

SECTION 5

Descriptions of RI/FS Sites

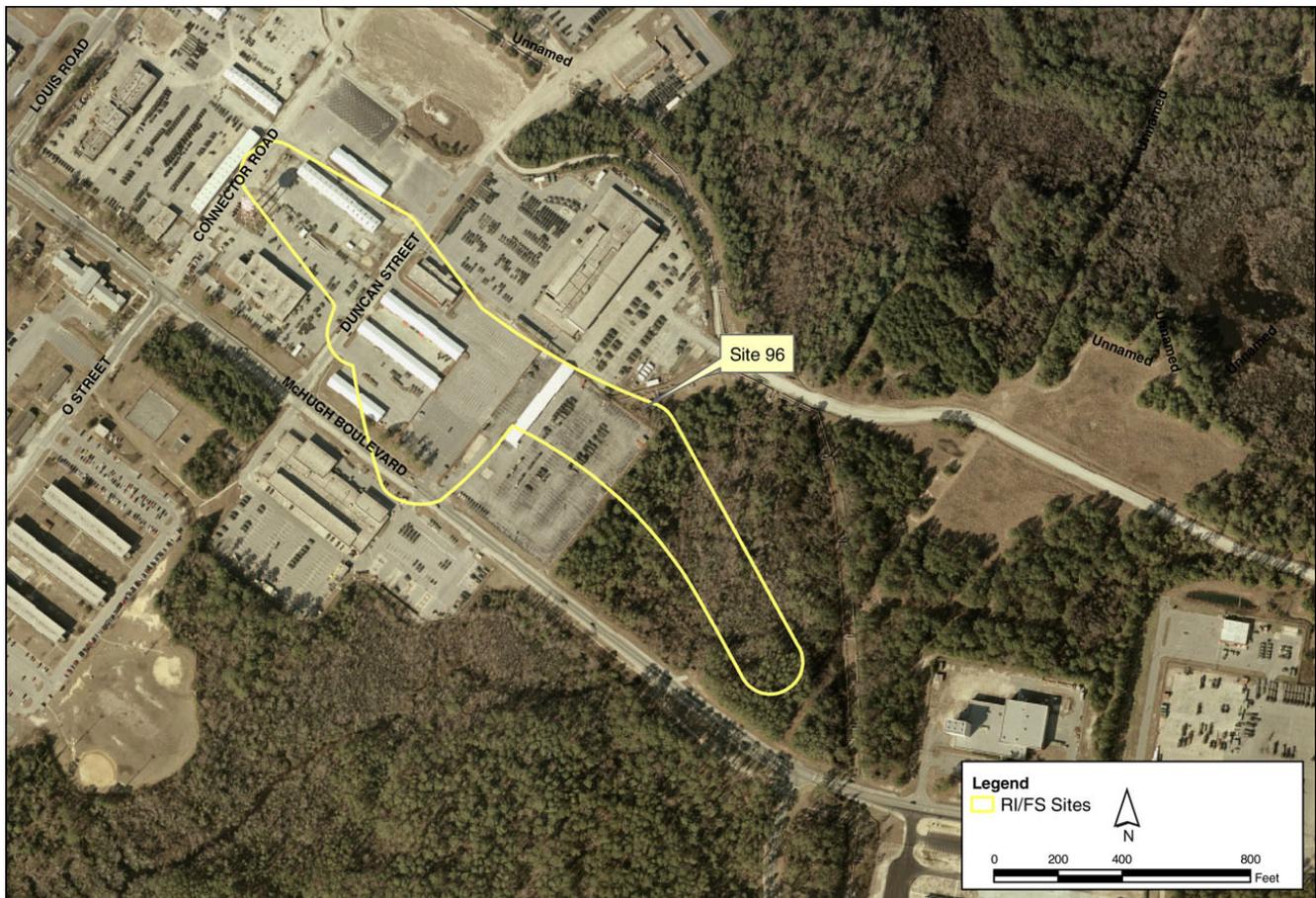
The following sections discuss the site history, summary of previous investigations, and future activities of the one IRP site and three MMRP sites that are in the RI/FS phase of the CERCLA process. Because these sites are currently under investigation, the site boundaries encompass the current nature and extent of contamination.

