SED008 4/8/2010
SVOCs - USEPA Method SW8270 (mg/kg)									
Atrazine	2.4	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Benz(a)anthracene	0.16	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Benzaldehyde	7800	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	**0.61**
Benzo(a)pyrene	0.016	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Benzo(b)fluoranthene	0.16	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	**0.14**
Benzo(ghi)perylene		< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Benzo(k)fluoranthene	1.6	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Bis(2-chloroethoxy)methane	190	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Bis(2-chloroethyl) ether	0.23	< 0.092 UJ	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Bis(2-chloroisopropyl) ether	4.9	< 0.092 UJ	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Bis(2-ethylhexyl)phthalate	39	< 0.092 U	**0.093**	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Butyl benzyl phthalate	290	< 0.18 U	< 0.18 U	< 0.17 U	< 0.16 U	< 0.16 U	< 0.17 U	< 0.16 U	< 0.21 U
Caprolactam	31000	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Carbazole		< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Chrysene	16	< 0.092 UJ	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Dibenz(a,h)anthracene	0.016	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Dibenzofuran	73	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Diethyl phthalate	51000	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Dimethyl phthalate		< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Di-n-butyl phthalate	6300	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Di-n-octylphthalate	630	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Fluoranthene	2400	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Fluorene	2400	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Hexachlorobenzene	0.21	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Hexachlorobutadiene	1.2	< 0.092 UJ	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Hexachlorocyclopentadiene	1.8	< 0.45 UJ	< 0.46 U	< 0.44 U	< 0.41 U	< 0.41 U	< 0.44 U	< 0.42 U	< 0.53 U
Hexachloroethane	1.8	< 0.092 UJ	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Indeno(1,2,3-cd)pyrene	0.16	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Isophorone	570	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Naphthalene	3.8	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Nitrobenzene	5.1	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
N-Nitroso-di-n-propylamine	0.078	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
N-Nitrosodiphenylamine	110	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Pentachlorophenol	1.0	< 0.45 U	< 0.46 U	< 0.44 U	< 0.41 U	< 0.41 U	< 0.44 U	< 0.42 U	< 0.53 U
Phenanthrene		< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	**0.14**
Phenol	19000	< 0.092 U	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U
Pyrene	1800	< 0.092 UJ	< 0.093 U	< 0.089 U	< 0.084 U	< 0.083 U	< 0.089 U	< 0.085 U	< 0.11 U

Footnotes appear on last page.

Table 3-2
April 2010 Sediment Analytical Data
SWMU 39
Fort Stewart, Georgia

	Location ID	F39SED001	F39SED002	F39SED003	F39SED004	F39SED005	F39SED006	F39SED007	F39SED008
	Sample Date	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010	4/8/2010
Chemical Name	Residential RSL[1]								
Metals - USEPA Method 6010/7470 (mg/kg)									
Arsenic	0.68	**0.57 J**	**0.52 J**	**1.0**	**0.5 J**	**0.81**	**3.7**	**2.9**	**17**
Barium	15000	**3.9**	**6.9**	**5.4**	**7.5**	**0.8 J**	**1.6 J**	**0.9 J**	**16**
Cadmium	71	**0.14**	0.11 UB	0.096 UB	0.053 UB	0.033 UB	0.11 UB	0.087 UB	**0.6**
Chromium		**3**	**1.9**	**6.3**	**1.4**	**1.3**	**1.3**	**0.85**	**4.6**
Lead	400	**3.9**	**2.6**	**9.3**	**1.9**	**0.64**	**1.5**	**1.5**	**5.1**
Selenium	390	0.35 UB	0.4 UB	0.51 UB	0.26 UB	0.21 UB	0.33 UB	< 0.6 U	1 UB
Silver	390	< 0.32 U	< 0.35 U	< 0.33 U	< 0.3 U	< 0.31 U	< 0.34 U	< 0.3 U	< 0.41 U
Mercury	9.4	< 0.11 U	**0.0098 J**	**0.062 J**	< 0.095 U	< 0.098 U	< 0.11 U	< 0.1 U	**0.03 J**

Notes:

[1]	USEPA Residential Regional Screening Level for sediment as of June 2015.
1	Constituent concentration exceeds the USEPA residential soil RSL.
mg/kg	Milligrams per kilogram.
U	Constituent concentration was qualified as nondetect.
J	Constituent concentration was estimated.
VOCs	Volatile Organic Compounds.
SVOCs	Semi-volatile Organic Compounds.
NA	Not analyzed.
B	Detected in method blank.

Table 4-1
Summary of Monitor Well Construction Details
SWMU 39
Fort Stewart, Georgia

Monitoring Well ID	TOC Elevation (ft msl)	Well Diameter (inches)	Screen length (ft)	Screened Interval (ft bgs)	Aquifer Zone
G4MW001	74.82	1	10	6 - 16	Shallow
G4MW002	74.33	1	10	5 - 15	Shallow
G4MW003	74.57	1	10	5 - 15	Shallow
G4MW004	74.51	1	10	5 - 15	Shallow
G4MW005	74.29	1	10	5 - 15	Shallow
G4MW006	74.38	1	10	5 - 15	Shallow
G4MW007R	74.74	4	10	5 - 15	Shallow
G4MW008	74.36	1	10	5 - 15	Shallow
G4MW009	74.75	2	10	4 - 14	Shallow
G4MW010	74.23	2	10	5 - 15	Shallow
G4MW011	74.08	2	10	5 - 15	Shallow
G4MW012	74.27	2	10	5 - 15	Shallow
G4MW013R	74.70	4	10	4 - 14	Shallow
G4MW014	74.96	2	10	2 - 12	Shallow
G4MW015	74.82	2	10	2 - 12	Shallow
G4MW016	72.28	1	10	3 - 13	Shallow
G4MW017	71.84	1	10	2 - 12	Shallow
G4MW018	74.27	1	10	2 - 12	Shallow
G4MW019	74.76	1	10	2 - 12	Shallow
G4MW020	74.64	1	10	2 - 12	Shallow
G4MW021	74.18	1	10	2 - 12	Shallow
G4MW022	72.59	2	10	3 - 13	Shallow
G4MW023	75.58	2	10	5 - 15	Shallow
G4MW024	74.41	2	10	5 - 15	Shallow
G4MW025	74.52	2	10	3 - 13	Shallow
G4MW026	76.01	2	10	9 - 19	Shallow
G4MW027	76.50	2	10	10 - 20	Shallow
G4MW028	82.91	2	10	9 - 19	Shallow
G4MW029	84.07	2	10	5 - 15	Shallow
G4MW030	67.64	2	10	10 - 20	Shallow
G4MW031	78.96	2	10	10 - 20	Shallow
G4MW032	74.27	2	10	35 - 45	Deep
G4MW033	74.23	2	10	5 - 15	Shallow
G4MW034	70.19	2	5	40 - 45	Deep
G4MW035	70.52	2	10	6 - 16	Shallow
G4MW036	83.62	2	5	40 - 45	Deep
G4MW037	82.47	2	10	34.5 - 44.5	Deep
G4MW038	85.12	2	10	35 - 45	Deep
G4MW039	86.02	2	10	35 - 45	Deep
G4MW040	72.21	2	10	35 - 45	Deep
G4MW041	84.24	2	10	35 - 45	Deep
G4MW042	77.24	2	10	35 - 45	Deep
G4MW043	72.58	2	10	14 - 24	Shallow
G4MW044	75.64	2	10	4.5 - 14.5	Shallow
G4MW045	75.44	2	10	20 - 30	Deep
G4MW046	77.15	2	10	9 - 19	Shallow
G4MW047	77.09	2	10	25 - 35	Deep
G4MW048	84.93	2	10	10 - 20	Shallow
G4MW049	84.86	2	10	25 - 35	Deep
G4MW050	83.26	2	10	35 - 45	Deep
G4MW051	84.02	2	10	50 - 60	Deep
G4MW052	83.78	2	10	35 - 45	Deep
G4MW053	74.78	2	10	35 - 45	Deep
G4MW054	71.59	1	5	2.2 - 7.2	Shallow
G4MW055	84.17	2	10	88 - 98	Deep
G4MW056	84.44	2	10	33.6 - 43.6	Deep
G4MW057	78.14	2	10	35 - 45	Deep
G4MW058	84.71	2	10	36 - 46	Deep
22-07R	75.38	4	5	5 - 10	Shallow
22-08	75.79	0.75	7	2.6 - 9.6	Shallow
22-09	75.52	0.75	7	2.4 - 9.4	Shallow

Notes:

TOC	Top of Casing
ft bgs	Feet below ground surface
ft msl	Feet Above Mean Sea Level

Table 4-2
2011 Groundwater Analytical Data
SWMU 39
Fort Stewart, Georgia

Location ID		G4MW010	G4MW011	G4MW013	G4MW014	G4MW016	G4MW016 DUP	G4MW017	G4MW018	G4MW019	G4MW020	G4MW022	G4MW023	G4MW024	G4MW025	G4MW026	G4MW027	G4MW028	G4MW029	G4MW030	G4MW031	G4MW032	G4MW032 DUP
Sample Date		1/27/2011	1/27/2011	1/27/2011	1/25/2011	1/26/2011	1/26/2011	1/26/2011	1/26/2011	1/27/2011	1/27/2011	1/25/2011	1/27/2011	1/27/2011	1/27/2011	1/25/2011	1/27/2011	1/25/2011	1/27/2011	1/26/2011	1/25/2011	1/25/2011	1/25/2011
Chemical Name	MCL[1]																						
VOCs - USEPA Method SW8260 (µg/L)																							
Benzene	5	**0.17 J**	< 1 U	< 1 U	< 1 UJ	**0.15 J**	**0.16 J**	**0.17 J**	< 1 U	< 1 U	**0.2 J**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 UJ	< 1 UJ	**0.19 J**
cis-1,2-Dichloroethene	70	**1.8**	**14**	**6.4**	< 1 U	**13**	**13**	**7.1**	**13**	**16**	**2.8**	**1.9**	**0.93 J**	**11**	**8.3**	< 1 U	**0.33 J**	< 1 U	**3.7**	**0.32 J**	< 1 U	**1.9**	**1.8**
Tetrachloroethene	5	< 1 U	< 1 U	< 1 U	< 1 U	**1.9**	**1.8**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**12**	**14**
Trichloroethene	5	**0.32 J**	**6.2**	**3.3**	< 1 U	**15**	**15**	**15**	**6.7**	**6.3**	**0.22 J**	**3.1**	**1.4**	**2.8**	**5.8**	< 1 U	**6.4**	< 1 U	**2.9**	< 1 U	< 1 U	**14**	**14**
Vinyl chloride	2	**2.5**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
Metals (mg/L)																							
Dissolved Arsenic	0.01	< 0.01 U	< 0.01 U	**0.006 J**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.0078 J**	**0.0099 J**	< 0.01 U	0.0041 UB	**0.0056 J**	**0.004 J**	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U
Total Arsenic	0.01	**0.0052 J**	**0.0052 J**	< 0.01 U	< 0.01 U	0.0048 UB	< 0.01 U	< 0.01 U	< 0.01 U	**0.0076 J**	< 0.01 U	< 0.01 U	0.0074 UB	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	**0.0075 J**	< 0.01 U	**0.0067 J**	< 0.01 U	< 0.01 U	< 0.01 U

Location ID		G4MW033	G4MW034	G4MW035	G4MW036	G4MW037	G4MW038	G4MW039	G4MW040	G4MW041	G4MW042	G4MW043	G4MW044	G4MW045	G4MW046	G4MW047	G4MW048	G4MW049	G4MW050	G4MW051	G4MW052	G4MW053	G4MW054
Sample Date		1/27/2011	1/26/2011	1/26/2011	1/27/2011	1/27/2011	1/26/2011	1/26/2011	1/28/2011	1/27/2011	1/26/2011	1/27/2011	1/26/2011	1/26/2011	1/27/2011	1/26/2011	5/6/2011	5/4/2011	5/6/2011	5/6/2011	5/6/2011	5/6/2011	5/6/2011
Chemical Name	MCL[1]																						
VOCs - USEPA Method SW8260 (µg/L)																							
Benzene	5	**0.22 J**	< 1 U	**16**	< 1 U	**2.1**	< 1 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**0.23 J**	**0.15 J**	< 1	< 1	**0.34 J**	< 1	< 1	< 1
cis-1,2-Dichloroethene	70	**4.9**	< 1 U	**7.5**	**0.53 J**	< 1 U	< 1 U	< 1 U	**24**	**97**	< 1 U	**1.7**	**0.93 J**	< 1 U	**0.33 J**	**0.28 J**	**0.42 J**	< 1	< 1	**260**	**2.2**	< 1	< 1
Tetrachloroethene	5	**2.4**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**290**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**5.9**	< 1	< 1	< 1	**2.2**	< 1	< 1	< 1
Trichloroethene	5	**33**	< 1 U	**3.7**	**0.38 J**	< 1 U	< 1 U	< 1 U	**52**	**550**	< 1 U	**1.4**	**4.9**	< 1 U	**2.5**	**3.2**	< 1	< 1	< 1	**380**	**5.3**	< 1	< 1
Vinyl chloride	2	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 10 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U	**0.56 J**	< 1	< 1	< 1	< 1	< 1	< 1
Metals (mg/L)																							
Dissolved Arsenic	0.01	< 0.01 U	< 0.01 U	< 0.01 U	**0.012**	0.009 UB	< 0.01 U	**0.008 J**	0.0059 UB	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	0.007 UB	< 0.01 U	< 0.01 U	< 0.01	< 0.01	**0.009 BJ**	**0.0098 J**	**0.0042 BJ**	**0.024 B**	**0.0047 BJ**
Total Arsenic	0.01	**0.0052 J**	< 0.01 U	< 0.01 U	**0.015**	0.0057 UB	< 0.01 U	**0.021**	0.0057 UB	< 0.01 U	< 0.01 U	< 0.01 U	< 0.01 U	0.0061 UB	< 0.01 U	< 0.01 U	**0.0064 BJ**	< 0.01	**0.018 B**	**0.023 B**	**0.025 B**	**0.077 B**	**0.017 B**

Location ID		G4MW055	G4MW056	G4MW057	G4MW058
Sample Date		8/30/2011	8/31/2011	8/30/2011	10/25/2011
Chemical Name	MCL[1]				
VOCs - USEPA Method SW8260 (µg/L)					
Benzene	5	< 1	< 1	< 1	< 1
cis-1,2-Dichloroethene	70	**0.13 J**	**5.8**	**3.2**	< 1
Tetrachloroethene	5	**0.25 J**	**1**	**7.1**	< 1
Trichloroethene	5	**0.54 J**	**21**	**16**	< 1
Vinyl chloride	2	< 1	< 1	< 1	< 1
Metals (mg/L)					
Dissolved Arsenic	0.01	NA	NA	NA	NA
Total Arsenic	0.01	NA	NA	NA	NA

Notes:

[1]	U.S. EPA Maximum Contaminant Level as of June 2015
	Exceedences of MCL are shaded gray
µg/L	Micrograms per liter.
B	Detected in method blank.
J	Constituent concentration was estimated.
U	Not detected at laboratory detection limit
NA	Not analyzed.
DUP	Duplicate Sample

Table 6-1
Process Options Screening Summary - Groundwater
SWMU 39
Fort Stewart, Georgia

Remedial Technology	Remedial Technology Process Option	Effectiveness Evaluation	Implementability Evaluation	Relative Cost Evaluation	Retained?
No Action	No Action	---	---	---	Yes: Required by NCP and USEPA guidance as a baseline for comparison to other process options.
Institutional Controls	Deed Notification	Moderate: Does not reduce environmental impacts but helps ensure long-term permanence of remedy.	High: Fort Stewart can specify Site uses.	Low	Yes: Considered in conjunction with other technologies and necessary to ensure long-term permanence of remedy.
	Deed Restriction	Moderate: Does not reduce environmental impacts but helps ensure long-term permanence of remedy.	High: Fort Stewart can specify Site uses.	Low	Yes: Considered in conjunction with other technologies and necessary to ensure long-term permanence of remedy.
	Fencing/Signage	Low: Access to Fort Stewart is already restricted.	Low:	Low	No: Does not provide significant increase in protectiveness due to current Fort Stewart access restrictions.
	Informational Pamphlet	Low: Because Fort Stewart access is already restricted, this process option would not result in a significant increase in effectiveness.	Low:	Low	No: Does not provide significant increase in protectiveness due to current Fort Stewart access restrictions.
	Permits	Moderate: Effective in avoiding access to contaminated groundwater or soil.	High: Permit programs are generally already in effect in most jurisdictions.	Low	Yes: Generally required by ARARs and an important component to the overall remedy and long-term permanence.
	Site Management/Health and Saftey Plans	Moderate to High: Effective for protection of site workers and management of remedial implementation	High: Easily implementable.	Low	Yes: Necessary for proper site managmenet, long-term implementation, and site health and safety
Monitored Natural Attenuation	Environmental Media Monitoring	Low: Biodegradation of VOCs is slowly occurring in the source area. Not effective for reducing VOC concentrations in groundwater to cleanup goals within a reasonable timeframe.	High:	Low	Yes: Conventional technology. Considered in conjunction with other technologies.