5.1 IRP RI/FS Sites

5.1.1 Site 96 (OU 22)—Building 1817 UST

Site 96, previously Solid Waste Management Unit (SWMU) 360, encompasses approximately 14 acres in the Mainside Hadnot Point Industrial Area (HPIA) between Duncan Street and “O” Street and one block north east of McHugh Boulevard (**Figure 5-1**). Site 96 is the site of a former 300-gallon waste-oil UST positioned near Building 1817. Building 1817 is a Hazardous Materials Consolidation Center. The former UST was located in the eastern portion of the compound, which is being used as a temporary staging area for batteries, refrigeration units, and other used equipment prior to disposal and or reutilization.

FIGURE 5-1
IRP Site 96, Operable Unit 22



Previous investigations are listed in **Table 5-1**.

TABLE 5-1
Previous Investigations Summary, IRP Site 96

Previous Investigation/Action	Date	Activities
UST Removal and Investigations (Catlin, 1997)	1997	The 300-gallon waste oil UST was removed in July 1997, and confirmatory samples were collected under the UST program. Additional sampling was completed in December 1997, indicating a petroleum release had occurred at the UST. A Limited Site Assessment was also conducted under the UST program, which included installing monitoring well 1817MW01 within the former UST excavation. Upon discovery of elevated concentrations of chlorinated compounds in groundwater, the site was removed from the UST program and included in the Confirmatory Site Investigation (CSI) under the Resource Conservation and Recovery Act (RCRA).
Confirmatory Sampling Investigation (Baker, 2005)	2002 - 2005	The CSI included soil and groundwater sampling for VOCs, SVOCs, pesticides, and RCRA metals analyses. The CSI identified VOCs, SVOCs, and pesticides in groundwater that exceeded screening criteria.
RCRA Facility Investigation (RFI) (Baker, 2005) and Amended RFI (CH2M HILL, 2006)	2005 - 2006	The RFI included soil and groundwater sampling for VOCs, pesticides, and RCRA metals analysis. A chlorinated VOC plume was identified in groundwater. Potential unacceptable human health risks to future residents were identified from exposure to tetrachloroethene (PCE), trichloroethene (TCE), and heptachlor epoxide in groundwater.
Corrective Measures Study (CMS) (CH2M HILL, 2007)	2007	A CMS was conducted to develop RGOs for the site and to evaluate management options for groundwater at SWMU 360. The corrective measures evaluated were enhanced reductive dechlorination (ERD), air sparging, and <i>in situ</i> chemical oxidation (ISCO).
Additional Groundwater Delineation (Osage, 2009)	2007 - 2009	The downgradient and vertical extent of the chlorinated VOC plume was not fully delineated and additional groundwater samples were collected for analysis of PCE and its daughter products. As a result, the vertical extent of contamination was delineated but the plume extends horizontally more than 1,800 feet southeast from the source area and is not fully delineated to North Carolina Groundwater Quality Standards (NCGWQS). Because the contamination is not associated with the former UST, the SWMU was transferred to the IRP to complete the delineation under an RI/FS.

5.1.1.1 Future Activities

Additional delineation is planned at Site 96 in FY 2014, and the results and the previous RFI and CMS will be summarized as an RI/FS to document the nature and extent of the groundwater contamination, potential risks to human health and the environment, and identify remedial alternatives for consideration, followed by a PRAP and ROD (**Schedule 5-1**).

**Schedule 5-1
IRP Site 96
FY 2013 Site Management Plan
MCIEAST-MCB CAMLEJ**

ID	Task Name	Duration	Start	Finish	2015																	
					Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	
1	RI/FS	350 days	Mon 3/3/14	Fri 7/3/15																		
2	Draft RI UFP-SAP	60 days	Mon 3/3/14	Fri 5/23/14																		
3	Review Period	45 days	Mon 5/26/14	Fri 7/25/14																		
4	Final RI UFP-SAP	30 days	Mon 7/28/14	Fri 9/5/14																		
5	Field Activities	60 days	Mon 9/8/14	Fri 11/28/14																		
6	Draft RI/FS Report	80 days	Mon 12/1/14	Fri 3/20/15																		
7	Review Period	45 days	Mon 3/23/15	Fri 5/22/15																		
8	Final RI/FS Report	30 days	Mon 5/25/15	Fri 7/3/15																		