Table 6-1
Process Options Screening Summary - Groundwater
SWMU 39
Fort Stewart, Georgia

Remedial Technology	Remedial Technology Process Option	Effectiveness Evaluation	Implementability Evaluation	Relative Cost Evaluation	Retained?
Barriers	Groundwater Extraction	Moderate to High: Effective for containment of impacted groundwater.	Moderate to High: Requires extraction well network to be installed	Moderate to High	Yes: Considered in conjunction with other technologies.
In-Situ Physical Treatment	Soil Vapor Extraction	Low : Limited effectivness due to deep geology, if combined with AS, vertical distance to recover would be too great. Low-permeability soil will limit effectiveness.	Low: Not easily implementable due to low-permeability soil.	Moderate	No: Geology, deep distance
	Multi-Phase Extraction	Moderate: Fine grained soils will limit the effectiveness of source mass recovery.	Low: Cannot dewater the sand layer	Moderate to High	No: Cannot dewater down to clay
	Thermal	Moderate to High: Effective means of enhancing soil vapor extraction for VOCs in soil and groundwater.	Low to Moderate: Railroad tracks negatively affect implementability	High cost	No: Cost too high
	Stabilization/Solidification	Low: Not effective for VOCs.	Low to Moderate: Low implementability at depths of source area impacts.	Moderate	No: Not effective or implementable when compared to other source treatment technologies.
In-Situ Chemical Treatment	Chemical Oxidation	Moderate to High: Highly affective for site VOCs	Moderate: Implementable as an aggressive source area treatment approach. May require permit for injection.	Moderate	Yes
	Reactive (Zero Valent) Iron	High: Effective for VOCs in groundwater.	Low to Moderate: Implementable as an aggressive source area treatment approach.	High	No: Not cost effective.
Containment	Slurry Wall	Low: Effective for preventing contaminant migration, not effective for remediation of VOCs	Low: Rail lines prevent installation of slurry wall	High	No. Rail lines prevent installation, high cost
In-Situ Biological Treatment	Anaerobic Bio-oxidation	Low: Fail to get complete degredation	Moderate:	Moderate	No
	Enhanced Reductive Dechlorination	Moderate to High: Effective for remediation of VOCs in groundwater.	Moderate to High: Proven technology. May require permit for injection of substrates.	Moderate to High	Yes: Considered in conjunction with other technologies.

Table 6-1
Process Options Screening Summary - Groundwater
SWMU 39
Fort Stewart, Georgia

Remedial Technology	Remedial Technology Process Option	Effectiveness Evaluation	Implementability Evaluation	Relative Cost Evaluation	Retained?
Ex-Situ Physical Treatment	Air Stripping	High: Effective for ex-situ remediation of VOCs in groundwater.	Moderate: Proven technology	Moderate to High	Yes: Considered in conjunction with groundwater extraction.
	Carbon Adsorption	Moderate: Not effective for vinyl chloride but effective for other COCs.	Low to Moderate: Proven and standard technology.	Moderate to High	Yes: Considered in conjunction with other technologies.
	Gravity Oil/Water Separator	Low: No NAPL present	High: Proven and standard technology.	Moderate	No: NAPL is not mobile
Ex-Situ Chemical Treatment	Ultraviolet/Chemical Oxidation	Moderate to High: Moderately effective for-ex situ treatment of VOCs in groundwater.	Moderate	High	No: Not cost effective over other similar technologies.
	Catalytic Oxidation	High: Highly effective for ex-situ treatment of VOCs.	Moderate	High	No: Not cost effective over other similar technologies.
Discharge	Publicly-Owned Treatment Works	High: Requires the lowest level of treatment prior to discharge.	Moderate: Requires permit for discharge	Moderate	Yes
	Groundwater Reinjection	High: Requires high level of treatment to meet discharge standards.	Moderate: Requires permit for discharge to groundwater.	Low	Yes
	Surface Water Discharge	Moderate: Requires high level of treatment to meet discharge standards.	Moderate: Requires permit for discharge .	Low	Yes
	Air Discharge	High: Already proven effective at site.	High: Already proven effective at site.	Low	Yes: Already proven effective for discharge from Air Stripper.

Notes:

	Shading indicates that process option will not be retained for further evaluation.
---	Evaluation not required.
H&S	Health and Safety
NAPL	Non-Aqueous Phase Liquid
NCP	National Contingency Plan
O&M	Operation and Maintenance
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Table 6-2
Process Options Screening Summary - LNAPL
SWMU 39
Fort Stewart, Georgia

Remedial Technology	Remedial Technology Process Option	Effectiveness Evaluation	Implementabillity Evaluation	Relative Cost Evaluation	Retained: yes or no
No Action	No Action	---	---	---	Yes: Required by NCP and USEPA guidance as a baseline for comparison to other process options.
Institutional Controls	Deed Notification	Moderate: Does not reduce environmental impacts but helps ensure long-term permanence of remedy.	High: Fort Stewart can specify Site uses.	Low: Negligible cost.	Yes: Considered in conjunction with other technologies.
	Deed Restriction	Moderate: Does not reduce environmental impacts but helps ensure long-term permanence of remedy.	High: Fort Stewart can specify Site uses.	Low: Negligible cost.	Yes: Considered in conjunction with other technologies.
	Informational Pamphlet	Low: Because Fort Stewart access is already restricted, this process option would not result in a significant increase in effectiveness.	Low:	Low: Negligible cost.	No: Does not provide significant increase in protectiveness due to current Fort Stewart access restrictions.
	Site Management/Health and Saftey Plans	Moderate to High: Effective for protection of site workers and management of remedial implementation	High: Easily implementable.	Low: Low capital and long-term costs to create and maintain.	Yes: Necessary for proper site management, long-term implementation, and site health and safety
Removal	Excavation	High: Permanently removes source mass and contaminated soil.	Low: Removal of concrete necessary	High: High capital costs.	Yes: Considered in conjunction with other technologies.
In-Situ Physical Recovery and Treatment	Absorbent Socks	Moderate: Capable of absorbing NAPL, doesn't actively draw NAPL into the well.	High:	Low to Moderate:	Yes: Effective in removing NAPL
	Soil Vapor Extraction	Low: Limited recovery; LNAPL is weathered.	Moderate	Moderate	No: LNAPL is weathered
	Product Recovery Trenches	Low: NAPL doesn't appear to be mobile.	Low: Install underneath existing concrete.	High	No
	Product Recovery Wells	Moderate: If NAPL is mobile	High: Requires installation of wells	Moderate to High	No: NAPL is mainly localized around one existing well
	Recovery Pump	Moderate: Effective at enhancing recover of mobile NAPL	High:	Moderate:	Yes: Effective at recovering NAPL

Notes:

Shading indicates that process option will not be retained for further evaluation.

--- Evaluation not required.
NAPL Non-Aqueous Phase Liquid
NCP National Contigency Plan
USEPA United States Environmental Protection Agency
VOC Volatile Organic Compound

Table 6-3
Summary of Detailed and Comparative Analysis of Source Area Soil and Groundwater Remedial Action Alternatives
SWMU 39
Fort Stewart, Georgia

	Evaluation Criteria	Alternative 1 No Action	Alternative 2 ISCO, Excavation of Soil and LNAPL, MNA and Institutional Controls	Alternative 3 ERD, MNA, Absorbent Socks and Institutional Controls	Alternative 4 Deep Groundwater Recirculation System, Shallow Groundwater Extraction, Active NAPL Recovery, MNA and Institutional Controls
Threshold Criteria					
1)	Overall protection of human health and the environment	Does not provide overall protection of human health or the environment. Does not minimize, reduce, or control COC impacts in source area soil or groundwater or associated exposure risks. Source area RAOs would not be met.	Protective of human health and the environment by eliminating potential exposure to COCs in source area soil and groundwater. Source area RAOs would be met.	Protective of human health and the environment by eliminating potential exposure to COCs in source area soil and groundwater. Source area RAOs would be met.	Protective of human health and the environment by eliminating potential exposure to COCs in source area soil and groundwater. Source area RAOs would be met.
2)	Compliance with ARARs	No established ARARs, remediate to the following levels: PCE: 5 ppb, TCE: 5 ppb, VC: 2 ppb	No established ARARs, remediate to the USEPA MCLs	No established ARARs, remediate to the USEPA MCLs	No established ARARs, remediate to the USEPA MCLs
Balancing Criteria					
3)	Long-term effectiveness and permanence	Not effective or permanent. Potential exposure risks associated with COCs in source area soil or groundwater would remain with no controls or long-term management plan.	Effective in protecting human health and the environment as long as the institutional controls are maintained. Long-term management plan necessary for insuring permancence of institutional controls.	Effective in protecting human health and the environment as long as the institutional controls are maintained. Long-term management plan necessary for ensuring permancence of institutional controls.	Effective in protecting human health and the environment as long as the institutional controls are maintained. Long-term management plan necessary for ensuring permancence of institutional controls.
4)	Reduction of mobility, toxicity, or volume	Natural attenuation processes may reduce mobility, toxicity, or volume of source area impacts, although monitoring of these processes would not be performed.	Reduces mobility, toxicity, and volume of VOCs in source area groundwater and soil.	Reduces mobility, toxicity, and volume of VOCs in source area groundwater and soil.	Reduces mobility, toxicity, and volume of VOCs in source area groundwater and soil.
5)	Short-term effectiveness	No activities would be implemented that would present potential short-term exposure risks to human health or the environment.	Grading, digging, demolition, well installation, and injection system installation may expose workers, adjacent populations, or the environment to potential exposure risks but risks would be easily minimized through engineering controls. Potential risks would be limited to onsite populations. Remedial response objectives would be met in <6 months.	Well installation, and injection system installation may expose workers, adjacent populations, or the environment to potential exposure risks but risks would be easily minimized through engineering controls. Potential risks would be limited to onsite populations. Remedial response objectives would be met in <6 months.	Well installation, and recirculation system installation may expose workers, adjacent populations, or the environment to potential exposure risks but risks would be easily minimized through engineering controls. Potential risks would be limited to onsite populations. Remedial response objectives would be met in <6 months.
6)	Implementability	Technically feasible due to lack of technical components. However, not administratively feasible due to lack of monitoring or protection of human health or the environment.	Technically and administratively feasible. However, excavation of soil and LNAPL would result in the removal of the buildling next to G4MW002.	Technically and administratively feasible. Would not interfere with ongoing operations at Fort Stewart.	Technically and administratively feasible. Would not interfere with ongoing operations at Fort Stewart
7)	Cost	No cost.	Present Worth = $2,143,000	Present Worth = $1,669,383	Present Worth = $4,871,100

Table 6-3
Summary of Detailed and Comparative Analysis of Source Area Soil and Groundwater Remedial Action Alternatives
SWMU 39
Fort Stewart, Georgia

Evaluation Criteria	Alternative 1 No Action	Alternative 2 ISCO, Excavation of Soil and LNAPL, MNA and Institutional Controls	Alternative 3 ERD, MNA, Absorbent Socks and Institutional Controls	Alternative 4 Deep Groundwater Recirculation System, Shallow Groundwater Extraction, Active NAPL Recovery, MNA and Institutional Controls
Modifying Criteria				
8) State Acceptance	Likely not acceptable	Assessed in the SOB following comment of the CAP.	Assessed in the SOB following comment of the CAP.	Assessed in the SOB following comment of the CAP.
9) Community Acceptance	Likely not acceptable	Assessed in the SOB following comment of the CAP.	Assessed in the SOB following comment of the CAP.	Assessed in the SOB following comment of the CAP.

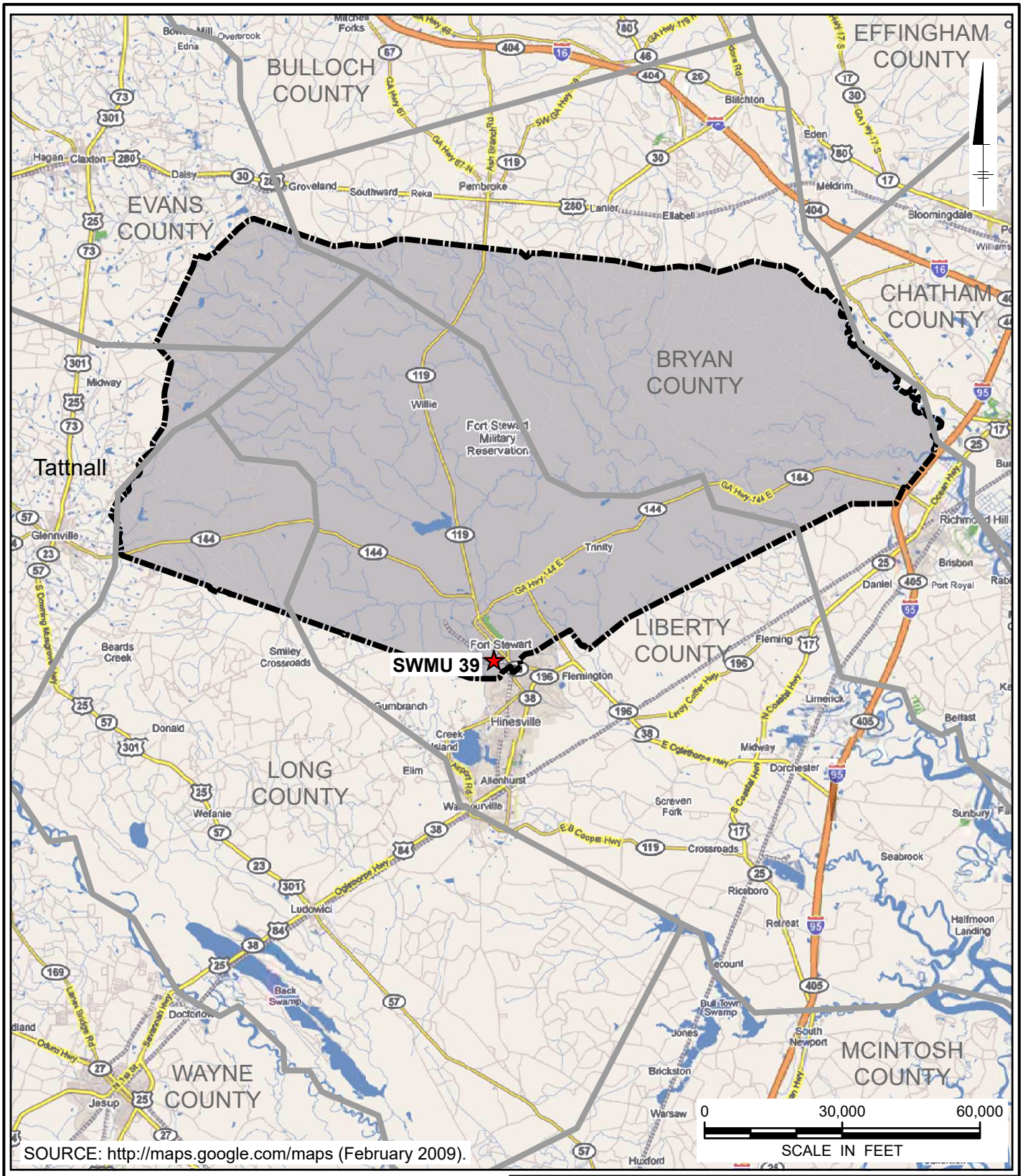
Notes:
All costs are estimated to an accuracy of +50 percent to -30 percent (USEPA, 2000)

Abbreviations:

ARAR	Applicable or Relevant and Appropriate Requirement
CAP	Corrective Action Plan
COC	Constituent of Concern
ERD	Enhanced Reductive Dechlorination
ISCO	In-Situ Chemical Oxidation
LNAPL	Light Non-Aqueous Phase Liquid
MNA	Monitored Natural Attenuation
RAO	Remedial Action Objective
SOB	Statement of Basis

PIKA
ARCADIS

Figures



SOURCE: http://maps.google.com/maps (February 2009).

FORT STEWART MILITARY RESERVATION, GEORGIA

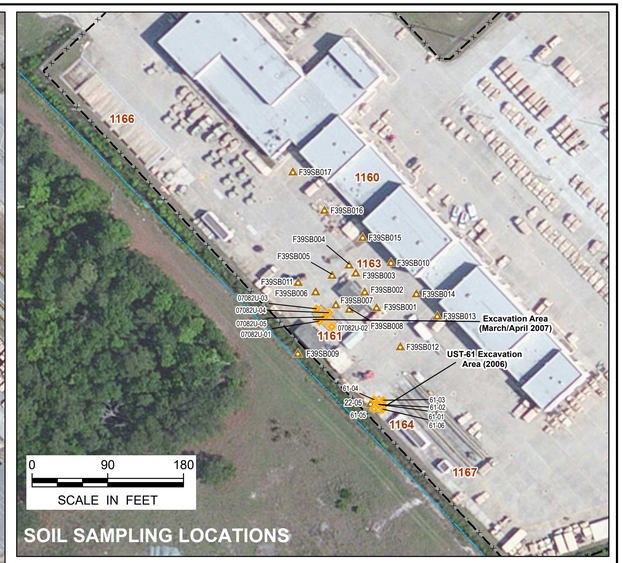
SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

SWMU 39 Location Map

PIKA ARCADIS

FIGURE **2-1**

CITY:(KNOXVILLE) DIV/GROUP:(ENV/GIS) LD:(B.ALTOM) PIC:(T.TALELE) PM:(S.GIBBONS) TM: (S.BOSTIAN/C.ANDERSON)
PROJECT: 10153001.0001 PATH: G:\GIS\FTSTEWART_PIKA\MAPDOCS\FST39\2015\CAP\F2-1 S39_CAP REG.MXD SAVED: 10/19/2015 BY: BALTOM



LEGEND

- Fencing
- Surface Water Drainage
- Rail Spur
- National Wetlands
- Monitor Well (deep)
- Monitor Well (shallow)
- Monitor Well (abandoned)
- Monitor Well (temporary)
- Vertical Profile
- Surface Water/Sediment Sample
- Soil Boring
- Excavation Area
- Excavation Soil Sample
- 1065 Building Number

NOTE: Abandoned wells have been highlighted in yellow and offset for clarity.