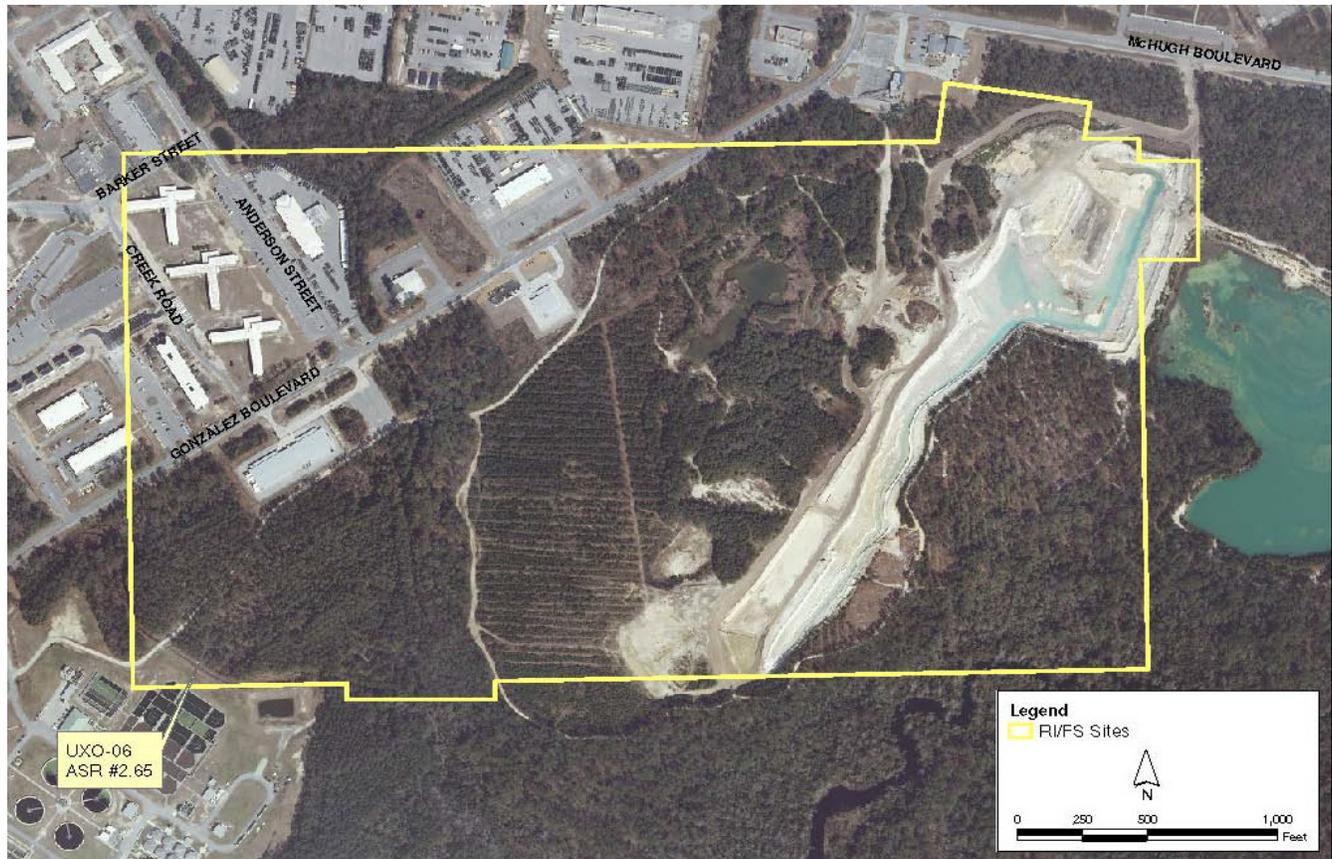
Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	

5.2 MMRP RI/FS Sites

5.2.1 UXO-06 (OU 24)—Fortified Beach Assault Area (ASR #2.65)

Site UXO-06, the Fortified Beach Assault Area, encompasses approximately 177 acres in the HPIA (**Figure 5-2**). This range was reportedly in use from 1953 until approximately 1977. The types of munitions that have been used onsite include small arms, 3.5-inch practice rockets, practice rifle grenades, and smoke and white phosphorus hand grenades. In addition, cleaning solvents and solutions were used at the site to clean equipment. The east central portion of Site UXO-06 has been investigated and cleared and is being used as a borrow pit to support construction projects across the Base.

FIGURE 5-2
MMRP Site UXO-06 (OU 24), ASR #2.65



Previous investigations are listed in **Table 5-2**.

TABLE 5-2
Previous Investigations Summary, MMRP Site UXO-06 (OU 24), ASR #2.65

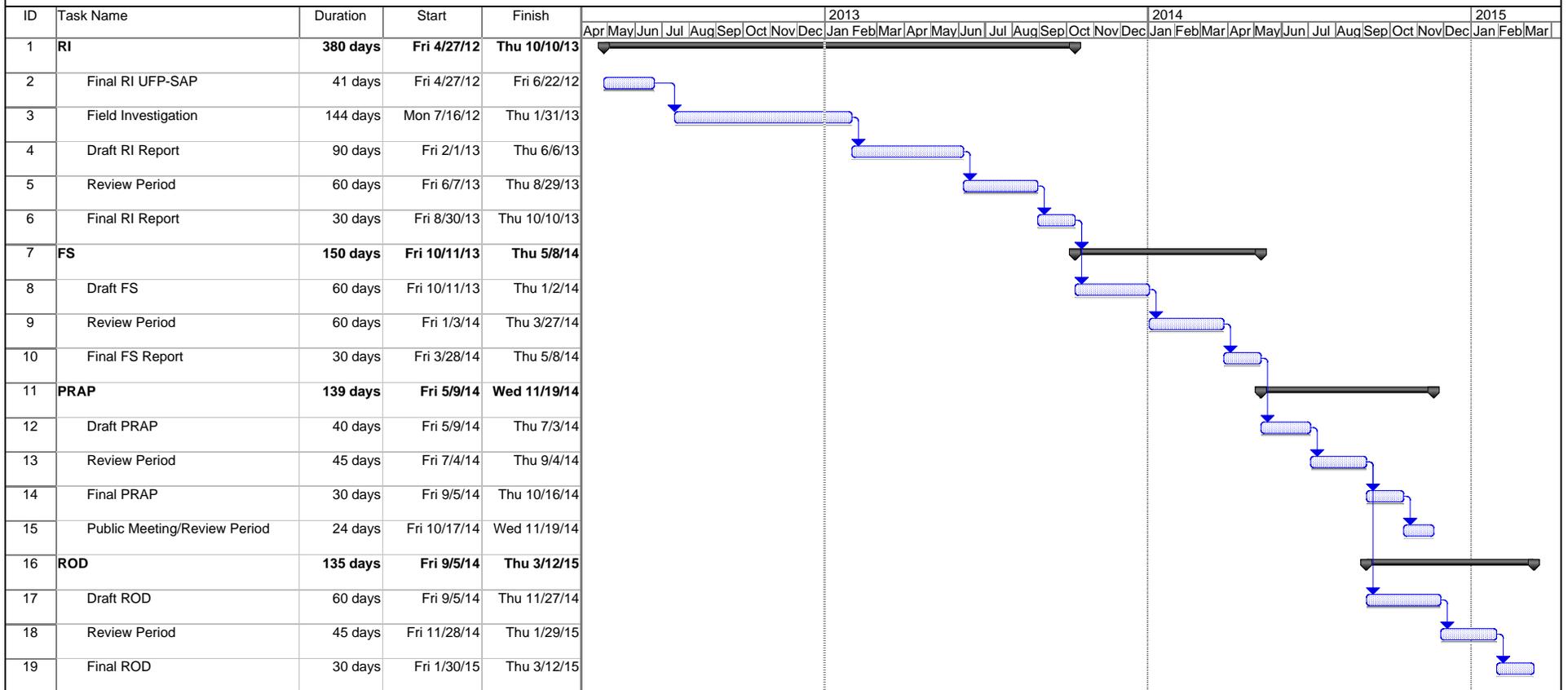
Previous Investigation/Action	Date	Activities
Focused SI (CH2M HILL, 2007; 2008)	2006 - 2008	In support of MILCON activities for an armory and extended parking area, soil and groundwater sampling, and 100 percent DGM were conducted in a 4-acre area at UXO 6. Samples were analyzed for VOCs, SVOCs, pesticides/PCBs, explosives, perchlorate, total petroleum hydrocarbon (TPH), and metals. No unacceptable human health or ecological risks were identified in site media. The 1,368 anomalies that were identified during DGM were investigated and removed prior to MILCON activities. Several MEC items were discovered and removed including a practice rocket, colored smoke hand grenade, and hand signal flare. Because it is not possible to provide 100 percent assurance that all MEC items have been removed from the site, "3R" (Recognize, Retreat, Report) training was provided for protection of construction workers.