REFERENCE: Chatham Survey (November 29, 2011).
AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

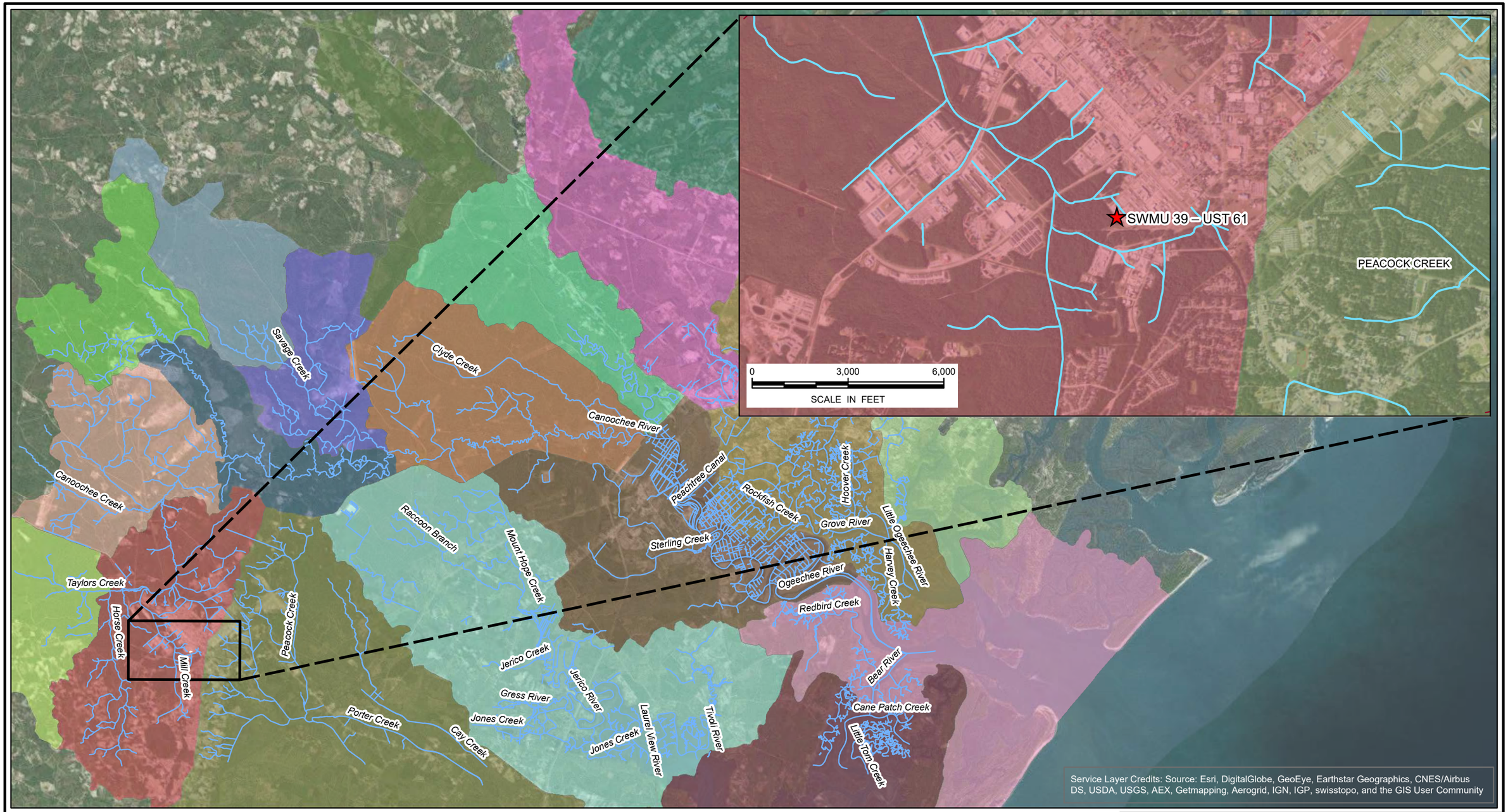
FORT STEWART MILITARY RESERVATION, GEORGIA

SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Site Map

PIKA ARCADIS A JOINT VENTURE

FIGURE **2-2**



USGS REGIONAL WATERSHED BOUNDARIES (WBDHU12)

- Alligator Bay-Canoochee River
- Clifton Bluff-Canoochee River
- Clyde Creek-Canoochee River
- Hardin Canal-Little Ogeechee River
- Jerico River-Laurel View River
- Little Creek-Black Creek
- Lower Savage Creek
- Lower Taylors Creek
- Medway River-Frontal Atlantic Ocean
- Middle Taylors Creek
- Morgans Bridge-Ogeechee River
- Ossabaw Sound-Frontal Atlantic Ocean
- Outlet Savannah River
- Pipemaker Canal
- Salt Creek-Little Ogeechee River
- Sterling Creek-Ogeechee River
- Strum Bay-Canoochee Creek
- Upper North Newport River
- Upper Savage Creek
- Vernon River

AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

0 20,000 40,000
SCALE IN FEET

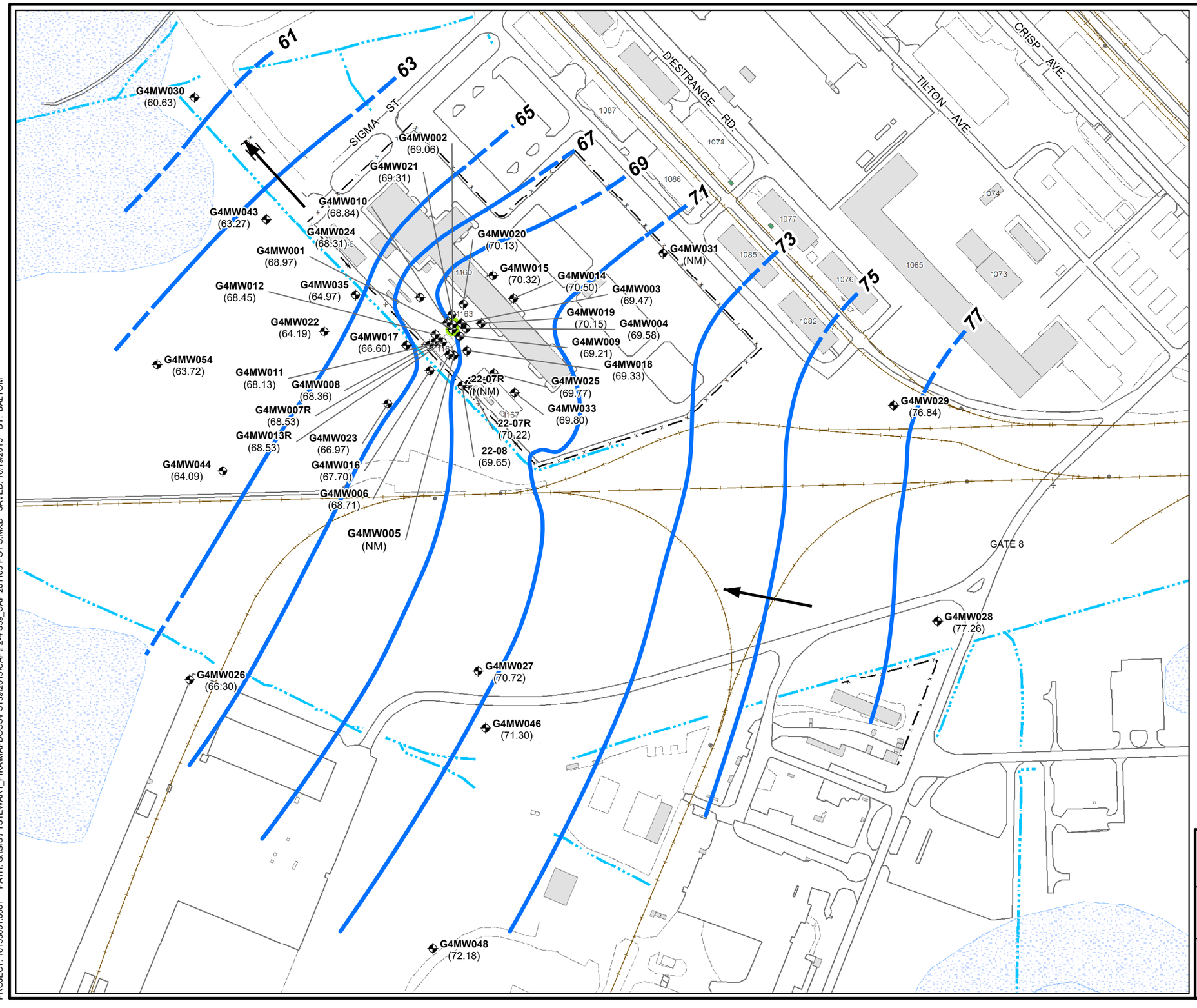
FORT STEWART MILITARY RESERVATION, GEORGIA

SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Regional Watershed Drainage

PIKA ARCADIS

FIGURE **2-3**



LEGEND

- Rail Spur
- Fencing
- Surface Water Drainage
- National Wetlands
- Monitor Well (shallow)
- LNAPL Detected in Well
- Potentiometric Contour (ft amsl)
- (inferred where dashed)
- Direction of Groundwater Flow
- (76.84) Groundwater Elevation (ft amsl) Measured May 4-6, 2011
- (NM) Not Measured

0 240 480

SCALE IN FEET

PROJECTION: NAD83 State Plane Georgia East Feet

FORT STEWART MILITARY RESERVATION, GEORGIA

SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Shallow Potentiometric Surface Map (May 2011)

PIKA ARCADIS

FIGURE **2-4**

CITY:(KNOXVILLE) DIV/GROUP:(ENV/GIS) LD:(B.ALTOM) PIC:(T.TALELE) PM:(S.GIBBONS) TM: (S.BOSTIAN/C.ANDERSON)
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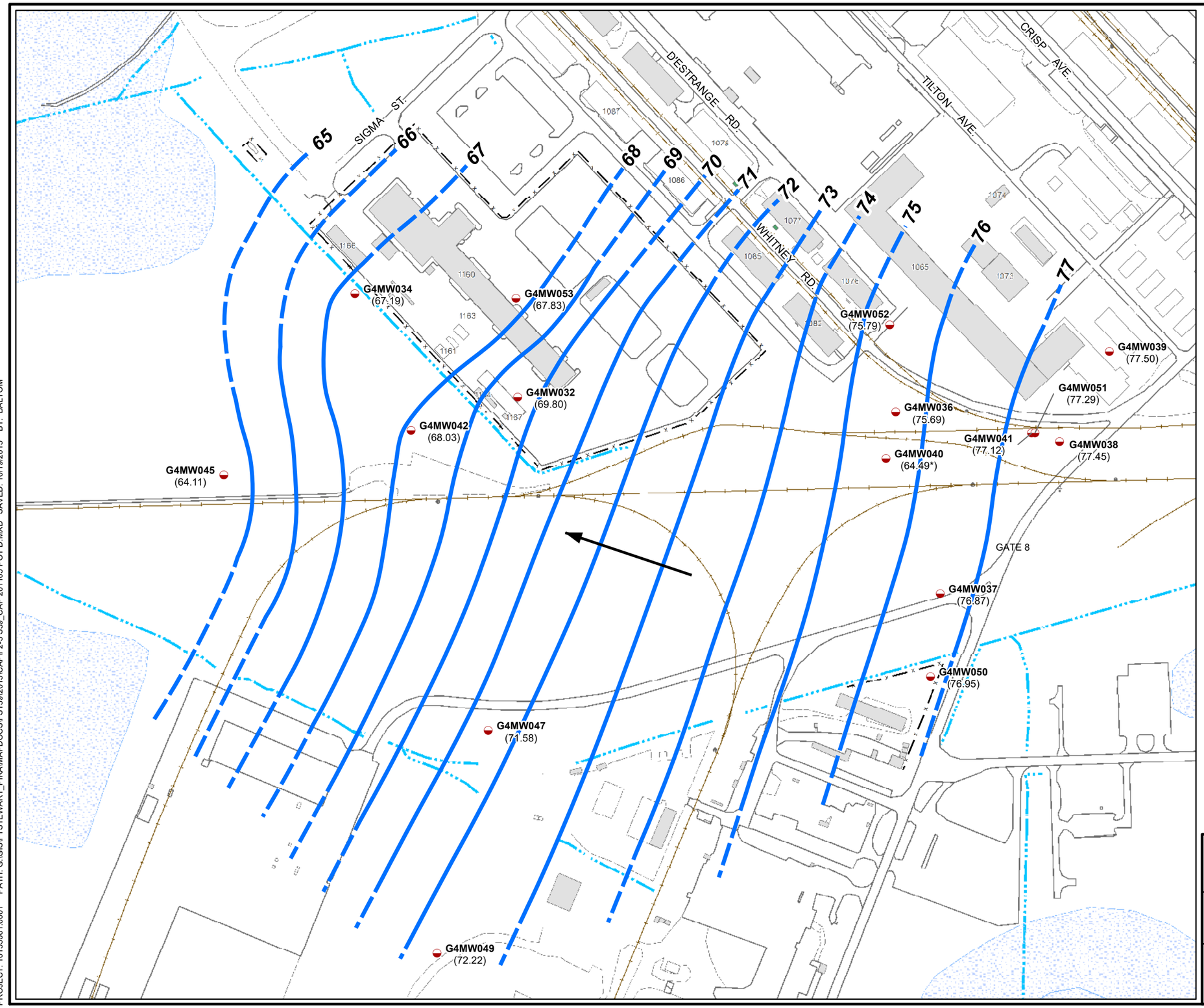

LEGEND

- Fencing
- Rail Spur
- Surface Water Drainage
- National Wetlands
- Monitor Well (deep)
- Potentiometric Contour (ft amsl)
- (inferred where dashed)
- Direction of Groundwater Flow
- (77.50) Groundwater Elevation (ft amsl) Measured May 4-6, 2011
- (64.49*) Not Used to Construct Contours (anomalous data)

0 240 480

SCALE IN FEET

PROJECTION: NAD83 State Plane Georgia East Feet

FORT STEWART MILITARY RESERVATION, GEORGIA

SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Deep Potentiometric Surface Map (May 2011)

PIKA ARCADIS

FIGURE **2-5**

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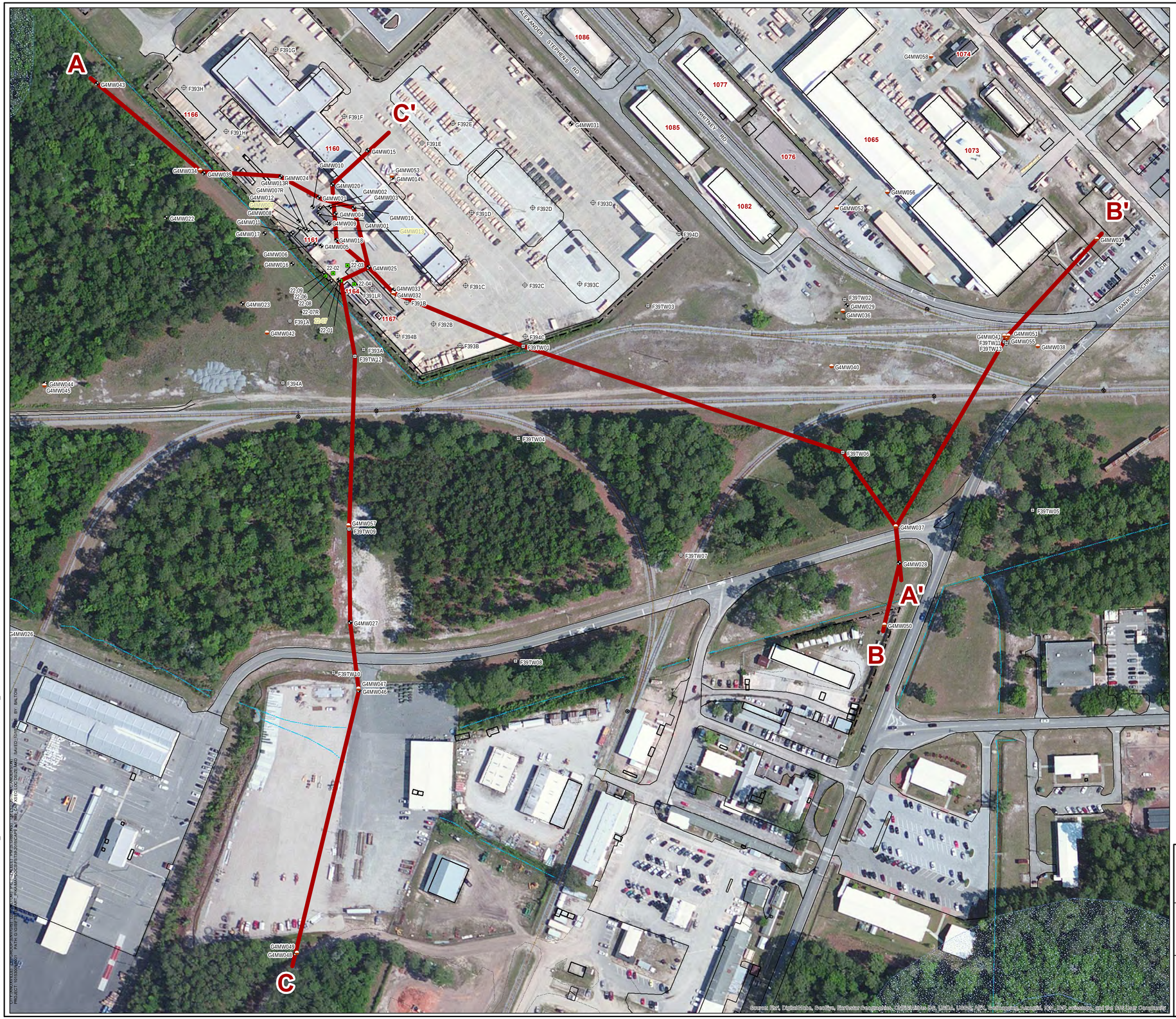