Previous Investigation/Action	Date	Activities
Focused PA/SI (Arcadis, 2007)	2007	To evaluate the presence of UXO and impacted soil or groundwater within a proposed sewer line easement, the ONWASA initiated a Focused PA/SI at UXO-06. Field activities included soil and groundwater sampling and DGM. Samples were analyzed for VOCs, SVOCs, TPH, explosives, perchlorate, and metals. No unacceptable risks to construction workers were identified in site media. 790 geophysical anomalies that were identified during DGM were investigated and were removed. All anomalies with the exception of two practice 3.5" rockets and one expended smoke rifle grenade were construction/cultural debris.
PA/SI(CH2M HILL, 2012)	2008 - 2012	A site-wide field investigation was conducted to identify the presence and nature of MC contamination and evaluate the number and density of anomalies that represent potential subsurface MEC. Field activities included soil, groundwater, surface water, and sediment sampling; and 10 percent DGM and intrusive anomaly investigation. The samples were analyzed for VOCs, SVOCs, pesticides, explosives, TPH, perchlorate, and metals and no unacceptable human health or ecological risks were identified from exposure to environmental media. MPPEH was found on the ground surface and in burial pits and there is potential for MEC/MPPEH to remain in the surface and subsurface at the site. An RI was recommended to further evaluate the potential for subsurface MEC in uninvestigated and undeveloped areas within the site and along the site boundaries.
Focused SI (CH2M HILL)	2010 - 2012	A Focused SI was conducted at the UXO-06 Borrow Pit Expansion Area in a phased approach. Field activities included 100 percent DGM and intrusive investigations. A total of 10,250 geophysical anomalies were investigated, 15 MEC items were identified and destroyed through controlled detonations, and over 2,000 MPPEH items were identified. Based on the clearance activities, the borrow pit was recommended to be opened for excavation in January 2012. The intrusive investigation significantly reduced the risk of encountering subsurface MEC. However, because it is not possible to provide 100 percent assurance that all MEC items have been removed from the site, "3R" (Recognize, Retreat, and Report) training was recommended for protection of site operators. On-call support from Base Explosive Ordnance Disposal (EOD) or a qualified UXO contractor for inspection and disposal of suspected MEC that may be unearthed was also recommended.

5.2.1.1 Future Activities

An RI will be conducted in FY 2013 to further evaluate the nature and extent of subsurface MEC in uninvestigated and undeveloped areas within the site and along the boundaries. DGM and intrusive investigation activities in support of MILCON for Gonzalez Boulevard utilities were also conducted and the results will be incorporated in the RI. Following the RI, an FS, PRAP, and ROD will be completed (**Schedule 5-2**).

**Schedule 5-2
MMRP Site UXO-06 ASR# 2.65
FY 2013 Site Management Plan
MCIEAST-MCB CAMLEJ**

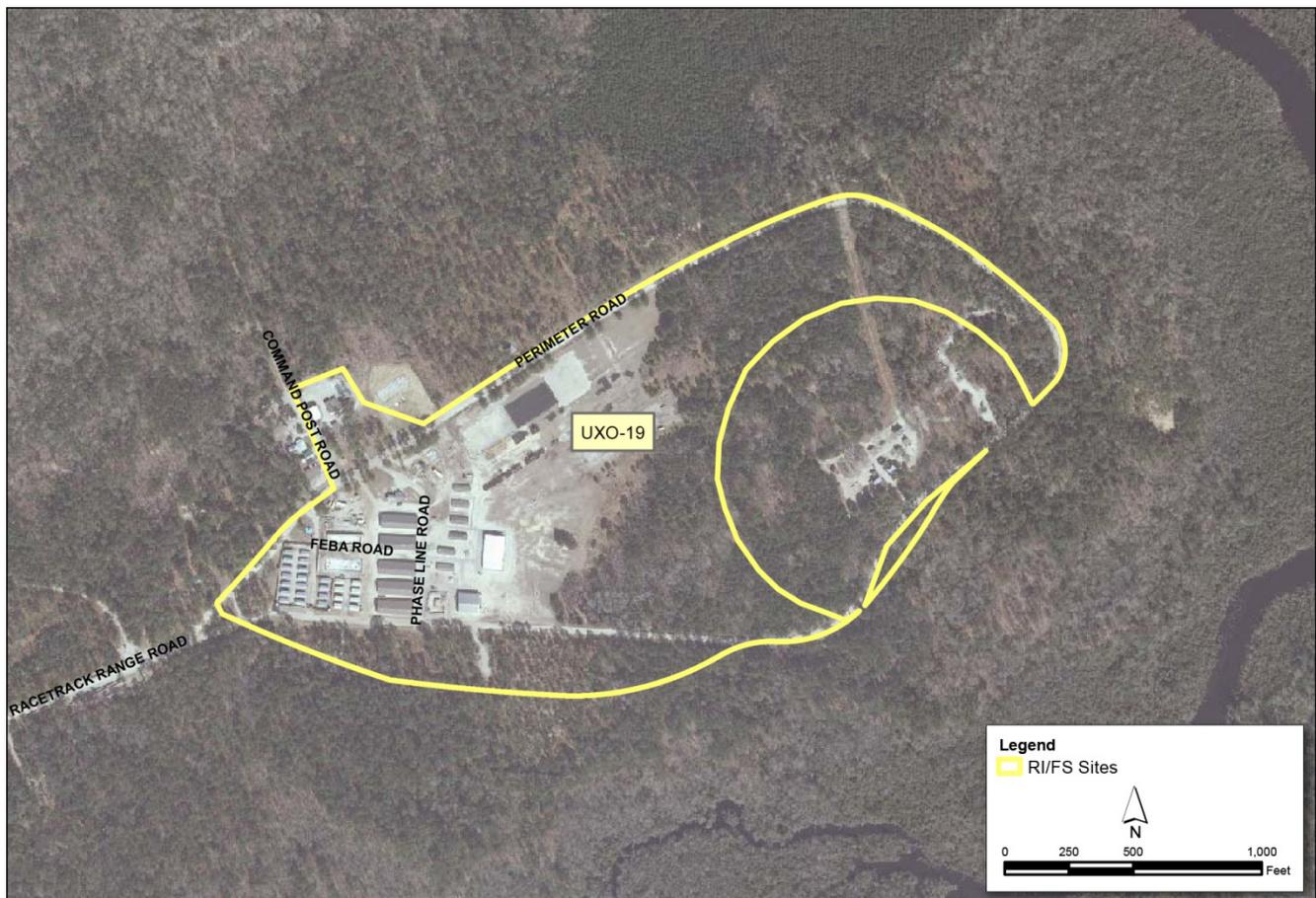


5.2.2 UXO-19 (OU 25)—M-4, Rifle Grenade Range (ASR #2.104), K-22 Practice Hand Grenade Course (ASR #2.111), and M115 Hand Grenade Course (ASR #2.168)

Site UXO-19 is located within the Camp Devil Dog training area and covers approximately 80 acres (**Figure 5-3**). There are eight overlapping ranges within UXO-19 boundaries and three of them were identified for closure under the MMRP. The M-4 Rifle Grenade Range (ASR #2.104) was used between 1950 and 1960. Reported munitions used were M28 and M29 rifle grenades, white phosphorous hand and rifle grenades, pyrotechnics, and demolitions. The K-22 Practice Hand Grenade Course (ASR #2.111) was used between 1950 and 1960 to practice grenade throwing techniques prior to throwing live grenades. Facilities included a bunker and foxhole. The M115 Hand Grenade Course (ASR #2.168) was used from 1970 to 1977 for high explosive hand grenades. The range consisted of six throwing pits, six control pits, and a barricade with two observation ports.

FIGURE 5-3

MMRP Site UXO-19 (OU 25), ASR #2.104, ASI #2.111, and ASR #2.168



Previous investigations are listed in **Table 5-3**.