LEGEND

- Fencing
- Surface Water Drainage
- Rail Spur
- National Wetlands
- Monitor Well (deep)
- Monitor Well (shallow)
- Monitor Well (abandoned)
- Monitor Well (temporary)
- Vertical Profile
- Geologic Cross-Section Location

0 100 200 300 400

SCALE IN FEET

REFERENCE: Chatham Survey (November 29, 2011).
AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

FORT STEWART MILITARY RESERVATION, GEORGIA

SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

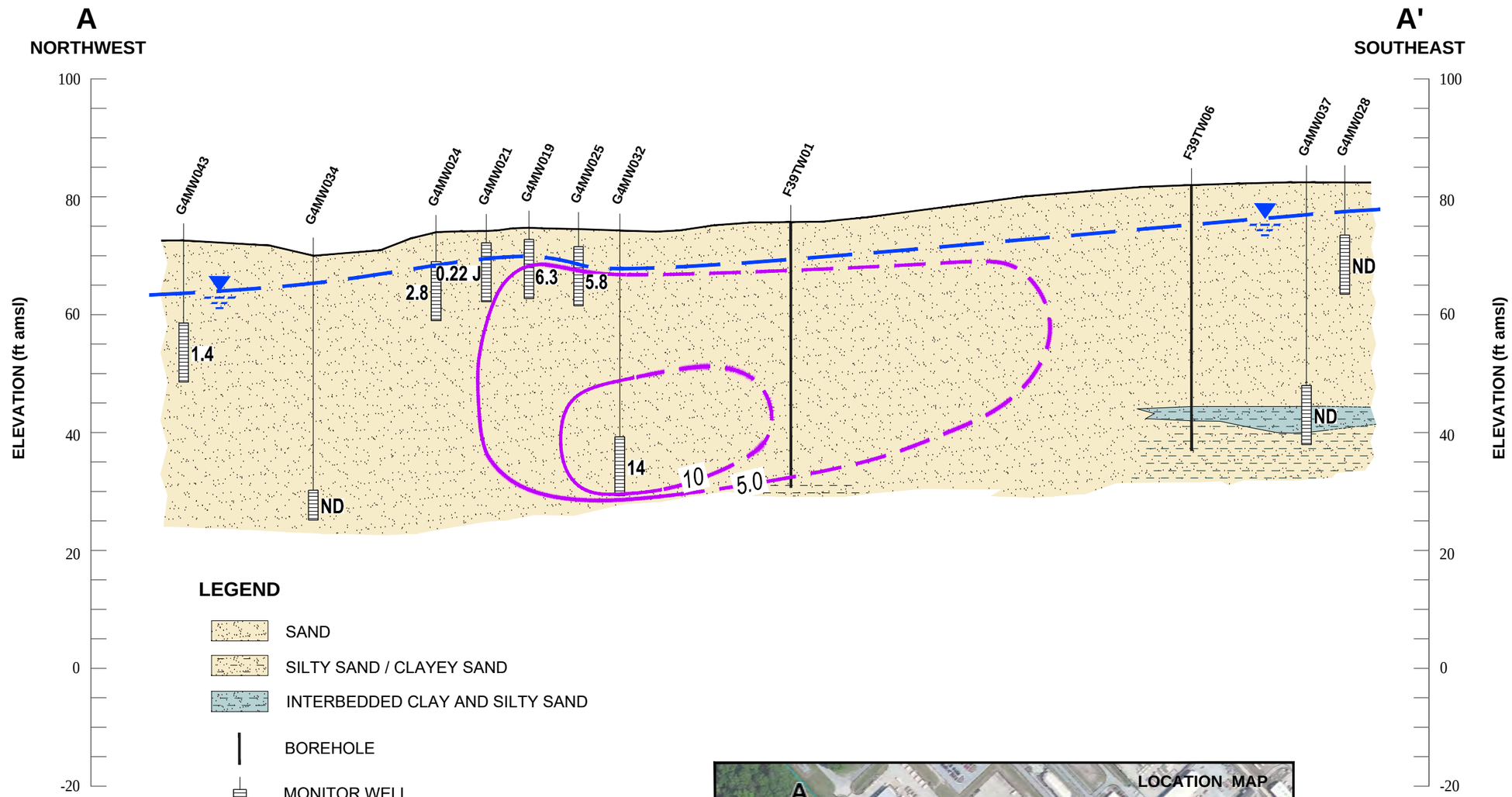
Geologic Cross-Section Locations

PIKA ARCADIS A JOINT VENTURE

FIGURE

3-1

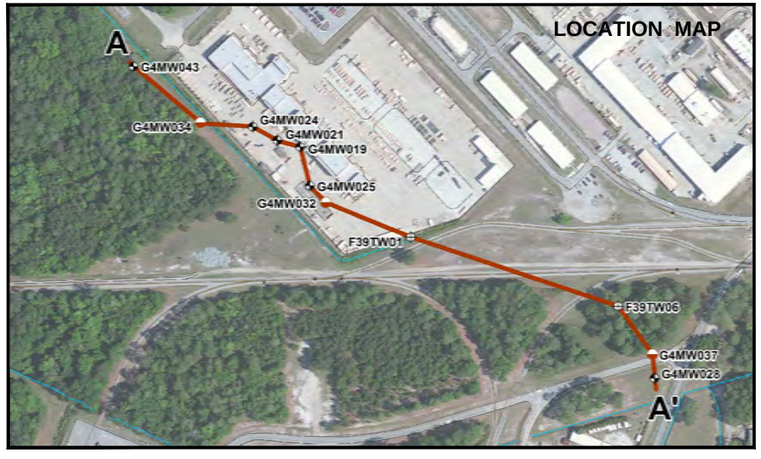
CITY:(KNOXVILLE) DIV/GROUP:(ENV/GIS) LD:(BALTOM) PIC:(T.TALELE) PM:(S.GIBBONS) TM: (S.BOSTIAN)
PROJECT: 10153001.0001 PATH: G:\GIS\FTSTEWART_PIKA\MAPDOCS\FST39\2015\CAP\F3-1 S39_CAP XSEC LOC DSIZE.MXD SAVED: 10/19/2015 BY: BALTOM



LEGEND

- SAND
- SILTY SAND / CLAYEY SAND
- INTERBEDDED CLAY AND SILTY SAND
- BOREHOLE
- MONITOR WELL SCREENED INTERVAL
- APPROXIMATE WATER TABLE
- **ND** NOT DETECTED
- **6.3** TRICHLOROETHENE CONCENTRATION (µg/L)
- *5.0* TRICHLOROETHENE ISOCONCENTRATION CONTOUR (µg/L)

NOTES:
1) MCL for Trichloroethene is 5 µg/L (USEPA, June 2015).
2) All samples collected between January 2011 and October 2011.
3) Contour for 5 µg/L line inferred based on cross-section B-B' (dashed where inferred.).



0 20 40
VERTICAL SCALE IN FEET

0 200 400
HORIZONTAL SCALE IN FEET

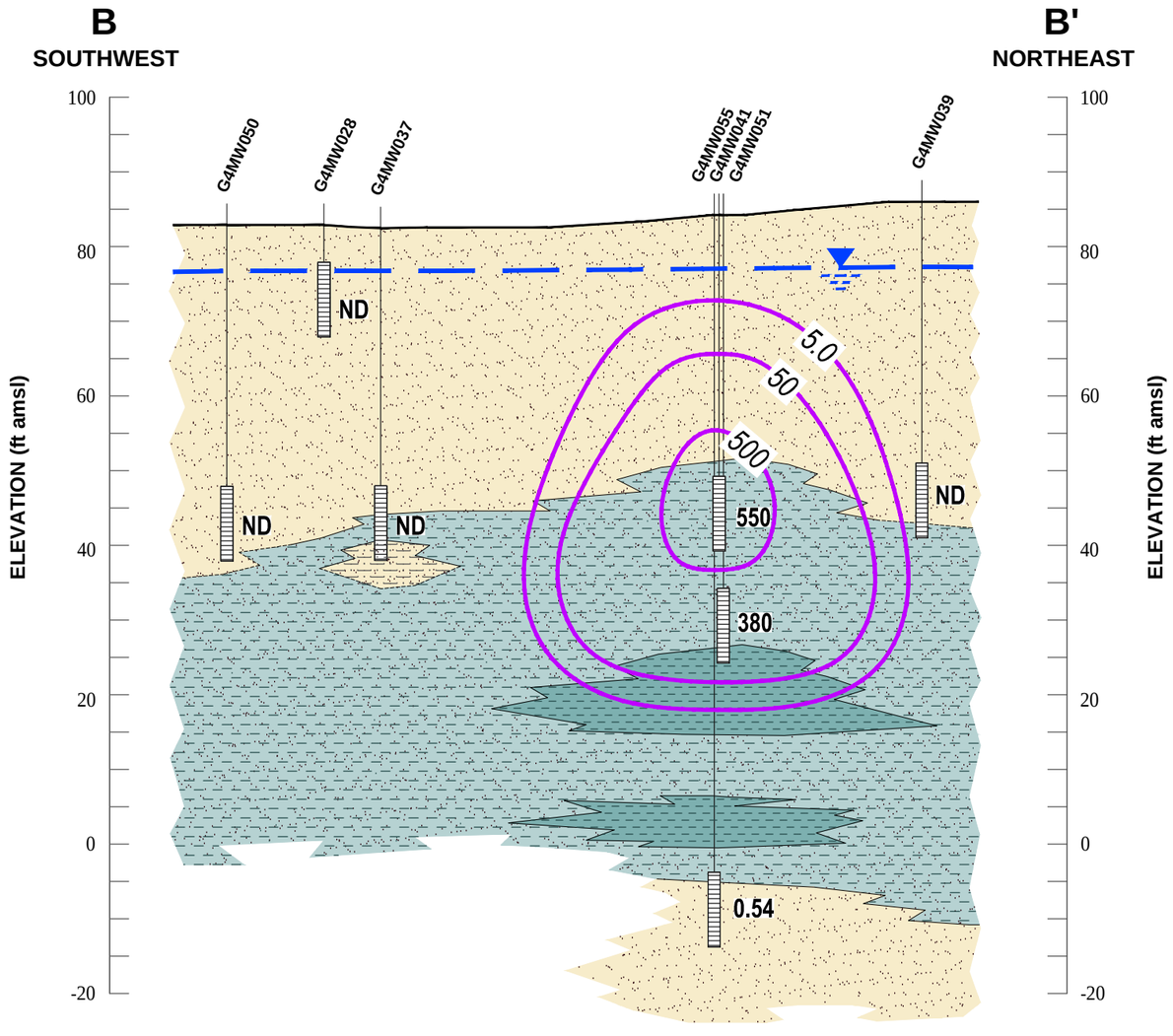
VERTICAL EXAGGERATION: 10X

FORT STEWART MILITARY RESERVATION, GEORGIA
SWMU 39 ï DIRECT SUPPORT MAINTENANCE FACILITY
CORRECTIVE ACTION PLAN

Trichloroethene in Groundwater along Geologic Cross-Section A-A'

PIKA ARCADIS A JOINT VENTURE

FIGURE
3-2



0 20 40
VERTICAL SCALE IN FEET

0 200 400
HORIZONTAL SCALE IN FEET

VERTICAL EXAGGERATION: 10X

LEGEND

- SAND
- SILTY SAND / CLAYEY SAND
- INTERBEDDED CLAY AND SILTY SAND
- CLAY

- MONITOR WELL SCREENED INTERVAL
- APPROXIMATE WATER TABLE
- **ND** NOT DETECTED
- **0.54** TRICHLOROETHENE CONCENTRATION (µg/L)
- *5.0* TRICHLOROETHENE ISOCONCENTRATION CONTOUR (µg/L)

NOTES:
1) MCL for Trichloroethene is 5 µg/L (USEPA, June 2015).
2) All samples collected between January 2011 and October 2011.

FORT STEWART MILITARY RESERVATION, GEORGIA
SWMU 39 ï DIRECT SUPPORT MAINTENANCE FACILITY
CORRECTIVE ACTION PLAN

Trichloroethene in Groundwater along Geologic Cross-Section B-B'

PIKA ARCADIS A JOINT VENTURE

FIGURE **3-3**

C
SOUTH

C'
NORTH

ELEVATION (ft amsl)

100
80
60
40
20
0
-20

G4MW048
G4MW049
G4MW046
G4MW047
G4MW027
F39TW09
G4MW057
F39TW12
22-07R
G4MW025
G4MW018
G4MW004
G4MW020
G4MW015

ND
ND
2.5
3.2
6.4
16
10
5.0
5.8
6.7
0.22 J

LEGEND

- SAND
- SILTY SAND / CLAYEY SAND
- BOREHOLE
- MONITOR WELL SCREENED INTERVAL
- APPROXIMATE WATER TABLE
- **ND** NOT DETECTED
- **6.4** TRICHLOROETHENE CONCENTRATION (µg/L)
- *5.0* TRICHLOROETHENE ISOCONCENTRATION CONTOUR (µg/L)

NOTES:
1) MCL for Trichloroethene is 5 µg/L (USEPA, June 2015).
2) All samples collected between January 2011 and October 2011.

LOCATION MAP

0 20 40
VERTICAL SCALE IN FEET

0 200 400
HORIZONTAL SCALE IN FEET

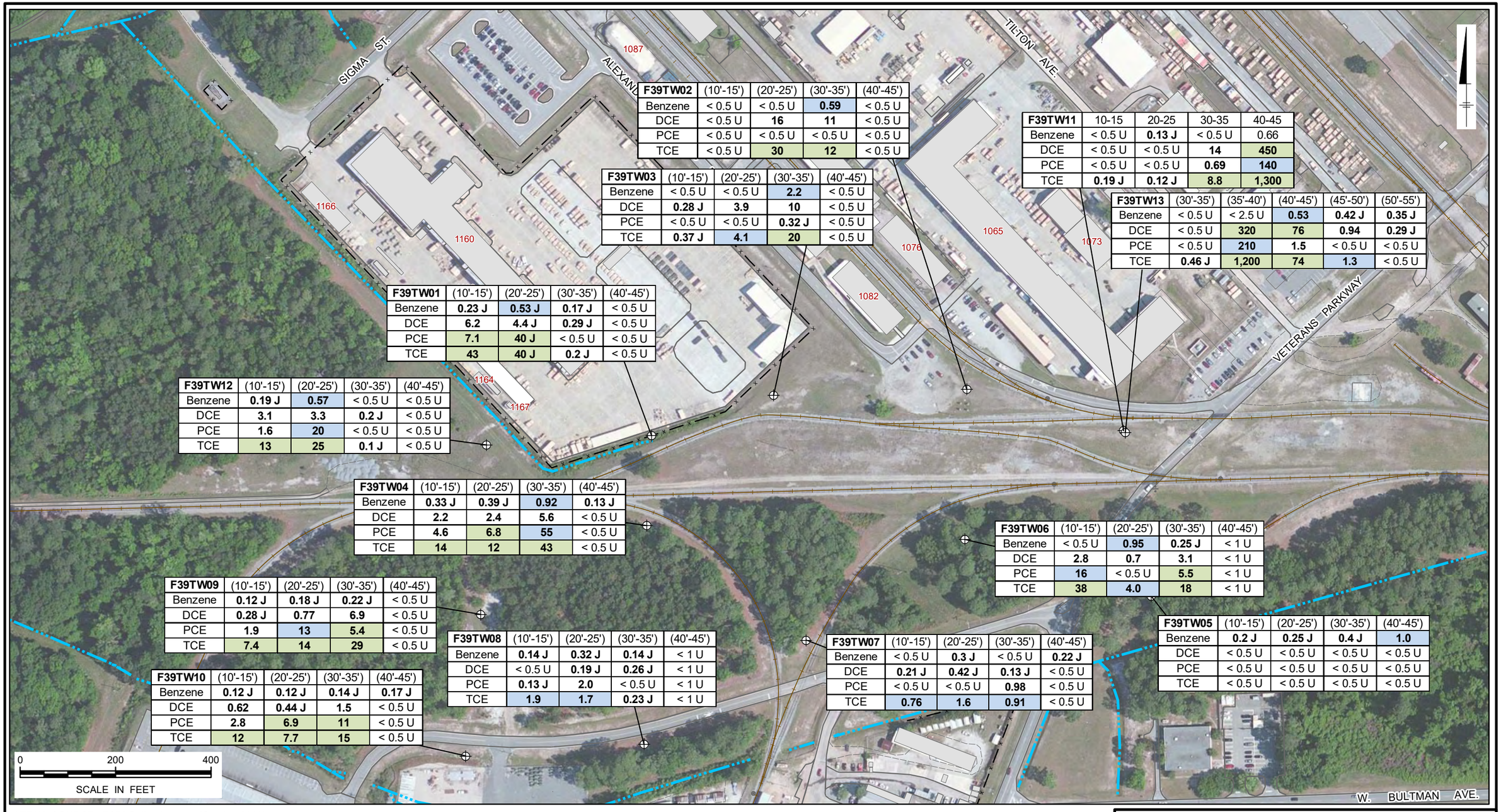
VERTICAL EXAGGERATION: 10X

FORT STEWART MILITARY RESERVATION, GEORGIA
SWMU 39 ï DIRECT SUPPORT MAINTENANCE FACILITY
CORRECTIVE ACTION PLAN

Trichloroethene in Groundwater along Geologic Cross-Section C-C'

PIKA ARCADIS A JOINT VENTURE

FIGURE
3-4



F39TW02	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	< 0.5 U	< 0.5 U	**0.59**	< 0.5 U
DCE	< 0.5 U	**16**	**11**	< 0.5 U
PCE	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
TCE	< 0.5 U	**30**	**12**	< 0.5 U

F39TW03	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	< 0.5 U	< 0.5 U	**2.2**	< 0.5 U
DCE	**0.28 J**	**3.9**	**10**	< 0.5 U
PCE	< 0.5 U	< 0.5 U	**0.32 J**	< 0.5 U
TCE	**0.37 J**	**4.1**	**20**	< 0.5 U

F39TW11	10-15	20-25	30-35	40-45
Benzene	< 0.5 U	**0.13 J**	< 0.5 U	0.66
DCE	< 0.5 U	< 0.5 U	**14**	**450**
PCE	< 0.5 U	< 0.5 U	**0.69**	**140**
TCE	**0.19 J**	**0.12 J**	**8.8**	**1,300**

F39TW13	(30'-35')	(35'-40')	(40'-45')	(45'-50')	(50'-55')
Benzene	< 0.5 U	< 2.5 U	**0.53**	**0.42 J**	**0.35 J**
DCE	< 0.5 U	**320**	**76**	**0.94**	**0.29 J**
PCE	< 0.5 U	**210**	**1.5**	< 0.5 U	< 0.5 U
TCE	**0.46 J**	**1,200**	**74**	**1.3**	< 0.5 U

F39TW01	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	**0.23 J**	**0.53 J**	**0.17 J**	< 0.5 U
DCE	**6.2**	**4.4 J**	**0.29 J**	< 0.5 U
PCE	**7.1**	**40 J**	< 0.5 U	< 0.5 U
TCE	**43**	**40 J**	**0.2 J**	< 0.5 U

F39TW12	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	**0.19 J**	**0.57**	< 0.5 U	< 0.5 U
DCE	**3.1**	**3.3**	**0.2 J**	< 0.5 U
PCE	**1.6**	**20**	< 0.5 U	< 0.5 U
TCE	**13**	**25**	**0.1 J**	< 0.5 U

F39TW04	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	**0.33 J**	**0.39 J**	**0.92**	**0.13 J**
DCE	**2.2**	**2.4**	**5.6**	< 0.5 U
PCE	**4.6**	**6.8**	**55**	< 0.5 U
TCE	**14**	**12**	**43**	< 0.5 U

F39TW06	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	< 0.5 U	**0.95**	**0.25 J**	< 1 U
DCE	**2.8**	**0.7**	**3.1**	< 1 U
PCE	**16**	< 0.5 U	**5.5**	< 1 U
TCE	**38**	**4.0**	**18**	< 1 U

F39TW09	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	**0.12 J**	**0.18 J**	**0.22 J**	< 0.5 U
DCE	**0.28 J**	**0.77**	**6.9**	< 0.5 U
PCE	**1.9**	**13**	**5.4**	< 0.5 U
TCE	**7.4**	**14**	**29**	< 0.5 U

F39TW08	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	**0.14 J**	**0.32 J**	**0.14 J**	< 1 U
DCE	< 0.5 U	**0.19 J**	**0.26 J**	< 1 U
PCE	**0.13 J**	**2.0**	< 0.5 U	< 1 U
TCE	**1.9**	**1.7**	**0.23 J**	< 1 U

F39TW07	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	< 0.5 U	**0.3 J**	< 0.5 U	**0.22 J**
DCE	**0.21 J**	**0.42 J**	**0.13 J**	< 0.5 U
PCE	< 0.5 U	< 0.5 U	**0.98**	< 0.5 U
TCE	**0.76**	**1.6**	**0.91**	< 0.5 U

F39TW05	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	**0.2 J**	**0.25 J**	**0.4 J**	**1.0**
DCE	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
PCE	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U
TCE	< 0.5 U	< 0.5 U	< 0.5 U	< 0.5 U

F39TW10	(10'-15')	(20'-25')	(30'-35')	(40'-45')
Benzene	**0.12 J**	**0.12 J**	**0.14 J**	**0.17 J**
DCE	**0.62**	**0.44 J**	**1.5**	< 0.5 U
PCE	**2.8**	**6.9**	**11**	< 0.5 U
TCE	**12**	**7.7**	**15**	< 0.5 U

AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

LEGEND

- Surface Water Drainage
- Monitor Well (temporary)
- (10'-15') Sample Depth (ft bgs)
- 1065 Building Number

NOTES:
1) Samples F39TW01 through F39TW12 collected between March and April 2010.
2) Sample F39TW13 collected in September 2010.
3) Sample depths are reported from screen intervals in feet below ground surface (ft bgs).
4) All concentrations reported in micrograms per liter (µg/L).
5) Only constituents which exceeded the screening criteria are shown.
6) All exceedances are highlighted according to applicable standard.
7) J – Constituent value was estimated.
8) U – Constituent value was qualified as non-detect based on laboratory detection limit.

Chemical Name	Tap Water RSL	MCL
Benzene	0.45	5
cis-1,2-Dichloroethene (DCE)	36	70
Tetrachloroethene (PCE)	11	5
Trichloroethene (TCE)	0.49	5

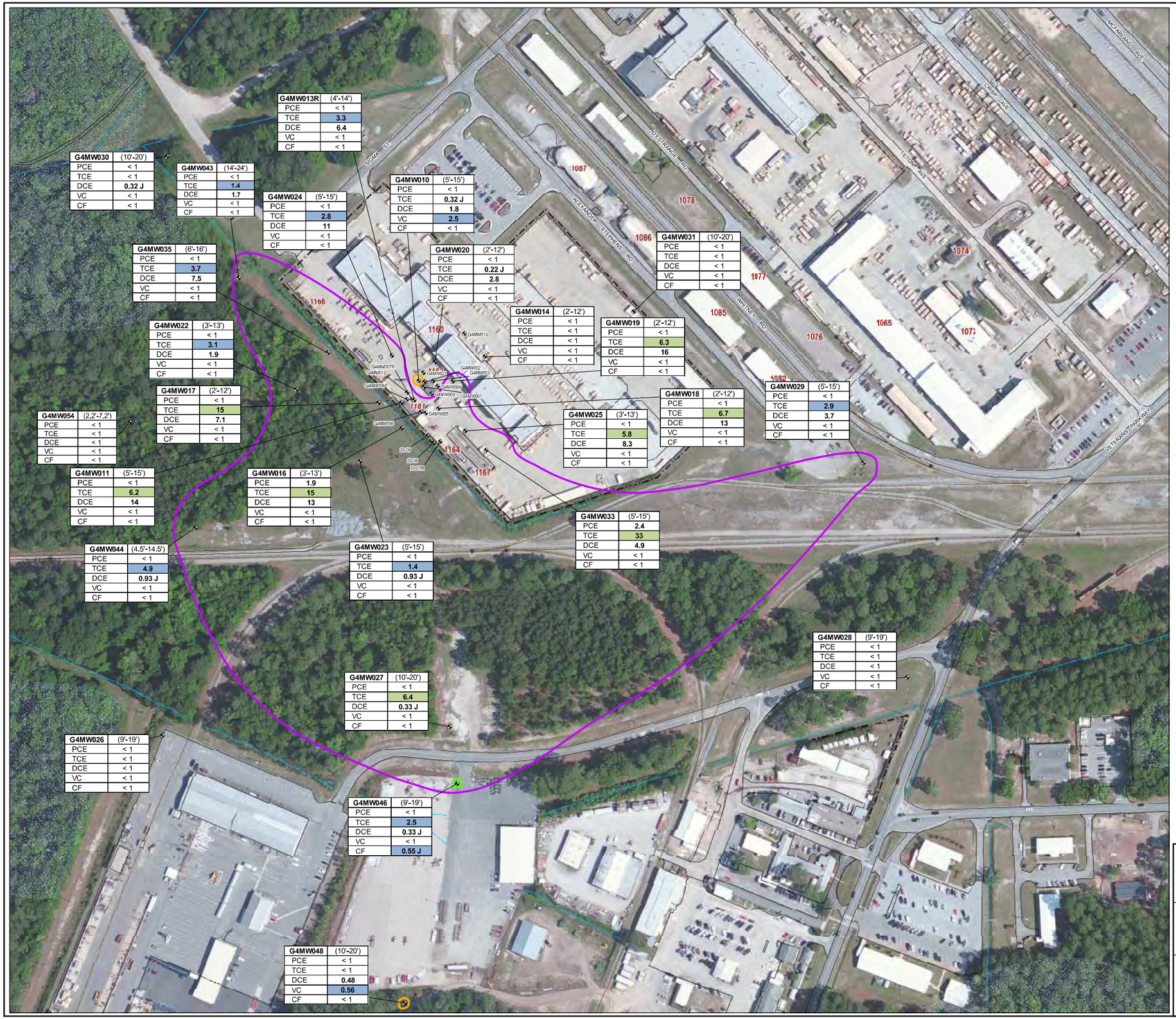
FORT STEWART MILITARY RESERVATION, GEORGIA
SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

DPT Groundwater Analytical Results (2010)

PIKA ARCADIS

FIGURE
3-5

CITY:(KNOXVILLE) DIV/GROUP:(ENV/GIS) LD:(B.ALTOM) PIC:(T.TALELE) PM:(S.GIBBONS) TM: (S.BOSTIAN/C.ANDERSON)
LYR:(ON);(OFF);(*) SAV:(B.ALTOM) SAVED: 1/26/2016 BY: BALTOM
PROJECT: 101530001.0001 PATH: G:\GIS\FTSTEWART_PIKA\MAPDOCS\FST39\2016\CAP\F35_S39_CAP GW VOCS 2010.MXD SAVED: 1/26/2016 BY: BALTOM
SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY



LEGEND

- Fencing
- Rail Spur
- Surface Water Drainage
- National Wetlands
- Monitor Well (shallow)
- Approximate Extent of Chloroform Regulatory Exceedance
- Approximate Extent of Trichloroethene Regulatory Exceedance
- Approximate Extent of Vinyl Chloride Regulatory Exceedance
- 1065 Building Number

NOTES:
1) Monitor wells G4MW010 through G4MW047 sampled in January 2011.
2) Monitor wells G4MW048 through G4MW054 sampled in May 2011.
3) Monitor wells G4MW055 through G4MW057 sampled in August 2011.
4) Monitor well G4MW058 sampled in October 2011.
5) All units reported in micrograms per liter (µg/L).
6) All constituents screened to U.S. EPA Regional Screening Level for tap water (RSL) and Maximum Contaminant Level (MCL) as of June 2015.
7) All exceedances are highlighted according to applicable standard.
8) J – Constituent value was estimated.
9) VOC – Volatile Organic Compounds

Chemical Name	Tap Water RSL	MCL
Tetrachloroethene (PCE)	11	5
Trichloroethene (TCE)	0.49	5
cis-1,2-Dichloroethene (DCE)	36	70
Vinyl chloride (VC)	0.019	2
Chloroform (CF)	0.22	80

0 120 240 360 480
SCALE IN FEET

AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

FORT STEWART MILITARY RESERVATION, GEORGIA

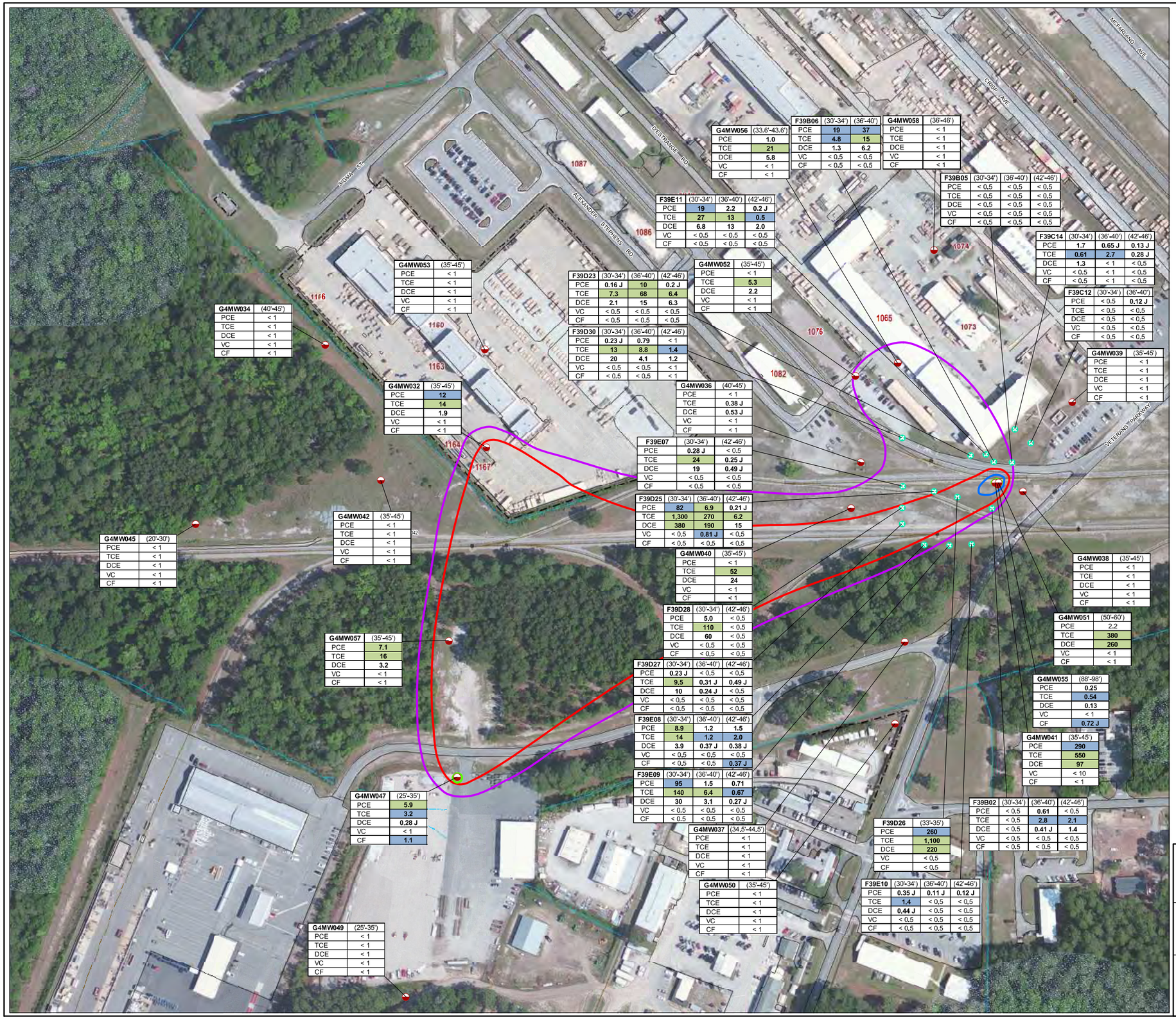
SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Shallow Zone Groundwater VOC Sampling Results (2011)

PIKA ARCADIS

FIGURE **3-6**

CITY:(KNOXVILLE) DIV/GROUP:(ENV/GIS) LD:(B.ALTOM) PIC:(T.TALELE) PM:(S.GIBBONS) TM: (S.BOSTIAN/C.ANDERSON)
PROJECT: 10153001.0001 PATH: G:\GIS\FTSTEWART_PIKA\MAPDOCS\FS739\2016\CAP\F3-6 S39_CAP GW VOCS 2011 S DSIZE.MXD SAVED: 1/26/2016 BY: BALTOM
SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY



LEGEND

- Fencing
- Rail Spur
- Surface Water Drainage
- National Wetlands
- Monitor Well (deep)
- Temporary (VAP) points
- Approximate Extent of Chloroform Regulatory Exceedance
- Approximate Extent of cis-1,2-DCE Regulatory Exceedance
- Approximate Extent of PCE Regulatory Exceedance
- Approximate Extent of TCE Regulatory Exceedance
- 1065 Building Number

NOTES:
1) Monitor wells G4MW010 through G4MW047 sampled in January 2011.
2) Monitor wells G4MW048 through G4MW054 sampled in May 2011.
3) Monitor wells G4MW055 through G4MW057 sampled in August 2011.
4) Monitor well G4MW058 sampled in October 2011.
5) All units reported in micrograms per liter (µg/L).
6) All constituents screened to U.S. EPA Regional Screening Level for tap water (RSL) and Maximum Contaminant Level (MCL) as of June 2015.
7) All exceedances are highlighted according to applicable standard.
8) J – Constituent value was estimated.
9) VOC – Volatile Organic Compounds
10) Data from temporary (VAP) points was not utilized to draw COC contours.