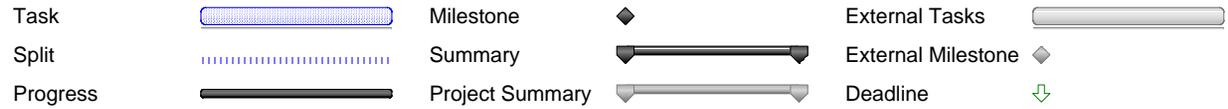
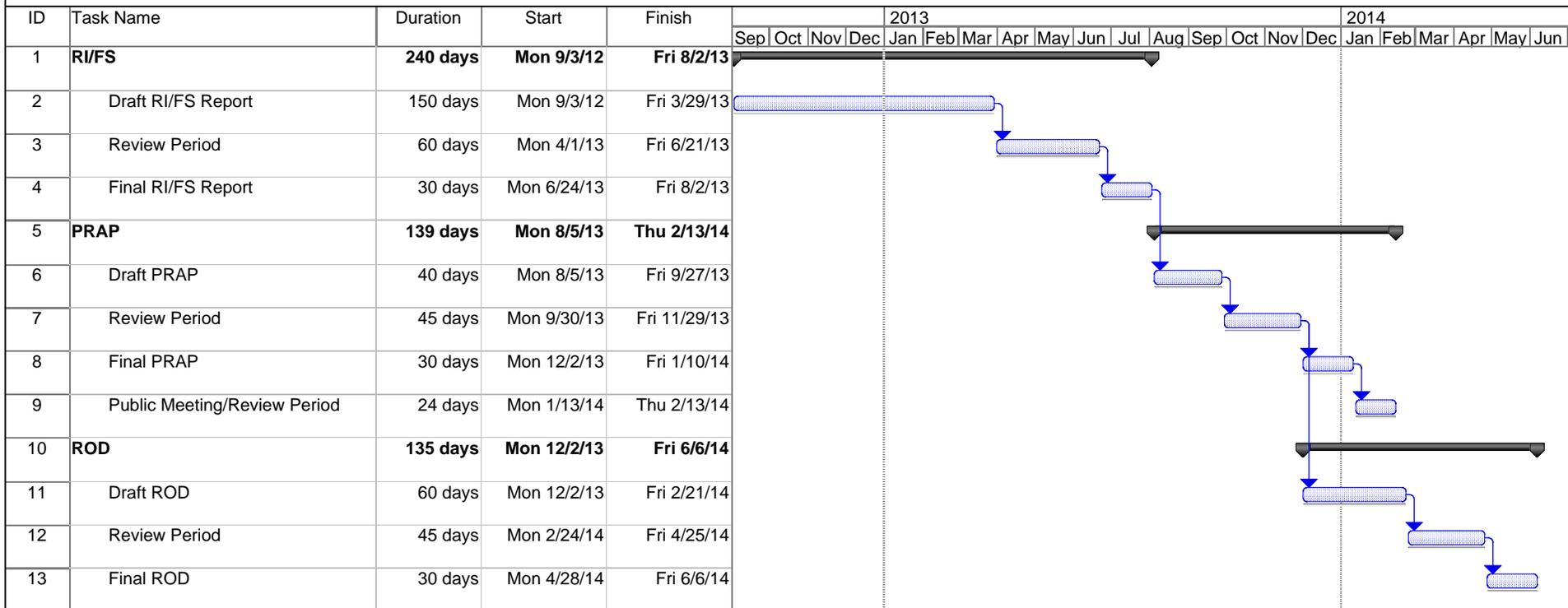
TABLE 5-3
Previous Investigations Summary, MMRP Site UXO-19 (OU 25), ASR #2.104, ASR #2.111, and ASR #2.168

Previous Investigation/Action	Date	Activities
PA/SI (CH2M HILL, 2010)	2010	In support of MILCON activities in the vicinity of the former grenade ranges, soil and groundwater sampling, 10 percent DGM of the former range area, 100 percent DGM of the MILCON footprint, and an intrusive MEC investigation were initiated in FY 2009. Samples were analyzed for explosives, metals, and perchlorate, and two subsurface soil samples were analyzed for VOCs. No unacceptable risks to human health or the environment were identified in site media. Approximately 4,465 geophysical anomalies were identified during DGM, 4,417 of which were intrusively investigated. 42 items were classified as UXO and detonated on site, and other MEC items were discovered and removed.
Draft ESI (CH2M HILL)	2010-2012	An ESI was conducted in support of MILCON activities and included 100 percent DGM and intrusive investigations from 0 to 3 feet below ground surface (bgs) in the undeveloped areas of the site. Over 54,000 geophysical anomalies were investigated, over 450 MEC items were identified and destroyed through controlled detonations, and over 50,000 MPPEH items were identified. The results will be presented in the RI/FS report for UXO-19.

5.2.2.1 Future Activities

An RI/FS report is planned for completion in FY 2013 to present the nature and extent of contamination identified during the previous investigations and evaluate alternatives to address MEC/ MPPEH that may remain on-site in undeveloped areas beneath buildings, roadways, and parking areas and/or deeper than 3 feet bgs site-wide (**Schedule 5-3**).