Chemical Name	Tap Water RSL	MCL
Tetrachloroethene (PCE)	11	5
Trichloroethene (TCE)	0.49	5
cis-1,2-Dichloroethene (DCE)	36	70
Vinyl chloride (VC)	0.019	2
Chloroform (CF)	0.22	80

0 120 240 360 480
SCALE IN FEET

AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

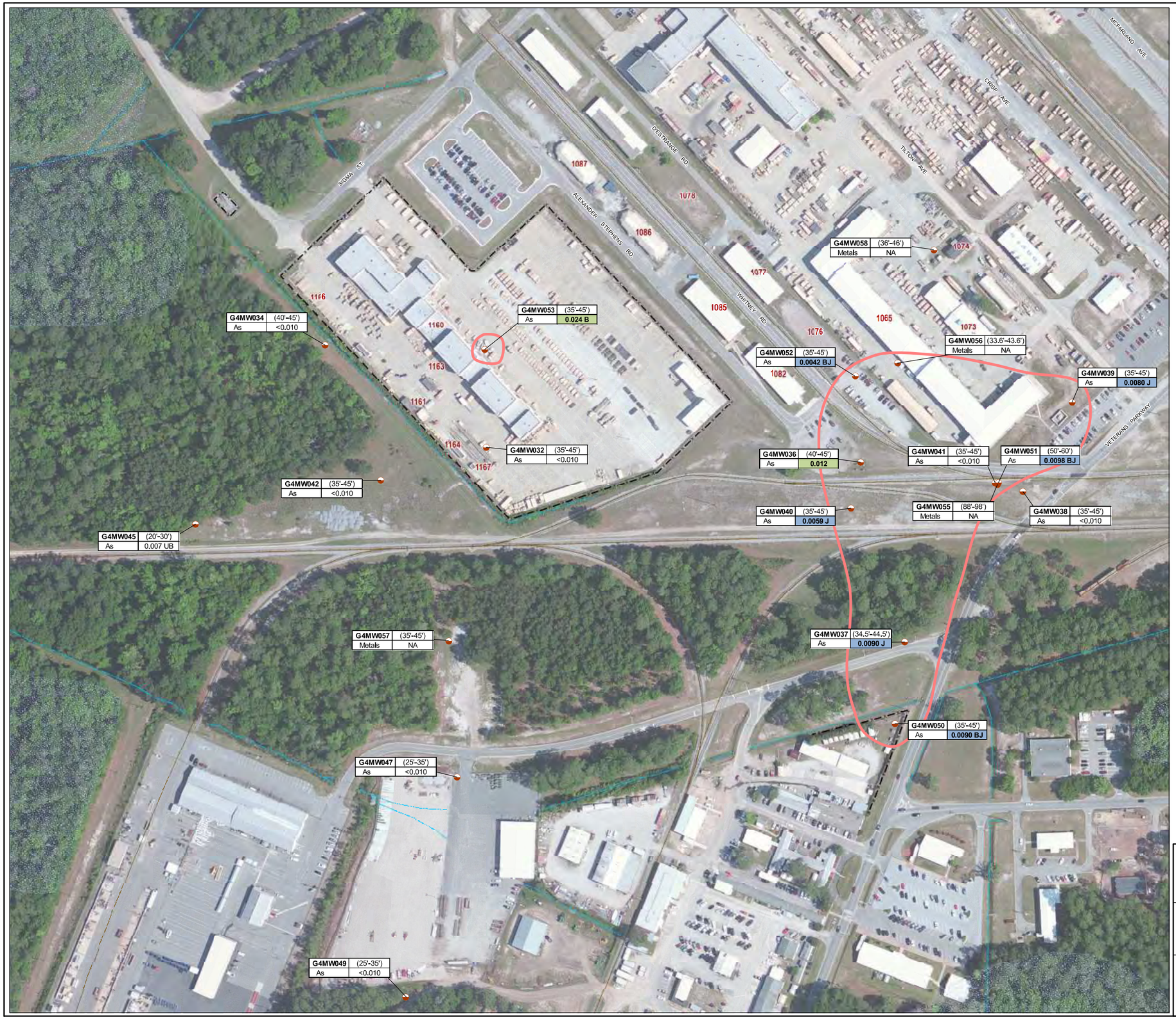
FORT STEWART MILITARY RESERVATION, GEORGIA
SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Deep Zone
Groundwater VOC Sampling Results (2011)

PIKA ARCADIS

FIGURE
3-7

CITY:(KNOXVILLE) DV/GROUP:(ENV/GIS) LD:(B.ALTOM) PIC:(T.TALELE) PM:(S.GIBBONS) TM: (S.BOSTIAN/C.ANDERSON)
PROJECT: 10153001.0001 PATH: G:\GIS\FTSTEWART_PIKA\MAPDOCS\FST39\2016\CAP\F3-7 S39_CAP GW VOCS 2011 D DSIZE.MXD SAVED: 1/26/2016 BY: BALTOM
SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/ARBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY



LEGEND

- Fencing
- Rail Spur
- Surface Water Drainage
- National Wetlands
- Monitor Well (deep)
- Approximate Extent of Arsenic Regulatory Exceedance
- 1065 Building Number

NOTES:
1) Monitor wells G4MW010 through G4MW047 sampled in January 2011.
2) Monitor wells G4MW048 through G4MW054 sampled in May 2011.
3) Monitor wells G4MW055 through G4MW057 sampled in August 2011.
4) Monitor well G4MW058 sampled in October 2011.
5) All units reported in milligrams per liter (mg/L).
6) All constituents screened to U.S. EPA Regional Screening Level (RSL) for tap water and Maximum Contaminant Level (MCL) as of June 2015.
7) All exceedances are highlighted according to applicable standard.
8) J – Constituent value was estimated.
9) NA – Not analyzed for metals.

Chemical Name	Tap Water RSL	MCL
Dissolved Arsenic (As)	0.00052	0.01

0 120 240 360 480
SCALE IN FEET

AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

FORT STEWART MILITARY RESERVATION, GEORGIA

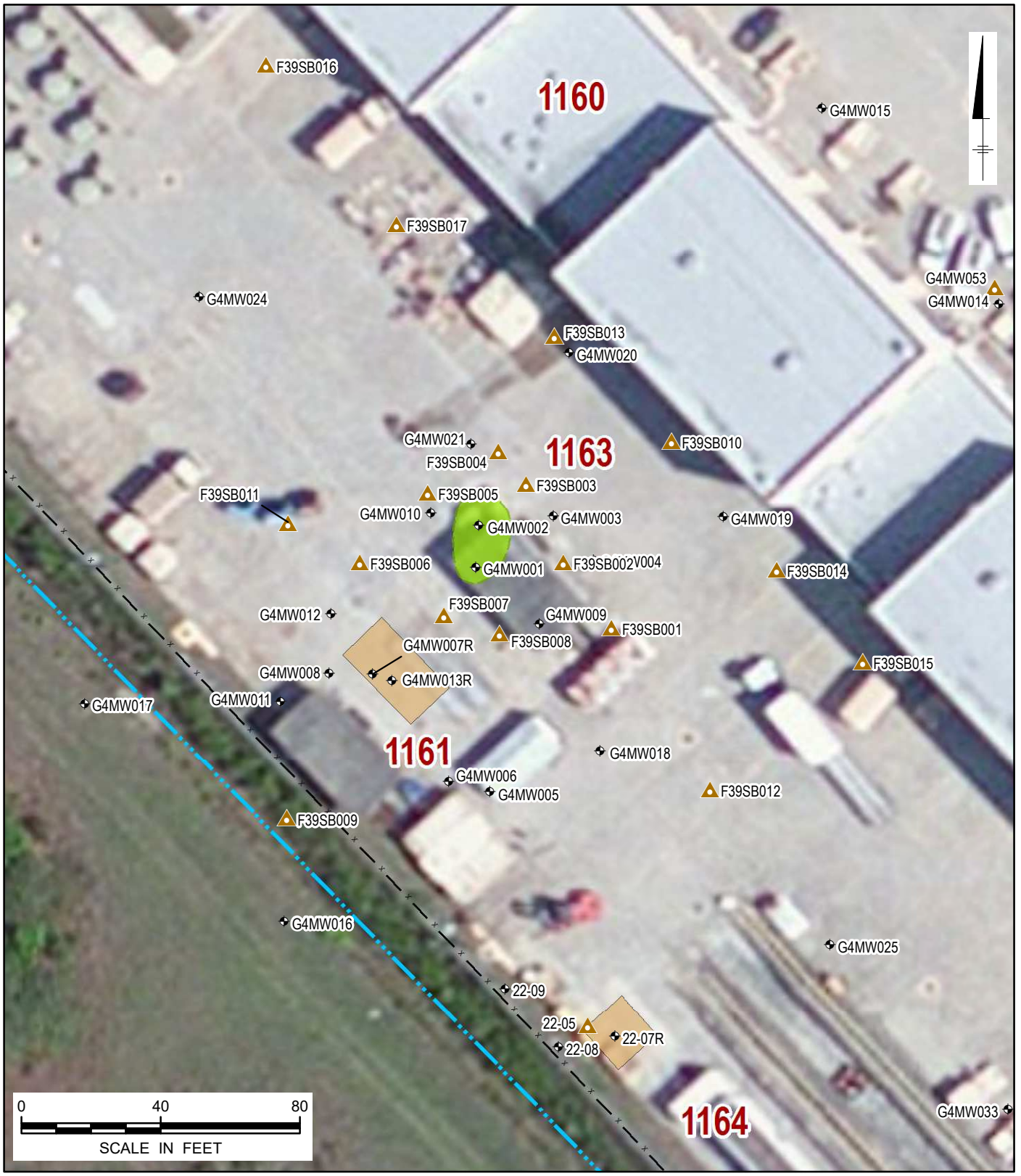
SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Deep Zone Groundwater Arsenic Sampling Results (2011)

PIKA ARCADIS

FIGURE **3-8**

CITY:(KNOXVILLE) DIV/GROUP:(ENV/GIS) LD:(B.ALTOM) PIC:(T.TALELE) PM:(S.GIBBONS) TM:(S.BOSTIAN/C.ANDERSON)
PROJECT: 10153001.0001 PATH: G:\GIS\FTSTEWART_PIKA\MAPDOCS\FST39\2016\CAP\F3-s 39_CAP GW MET 2011 D DSIZE.MXD SAVED: 1/26/2016
SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY



AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet
REFERENCE: SES (2008).

LEGEND

- Surface Water Drainage
- Excavation Area
- Monitor Well (shallow)
- Estimated Extent of LNAPL
- Soil Boring (2010/2011)
- 1161 Building Number

NOTE: Extent of LNAPL is estimated according to water level and product gauging measurements (2008 through 2011).

FORT STEWART MILITARY RESERVATION, GEORGIA

SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Estimated Extent of LNAPL

PIKA ARCADIS

FIGURE **3-9**

F39SB016	(0.5'-1.0')
4-Chlorobenzenamine	**0.015**

F39SB017	(0.5'-1.0')
1,1'-Biphenyl	**0.012**
Benzo(a)anthracene	**0.070**
Benzo(a)pyrene	**0.091**
Dibenz(a,h)anthracene	**0.019**

F39SB009	(0.5'-1.0')
Lead	**43**

F39SB013	(0.5'-1.0')
Benzo(a)anthracene	**0.25**
Benzo(a)pyrene	**0.42**
Benzo(b)fluoranthene	**0.50**
Dibenz(a,h)anthracene	**0.068 J**
Indeno(1,2,3-cd)pyrene	**0.22**

F39SB010	(0.5'-1.0')
Benzo(a)anthracene	**0.50**
Benzo(a)pyrene	**0.82**
Benzo(b)fluoranthene	**1.1**
Indeno(1,2,3-cd)pyrene	**0.42**

G4MW053	(0.5'-1.0')
No Detections	

F39SB014	(0.5'-1.0')
Benzo(a)anthracene	**0.088**
Benzo(a)pyrene	**0.073**
Benzo(b)fluoranthene	**0.097**

F39SB015	(0.5'-1.0')
4-Chlorobenzenamine	**0.068**

F39SB012	(0.5'-1.0')
No Detections	

Chemical Name	Residential Soil RSL	MCL-Based SSL	Risk-Based SSL
1,1'-Biphenyl	47	---	0.0087
4-Chlorobenzenamine	2.7	---	0.00016
Benzo(a)anthracene	0.16	---	0.0043
Benzo(a)pyrene	0.016	0.24	0.004
Benzo(b)fluoranthene	0.16	---	0.041
Benzo(k)fluoranthene	1.6	---	0.40
Dibenz(a,h)anthracene	0.016	---	0.013
Indeno(1,2,3-cd)pyrene	0.16	---	0.13
Lead	400	14	---

AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

LEGEND

- Surface Water Drainage
- Excavation Area
- Monitor Well (shallow)
- Soil Boring (2010/2011)
- 1161 Building Number

NOTES:
1) F39SB001 through F39SB012 collected in March 2010. Surface soil samples were only collected from F39SB009 through F39SB012.
2) F39SB013, F39SB014, and G4MW053 were collected in April 2011.
3) F39SB015 through F39SB017 collected in May 2011.
4) All concentrations reported in milligrams per kilogram (mg/kg).
5) Only results exceeding the background soil values and screening criteria are shown.
6) Residential Soil RSL applies to samples collected between 0-2 ft bgs.
7) Constituents are screened against the MCL-based SSL. If no MCL-based SSL exist, then they are screened against the Risk-based SSL.
8) All exceedances are highlighted according to highest applicable standard exceeded.
9) Sample depths are reported in feet below ground surface (ft bgs).
10) J – Constituent value was estimated.

FORT STEWART MILITARY RESERVATION, GEORGIA
SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Surface Soil Sample Results (2010/2011)

PIKA ARCADIS

FIGURE **3-10**

F39SB017	(3.0'-3.5')
Benzo(a)anthracene	0.32
Benzo(a)pyrene	0.43
Benzo(b)fluoranthene	0.48
Dibenz(a,h)anthracene	0.05
Indeno(1,2,3-cd)pyrene	0.16
Naphthalene	0.011

F39SB013	(3.0'-3.5')
Benzo(a)anthracene	0.43
Benzo(a)pyrene	0.68
Benzo(b)fluoranthene	0.79
Benzo(k)fluoranthene	0.44
Dibenz(a,h)anthracene	0.10
Indeno(1,2,3-cd)pyrene	0.33

G4MW020	(4'-8')
Acetone	61 J
Benzene	0.91 J
Xylenes (total)	3.5 J

G4MW015	(4'-8')
2-Butanone	57

G4MW014	(4'-8')
1,2-Dichlorobenzene	0.4 J
Acetone	10 J
Isopropyl benzene	1.3 J
Carbon disulfide	1.3 J
cis-1,2-Dichloroethene	0.71 J
Ethylbenzene	6.8 J
Toluene	8.1 J
Trichloroethene	3.0 J
Xylenes (total)	55 J

G4MW024	(4'-6')	(8'-10')
1,4-Dichlorobenzene	ND	1.3 J
Xylenes (total)	ND	0.97 J

G4MW021	(4'-8')
4-Methyl-2-pentanone	78 J
Carbon disulfide	1.6 J
Tetrachloroethene	2.3 J

G4MW022	(2'-4')	(4'-6')
Toluene	ND	10

F39SB010	(3.0'-3.5')
Benzo(a)anthracene	0.038 J
Benzo(b)fluoranthene	0.073

G4MW019	(4'-8')
1,4-Dichlorobenzene	1.3 J
2-Butanone	44 J
4-Methyl-2-pentanone	0.48 J
Methylene chloride	4.3 J

F39SB007	(4'-5')
Benzo(a)anthracene	0.059 J
Benzo(b)fluoranthene	0.097

F39SB015	(3.0'-3.5')
4-Chlorobenzenamine	0.023

G4MW017	(8'-12')
2-Butanone	56
cis-1,2-Dichloroethene	2.7 J
Ethylbenzene	0.81 J

G4MW018	(1'-4')
1,4-Dichlorobenzene	1.0 J
2-Butanone	21 J
4-Methyl-2-pentanone	0.50 J
Carbon disulfide	0.9 J
Methylene chloride	6.2 J

G4MW025	(4'-6')	(8'-10')
Acetone	ND	430 J
Methylene chloride	ND	20 J

G4MW023	(2'-4')	(4'-6')
Acetone	ND	110 J

G4MW016	(8'-12')
1,2-Dichlorobenzene	1.7 J
2-Butanone	49
Acetone	14
cis-1,2-Dichloroethene	20
Ethylbenzene	4.6 J

Chemical Name	Industrial Soil RSL	Residential Soil RSL	MCL-based SSL	Risk-based SSL
1,2-Dichlorobenzene	9,300	1,800	0.58	0.30
1,4-Dichlorobenzene	11	2.6	0.072	0.00046
2-Butanone	190,000	27,000	---	1.2
4-Chlorobenzenamine	11	2.7	---	0.00016
4-Methyl-2-pentanone	56,000	5,300	---	0.28
Acetone	670,000	61,000	---	2.9
Benzene	5.1	1.2	0.0026	0.00023
Benzo(a)anthracene	2.9	0.16	---	0.0043
Benzo(a)pyrene	0.29	0.016	0.24	0.004
Benzo(b)fluoranthene	2.9	0.016	---	0.041
Benzo(k)fluoranthene	29	1.6	---	0.40
Carbon disulfide	3,500	770	---	0.24
cis-1,2-Dichloroethene	2,300	160	0.021	0.011
Dibenz(a,h)anthracene	0.29	0.016	---	0.013
Ethylbenzene	25	5.8	0.78	0.0017
Indeno(1,2,3-cd)pyrene	2.9	0.16	---	0.13
Isopropyl benzene	9,900	1,900	---	0.74
Methylene chloride	1000	57	0.0013	0.0029
Naphthalene	17	3.8	---	0.00054
Tetrachloroethene	100	24	0.0023	0.0051
Toluene	47,000	4,900	0.69	0.76
Trichloroethene	6.0	0.94	0.0018	0.00018
Xylenes (total)	2,800	650	9.8	0.19

AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet
REFERENCE: SES (2008).

LEGEND

- Surface Water Drainage
- Excavation Area
- Monitor Well (shallow)
- Soil Boring (2010/2011)
- 1161 Building Number

NOTES:
1) F39G4MW014 through F39G4MW021 were collected by SES, April 14-15, 2004.
2) F39G4MW022 through F39G4MW025 were collected by SES, August 26-27, 2004.
3) F39SB001 through F39SB012 collected in March 2010.
4) F39SB013 and F39SB014 collected in April 2011.
5) F39SB015 through F39SB017 collected in May 2011.
6) All concentrations reported in milligrams per kilogram (mg/kg).
7) Only results exceeding the background soil values are shown.
8) Industrial Soil RSL apply to samples collected greater than 2 ft bgs.
9) Constituents are screened against the MCL-based SSL. If no MCL-based SSL exist, then they are screened against the Risk-based SSL.
10) All exceedances are highlighted according to highest applicable standard exceeded.
11) Sample depths are reported in feet below ground surface (ft bgs).
12) J – Constituent value was estimated.
13) ND – Not Detected

FORT STEWART MILITARY RESERVATION, GEORGIA
SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Soil Sampling Analytical Results (2010/2011)

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FIGURE **3-11**

AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet
REFERENCE: SES (2008).

LEGEND

- Surface Water Drainage
- Monitor Well (shallow)
- Excavation Area
- Estimated Extent of LNAPL
- Proposed LNAPL Excavation Area
- 1161 Building Number

NOTE: Extent of LNAPL is estimated according to water level and product gauging measurements (2008-2011).

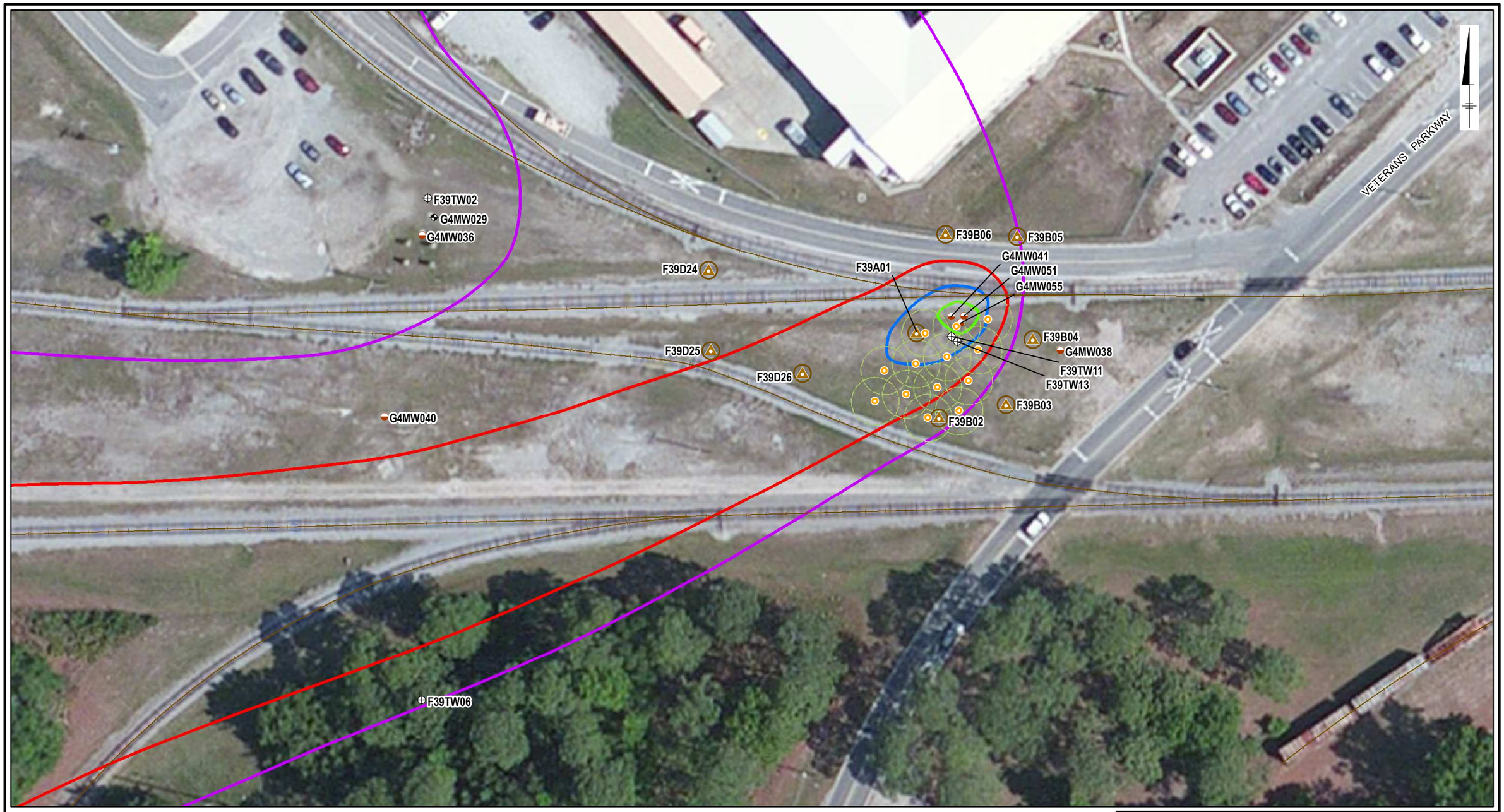
FORT STEWART MILITARY RESERVATION, GEORGIA

SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Remedial Alternative CAA-2: Proposed Excavation of LNAPL

PIKA ARCADIS

FIGURE **6-1**



AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

LEGEND

- Monitor Well (shallow)
- Monitor Well (deep)
- Monitor Well (temporary)
- MIP Sounding Location (October 2010)
- Proposed Injection Well
- Radius of Influence (15 ft)
- Approximate Extent of Chloroform Regulatory Exceedance
- Approximate Extent of cis-1,2-DCE Regulatory Exceedance
- Approximate Extent of PCE Regulatory Exceedance
- Approximate Extent of TCE Regulatory Exceedance

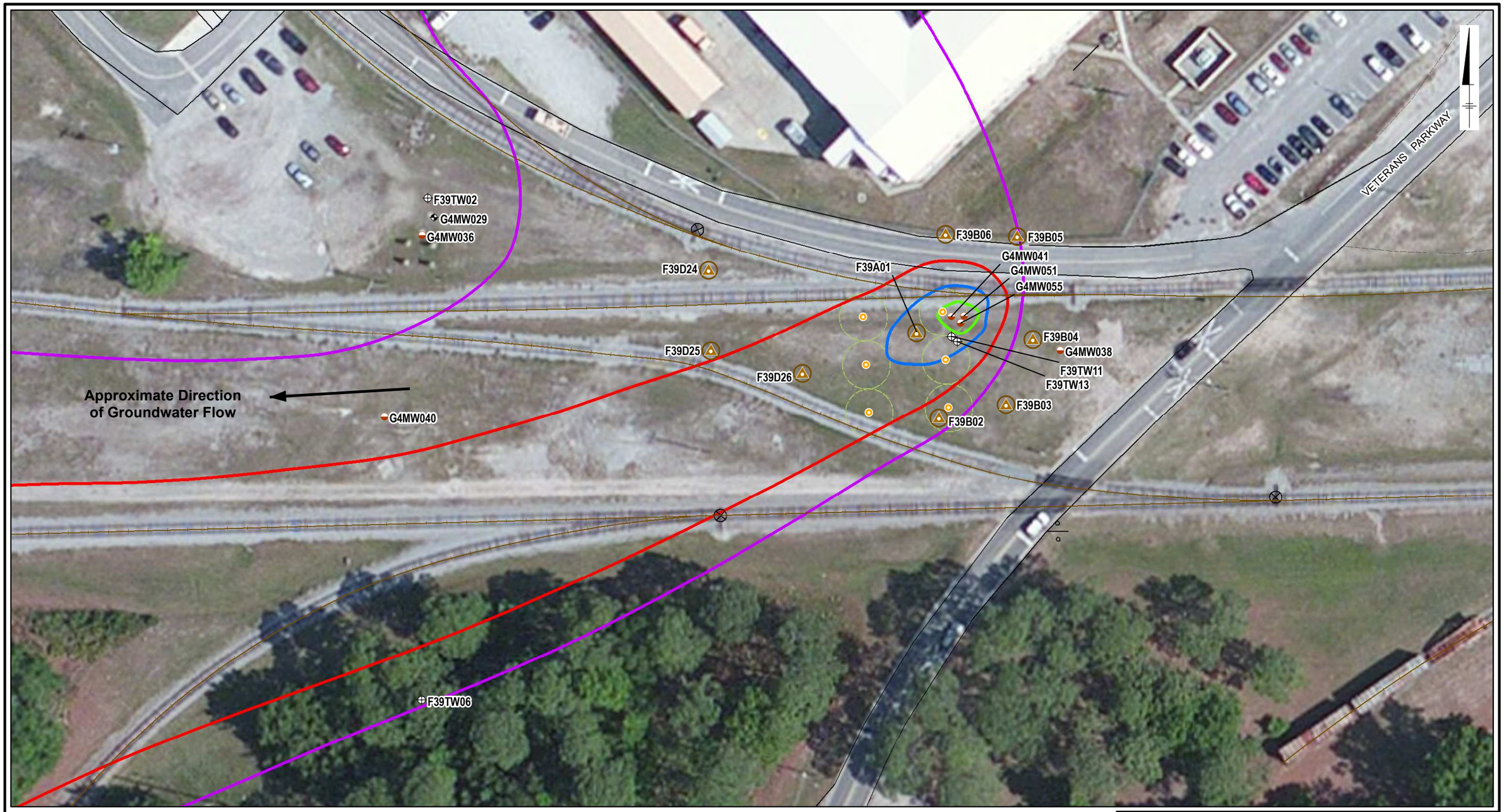
0 60 120
SCALE IN FEET

FORT STEWART MILITARY RESERVATION, GEORGIA
SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Remedial Alternative CAA-2: Deep ISCO Injection System

PIKA ARCADIS

FIGURE
6-2



AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

LEGEND

- Monitor Well (shallow)
- Monitor Well (deep)
- Monitor Well (temporary)
- MIP Sounding Location (October 2010)
- Proposed Injection Well
- Radius of Influence (15 ft)
- Approximate Extent of Chloroform Regulatory Exceedance
- Approximate Extent of cis-1,2-DCE Regulatory Exceedance
- Approximate Extent of PCE Regulatory Exceedance
- Approximate Extent of TCE Regulatory Exceedance

0 60 120
SCALE IN FEET

FORT STEWART MILITARY RESERVATION, GEORGIA

SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Remedial Alternative CAA-3: Deep ERD Injection System

PIKA ARCADIS

FIGURE **6-3**

AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

LEGEND

- Monitor Well (shallow)
- Monitor Well (deep)
- Monitor Well (temporary)
- MIP Sounding Location (October 2010)
- Proposed Extraction Well
- Proposed Injection Well
- Radius of Influence (10 ft)

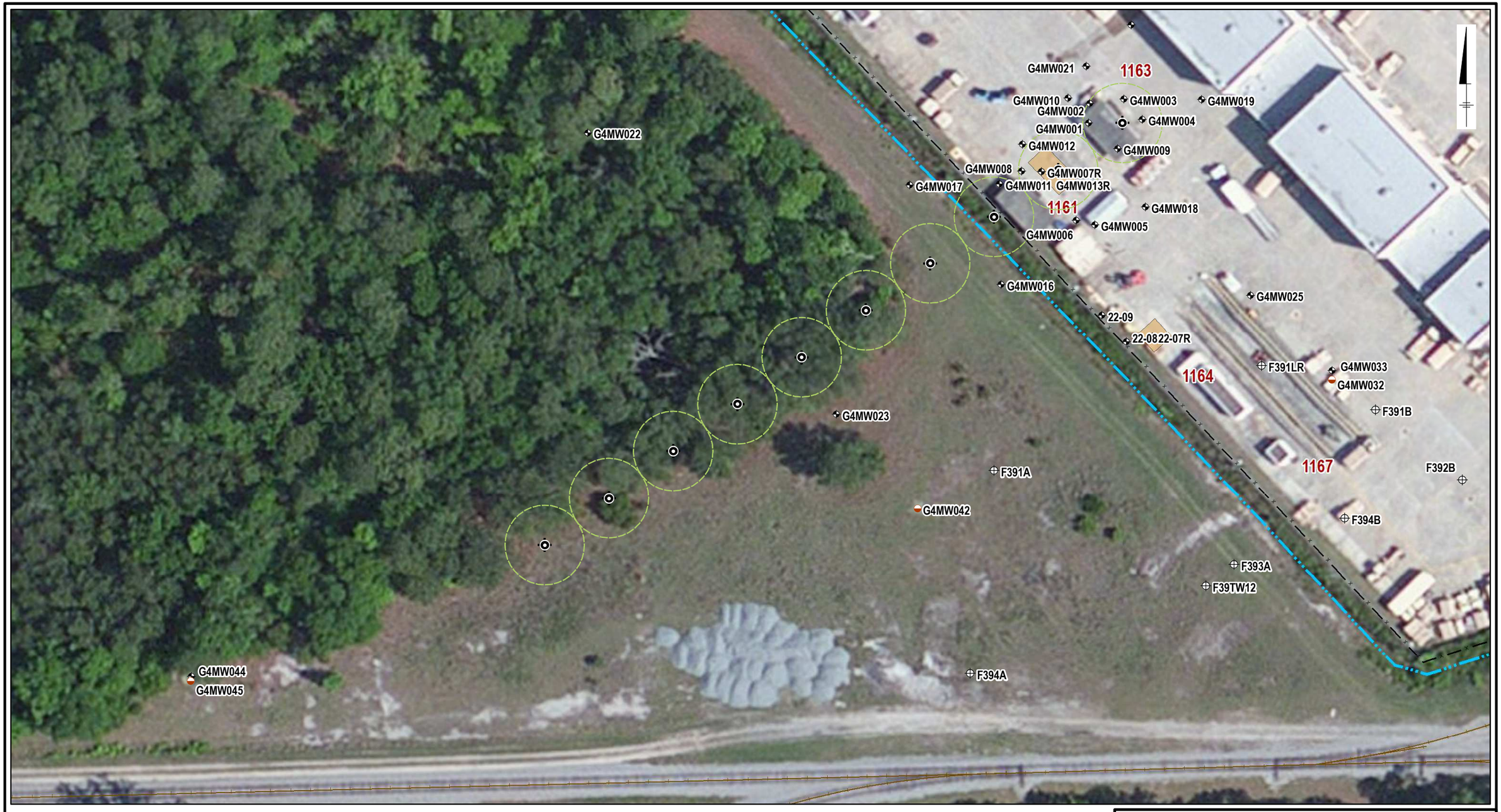
0 60 120
SCALE IN FEET

FORT STEWART MILITARY RESERVATION, GEORGIA
SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Remedial Alternative CAA-4: Deep Groundwater Recirculation System

PIKA ARCADIS

FIGURE
6-4



AERIAL SOURCE: ESRI Online Imagery (October 2013).
PROJECTION: NAD83 State Plane Georgia East Feet

LEGEND

- Surface Water Drainage
- Monitor Well (shallow)
- Monitor Well (deep)
- Monitor Well (temporary)
- MIP Sounding Location (October 2010)
- Proposed Extraction Well
- Excavation Area
- Radius of Influence (25 ft)
- 1161 Building Number

0 60 120
SCALE IN FEET

FORT STEWART MILITARY RESERVATION, GEORGIA

SWMU 39 – DIRECT SUPPORT MAINTENANCE FACILITY CORRECTIVE ACTION PLAN

Remedial Alternative CAA-4: Shallow Groundwater Extraction System

PIKA ARCADIS

FIGURE **6-5**

Appendix A

GAEPD Response Letter to
RFI Rev. 3

Georgia Department of Natural Resources
Environmental Protection Division-Land Protection Branch
2 Martin Luther King Jr., Dr., Suite 1054, Atlanta, Georgia 30334
(404) 656-7802; Fax (404) 651-9425
Judson H. Turner, Director

November 24, 2014

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert R. Baumgardt
Director, Public Works
Headquarters, 3D Infantry Division (Mechanized) and Fort Stewart
Directorate of Public Works, Building 1137
Environmental Branch (ATTN: Algeana Stevenson)
1550 Frank Cochran Drive
Fort Stewart, GA 31314-4927

RE: *Revision 3 Final SWMU 39 RCRA Facility Investigation Report and Response to Comments, Direct Support Maintenance Facility [Solid Waste Management Unit (SWMU) 39], Fort Stewart, Georgia;* dated September 9, 2014 and received September 12, 2014; EPA ID No. GA9 210 020 872.

Dear Mr. Baumgardt:

The Land Protection Branch of the Georgia Environmental Protection Division (EPD) reviewed Fort Stewart's *Revision 3 Final SWMU 39 RCRA Facility Investigation Report and Response to Comments, Direct Support Maintenance Facility SWMU 39,* dated September 9, 2014 and received September 12, 2014. During that review, the following comments were generated:

EPD Original Comment # 17: Groundwater Leaching in Subsurface Soils. An evaluation of the potential leaching of contaminants to groundwater was not performed. Please note that soil screening level (SSL) values should be derived to determine the leachability of contaminants to groundwater in subsurface soils. In this section, please provide adequate justification that the input parameters used to develop the default SSL values are appropriate for this site, or develop site-specific SSLs.

Fort Stewart Response: At SWMU 39, the majority of the risk drivers in soil are in the surface soil. The main detections in surface and subsurface soil were PAHs, which were not detected in groundwater. Since the constituents were not detected in groundwater, the remaining impacts in soil do not appear to be leaching to groundwater. Therefore, the generic SSLs provide a conservative assessment of the potential for leaching to groundwater.

EPD Response # 1: The use of unadjusted MCL-based SSLs (MCL-SSL), or generic risk-based SSLs if an MCL-SSL does not exist, is acceptable. Please address the following comments pertaining to the evaluation of leaching when using the generic SSLs:

- Section 5.5.2 does not discuss the results for subsurface soil samples F39SB013 and F39SB017. According to Table 4-6 (Page 4 of 4), several contaminants at this location exceed either the MCL-SSL or risk-based SSL, including Benzo(a)pyrene, which was detected at a concentration of 0.43 mg/kg (the MCL-SSL is 0.24 mg/kg) at location F39SB017. Please revise accordingly.
- Section 5.5.2 (Page 5-7) states, "The F39SB010 subsurface soil sample reported decreasing concentrations with depth with exceedances of the risk based SSL for benzo(a)anthracene and benzo(b)fluoranthene." Since Fort Stewart, as stated in their response, has chosen to assess the potential for leaching to groundwater using generic risk-based SSLs in lieu of developing site-specific SSLs, please identify these contaminants as COCs requiring corrective action.
- Section 5.5.2 (Page 5-7) states, "The subsurface soil sample collected at F39SB009 from 3 to 3.5 ft bgs was below the background value at a concentration of 5.4 mg/kg." It is unclear which chemical the statement is referring to, and the background value is not specified. Please revise to clarify.

Fort Stewart (June 3, 2014) Response: Remedial goals were derived for those constituents detected in soil that have an excess lifetime cancer risk greater than $1x10^{-6}$. There were no constituents identified as constituent (COCs) based on noncancer effects. New tables have been added to the text with the remedial goal results.

EPD Response # 2: Pursuant to U.S. EPA Region 4 Draft Human Health Risk Assessment Guidance[1], "contaminants that exceed the generic Protection of Ground Water SSL (soil screening level) values from the RSL table are evaluated on a site-specific basis." There are several instances in which contaminant levels in soil have exceeded the generic SSLs, therefore, triggering the development of site-specific SSLs. While existing groundwater data can be used as a line of evidence for evaluating the leachability pathway, it is only a single line of evidence and should not serve as the sole indication that contaminants in soil will not leach to groundwater in the future. Evaluation of the leachability pathway could include TCLP and/or SPLP analyses, site hydrogeologic conditions, current groundwater conditions, historic use and release conditions and distribution of soil COPCs. Please further evaluate the leachability pathway for all COPCs identified through comparison to the generic SSLs.

Fort Stewart (September 9, 2014) Response: GAEPD Response # 1 (shown above), which was received on March 31, 2014, indicates the "The use of unadjusted MCL-based SSLs (MCL-SSL), or generic risk-based SSLs if an MCL-SSL does not exist, is acceptable." Therefore, site-specific SSLs were not generated at that time. However, based on more recent discussions with GAEPD, site-specific SSLs were generated for Benzo(a)anthracene and Benzo(b)fluoranthene (as requested in subsequent comment 1) and presented as an Appendix M to the RFI, revision 3. Further, additional information was included throughout the RFI

Report, and new text added to Section 5.5.2, to help support the conclusion that leaching of SVOCs is not a significant exposure pathway. For example, there was no definitive source identified for the groundwater impacts at the site; however, it is thought that spent solvents from a former electronic repair may have been disposed of in the sewer lines near Building 1065. None of the constituents detected in the soil at concentrations exceeding SSLs [i.e., Benzo(a)anthracene and Benzo(b)fluoranthene], were detected in the groundwater. It is believed that the PAH impacts to soil are related to the Heating Oil Tanks (HOTs) and USTs located west of Building 1160. This area was historically used for vehicle washing and service and is covered by 12 inches of concrete to support the heavier Army vehicles. The highest PAH detections in soil were found just below the 12 inch concrete surface, along the southwest side of Building 1160. The subsurface soil samples reported decreasing concentrations with depth. The 12 inch concrete surface and fine sand below the concrete surface would impede migration of these constituents to groundwater. In addition, the Koc values for the PAHs indicate a potential to absorb to soil rather than migrate to groundwater. It is unknown when the release occurred; however, the HOTs and USTs were closed in 1997. Given the age of the suspected release and the multiple lines of evidence discussed above, it is concluded that the SVOCs are unlikely to migrate to groundwater at this SWMU.

EPD Response # 3: Response noted. The additional narrative throughout the report and specifically Section 5.5.2 are acceptable for addressing the leachability concerns at the site. However, the following minor modification to the tap water RSLs in Appendix M of the RFI (Revision 3) is needed:

Although the reference cited in this section indicates that the most current version of the Regional Screening Level (RSL) Table (May 2014) was utilized when obtaining the chemical-specific values, the tap water RSL of 2.9E-05 mg/L listed for Benz(a)anthracene and Benzo(b)fluoranthene in Appendix M, Table 1 are incorrect. The correct tap water RSLs listed for these constituents are 3.4E-05 mg/L. This marginally changes the target soil leachate concentration (noted as Cpw in Table 1) for these constituents from 3E-04 mg/L to 3.5E-04 mg/L and the SSLs to 0.12 and 0.42 mg/kg for Benz(a)anthracene and Benzo(b)fluoranthene, respectively. The table should be revised accordingly.

Additional Comments:

EPD Original Additional Comment # 2: Typically, an adolescent trespasser is not anticipated to come into contact with soils deeper than 1-foot below ground surface. Therefore, it is not necessary to quantitatively evaluate the trespasser scenario for exposure to subsurface soil contaminants.

Fort Stewart Response: GAEPD original comment 16 stated "All other receptor scenarios should have surface and subsurface soil evaluated separately, although it is unlikely that the trespasser would be exposed to subsurface soil." Based on this comment, exposure of a trespasser to subsurface soil was included in Revision 1 of the RFI document. Since this exposure scenario was included at the request of GAEPD, the text will not be revised to remove this exposure scenario.

EPD Response (November 2014): Response noted. Please note that the original intent of EPD's prior comment was not to require subsurface soil evaluation for trespassers, but was rather directed at all other current/future receptors. Inclusion of the subsurface soil risk and hazard estimates for the trespasser scenario does not impact the risk assessment conclusions. Therefore, retaining the text and calculations in the risk assessment is acceptable.

EPD Original Additional Comment # 3: Please note that the presentation of RGOs is not required. Instead, please calculate remedial levels at a proposed risk level (i.e., $1x10^{-5}$ for carcinogenic COCs) or hazard quotient (HQ) of 1 for each chemical of concern (COC) identified in each medium per exposure scenario evaluated.

Fort Stewart Response: Comment 14 in the original set of comments received from GAEPD stated: "Additionally, please provide remedial goal options (RGOs) for all contaminants of concerns (COCs) that exceed a TR of 10^{-6} in each medium in each land use scenario evaluated in the risk assessment." Based on this comment, RGOs were calculated following the USEPA Region 4 human health risk assessment guidance and were included in the Revision 1 RFI document. RGOs are provided for the COCs for the range of target risk levels and/or hazard quotients based on the results of the risk assessment. Since none of the calculated hazard quotients were greater than 0.1 for each constituent or pathway, RGOs were only calculated based on carcinogenic endpoints.

EPD's Response (November 2014): This response inaccurately interprets the context of EPD's original comment. It should be noted that the risk assessment protocol that should be followed when conducting risk assessment in Georgia are found in the *Georgia EPD Guidance for Selecting Media Remediation Levels at RCRA Solid Waste Management Units* (GAEPD, 1996), which incorporates the draft *EPA Region 4 Human Health Risk Assessment Supplemental Guidance* (EPA, 2014). Please note that where these guidance documents differ, the Georgia Guidance precedes the Region 4 HHRA Supplemental Guidance. Pursuant to the Georgia Guidance, "The facility reviews the results of the baseline risk assessment and proposes a remediation level (RL) for protection of human health for each chemical of concern in each affected medium." Based on this language, the comment above (Original Additional Comment #3) suggested not presenting cancer-based RLs for EPA's risk range, but rather highlighting or bolding the proposed remediation levels determined at the site's preferred target risk level along with sufficient justification for any proposed RLs established at a target risk level greater than $1X10^{-6}$ and HI of 1. This has been sufficiently addressed as part of "Subsequent Comment #3" and clarified in the text on Page xviii.

Subsequent Comment # 2 (August 5, 2014 via email): It is not clear from reading the text whether RGOs would be based on residential or non-residential exposure just that a target risk level (TRL) of 1E-05 is proposed. However, Page 6-18 (last paragraph) states, "To change the land use, the base would be required to do an evaluation prior to development." This infers the site is proposing cleanup (if needed) to the site worker RGOs. If so, further language indicating the site's proposal to implement an institutional control (IC) prohibiting residential redevelopment of the site is needed. It

is suggested that any discussion regarding restricting future residential use of the site be discussed in the "Risk Management" section of the risk assessment. Further discussion of any proposed ICs and any other proposed remedial action should be discussed in the CAP to be completed following the risk assessment.

Fort Stewart Response to Subsequent Comment # 2: The referenced sentence on page 6-18 (last paragraph) was deleted. The current land use for the identified area is industrial. There are no current plans to change the land use at this time and the potential future land use is assumed to remain the same as the current land use. The current and planned future use for the Site will be discussed in the CAP.

EPD's Response Subsequent Comment # 2 (November 2014): Response noted. Any proposed RLs based on non-residential land use or that differs from the stipulated target risk level of $1X10^{-6}$ for carcinogenic COCs will need to include institutional controls to supplement the proposed remedy.

Subsequent Comment # 3 (August 5, 2014 via email): While the RGO tables (Tables 6-33 through 6-35) presented RGOs based on the cancer risk range, the tables did not highlight or select RGOs at the proposed target risk level (TRL) of 1E-05 (as indicated on top of Page 6-19). For transparency, this needs to be indicated in the RGO tables either through highlighting, bolding or via a footnote. ARCADIS agreed to review the document to ensure justification is clearly provided in the text as a basis for coming off EPD's 1E-06 TRL. The rationale can be along the lines of a worker at the site not being expected to engage in activities under exposure conditions assumed in the risk estimations, presence of a building, parking lot, concrete and/or vegetation barrier covering most of the site thus limiting exposure to contaminants in soil, the nature and distribution of the contaminants in the soil, etc.

Fort Stewart Response to Subsequent Comment # 3: A footnote was added to Tables 6-33 through 6-35, as requested "A target cancer risk of $1x10^{-5}$ was selected because the site use is industrial".

The following text was added to Section 6.5 of the report to providing additional justification for the TCR of 1×10^{-5}: A TCR of 1×10^{-5}, is selected for the Site since workers would not typically be exposed to soil (as assumed in risk estimations) due to the presence of buildings, parking lot, concrete and/or vegetation barrier covering most of the site thus limiting exposure to contaminants in soil. Therefore, based on the current and likely future land use, Fort Stewart recommends using the target risk of 1×10^{-5}.

EPD's Response to Subsequent Comment # 3 (November 2014): Response noted. The justification provided is adequate to support the use of a target risk of $1X10^{-5}$ for the development of cancer-based RLs. However, please see "Subsequent Comment #2" with regards to the use of non-residential based RLs. Additionally, the target risk level should not be described in the text as "GAEPD's acceptable risk level", but rather as the facility's proposed target risk level. While it is acceptable to calculate RLs based on the site's

proposed risk level of $1X10^{-5}$, that acceptance is based on knowledge of the site and site-specific conditions. The preferred target risk level is $1X10^{-6}$ without such justification. For transparency, please revise the text or provide additional clarification.

Within sixty (60) days of receipt of this letter, please submit two (2) copies of all revisions that address the above comments to the report, and one (1) electronic copy (in Word or PDF format) of the full report. The revised pages should be noted at the bottom with the word "Revised" and the revision date. If you have any questions, please contact Mr. Mo Ghazi at (404) 656-2833.

Sincerely,

Amy Potter
Unit Coordinator
Hazardous Waste Management Program

c: Tressa Rutland, Fort Stewart (via e-mail)

File: Fort Stewart (G)
S:\RDRIVE\GHAZI\All Sites\Ft Stewart\IRP Projects\SWMU 39\ EPD Review Revision 3_ RTC on revised RCRA Facility Investigation_SWMU 39_November-2014.doc

[1]U.S. EPA (January 2014) Draft Final Region 4 Human Health Risk Assessment Supplemental Guidance. Available for download: http://www.epa.gov/region04/superfund/programs/riskassess/riskassess.html

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Appendix B

Summary of Remedial Alternatives
Cost Estimates

Appendix B Summary Table of Estimates Remedial Alternative Costs

Site: **Fort Stewart - SWMU 39**
Location: **Fort Stewart, Georgia**
Phase: **CAP**
Base Year: **2015**

Remedial Alternative	**Total Cost**	**Present Worth Total Cost**	**Capital Cost**	**Total Annual O&M and Periodic Costs**	**Present Worth of Total Annual O&M and Periodic Costs**	***Estimated Timeframe of Alternative*** [1]	***Basis for Estimated Term of Alternative***
Alternative 2 - ISCO, Excavation of Surface Soil and LNAPL, MNA and Institutional Controls	$ 2,478,665	$ 1,655,623	$ 528,129	$ 1,950,535	$ 1,127,494	*30*	*USEPA 1988*
Alternative 3: ERD, MNA, Absorbent Socks, Impermeable Cap Maintenance and Institutional Controls	$ 2,149,592	$ 1,261,010	$ 305,445	$ 1,844,147	$ 955,564	*30*	*USEPA 1988*
Alternative 4 - Deep Groundwater Recirculation System, Shallow Groundwater Extraction, Active NAPL Recovery, MNA and Institutional Controls	$ 4,518,402	$ 4,540,372	$ 1,758,114	$ 2,760,288	$ 2,782,258	*30*	*USEPA 1988*

Notes and References:

1: The estimated timeframe of each alternative assumed for costing may not reflect the actual time to cleanup.

United States Environmental Protection Agency. 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA Interim Final. USEPA Office of Emergency and Remedial Response. October 1988.

Remedial Alternative CAA-2: Institutional Controls, Monitored Natural Attenuation, Excavation of Soil and LNAPL, and ISCO

- Institutional Controls
  - Potable well ban
  - Periodic review of site use and concrete maintenance
- ISCO injection
  - Well network installed within confines of the railroad tracks and Veterans Parkway
  - 13 wells with screened interval of 35-45 ft. BGS
  - 2" diameter wells with 10' stainless steel screens
  - Target 15 ft. ROI for injected solution
  - Injection of 3,800 gallons of 60 g/L sodium persulfate and 40 g/L sodium hydroxide solution per well per event
  - Assume injection rate of 0.5 gpm per well via gravity feed. All wells injected concurrently.
  - Performance monitoring includes 3 new monitor wells installed inside treatment zone.
  - Performance monitoring for VOCs, sulfate, field parameters, persulfate (field kit), sulfide (field kit).
  - 10 sampling events after each injection event; Weekly for 1 month, monthly for 2 months, then at 6 months and 12 months in Year 1 and at 6 months and 12 months in Year 2
  - Biannual injections (3 injections)
- Excavation of soils and LNAPL around G4MW001 and G4MW002 down to ~3' below the water table (~16 ft x 16 ft x 9 ft = 85 cubic yards)
  - Removal of building located next to G4MW001 and G4MW002
- Monitored Natural Attenuation
  - Monitor 26 shallow and 16 deep wells outside of treatment zone for MNA purposes
  - Assume 30 years for costing based on USEPA 1988 and may not reflect actual time to clean up
    - Semi-annual sampling for 5 years
    - Annual sampling for 25 years
  - Analyze for VOCs and field parameters

Remedial Alternative CAA-3 – Institutional Controls, Monitored Natural Attenuation, Absorbent Socks and ERD

- Institutional Controls
  - Potable well ban
  - Periodic review of site use and concrete maintenance
- ERD injection
  - Well network installed within confines of railroad tracks and Veterans Parkway.
  - 6 injection wells with screen interval of 35-45 ft BGS.
  - Target 15 ft. ROI for injected solution.
  - 2” diameter wells with 10 ft. stainless steel screens.
  - Assume injection rate of 0.5 gpm per well via gravity feed. All wells injected concurrently.
  - Injection of 3,800 gallons of 2% EVO per well per event.
  - Performance monitoring includes 3 new monitor wells installed inside treatment zone.
  - Performance monitoring of wells inside of treatment zone for VOCs, light gases, TOC and field parameters.
  - Injection biannually for 5 years (3 injections).
- LNAPL Recovery
  - Install absorbent socks in monitoring wells G4MW001 and G4MW002
  - Sock replacement monthly
- Monitored Natural Attenuation
  - Monitor wells outside of treatment zone monitored for MNA
  - Analyze for VOCs, light gases and field parameters
  - 6 monitor wells also analyzed for total and dissolved Arsenic
  - Assume 30 years for costing based on USEPA 1988 and may not reflect actual time to clean up
    - Semi-annual sampling for 5 years
    - Annual sampling for 25 years

Remedial Alternative CAA-4 – Institutional Controls, Monitored Natural Attenuation, Active LNAPL recovery, Deep Groundwater Recirculation System, and Shallow Groundwater Extraction System

- Institutional Controls
  - Potable well ban
  - Periodic review of site use and concrete maintenance
- Groundwater System
  - Deep groundwater recirculation system consisting of 2 extraction wells and 6 injection wells installed within confines of railroad tracks and Veterans Parkway
  - 8 Shallow extraction wells installed downgradient
  - Install 2 deep extraction wells to 30 ft. – 45 ft. BGS
  - Install 6 deep injection wells to 30 ft. – 45 ft. BGS
  - Install 8 shallow extraction wells to 5 ft. to 15 ft. BGS
  - 2” diameter injection wells with 10 ft. stainless steel screens
  - 8” diameter extraction wells with 10 ft. stainless steel screens
  - Dedicated pipe to each well (1000 linear feet)
  - System operated at 2 gpm per extraction well
  - Treatment system (separate systems for shallow and deep)
    - 2 GAC units
    - Multimedia filter
    - Low profile air stripper
  - Performance monitoring – nearby wells for VOCs
  - Semi-annual cleaning of the air stripper
  - Estimate 2000 lbs. per year GAC change out
  - Monthly O&M visits (8 hours per visit)
  - Monthly system sampling to include influent and effluent air and water for VOCs
  - Assume system operation for 5 years based on professional judgement
- LNAPL Recovery
  - Bladder pumps for LNAPL removal from G4MW001 and G4MW002
  - Pump LNAPL into 55 gal drums; disposal off-site
- Monitored Natural Attenuation
  - Monitor wells outside of treatment zone for MNA purposes
  - Assume 30 years for costing based on USEPA 1988 and may not reflect actual time to clean up
    - Semi-annual sampling for 5 years
    - Annual sampling for 25 years
    - Analyze for VOCs and field parameters