Schedule 5-3
MMRP Site UXO-19 ASR# 2.104, 2.111, and 2.168
FY 2013 Site Management Plan
MCIEAST-MCB CAM LEJ

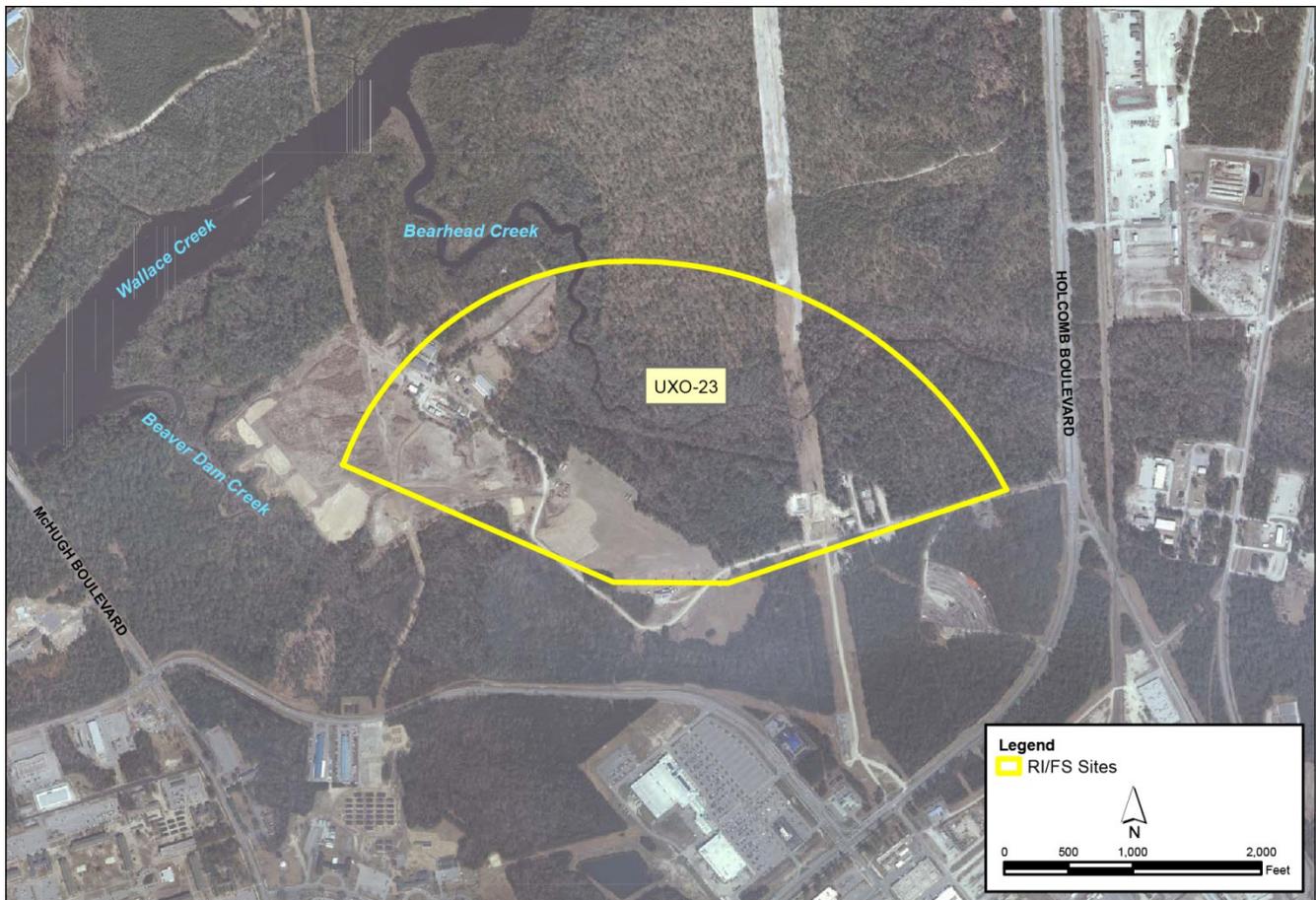


5.2.3 UXO-23—D-9 Skeet Range (ASR #2.82)

The D-9 Skeet Range is located west of Holcomb Boulevard and north of Parachute Tower Road and encompasses approximately 187 acres (**Figure 5-4**). The D-9 Skeet Range was used for recreational shooting from 1953 until it was closed in July 2011. The range was one of four live-fire ranges within a training area known as Area D. The weapons historically accommodated included 12-, 16-, 20-, 28-, and 410-gauge shotguns and sizes of lead shot used on the range included 7.5 mm, 8 mm, 8.5 mm, and 9 mm. Although the total amounts of ammunition used on the skeet ranges are not available, it is estimated that several hundred thousand rounds were fired each year.

Currently, the planned Wallace Creek Military Construction (MILCON) project covers approximately 100 acres north of Hadnot Point and south of Wallace Creek and includes the theoretical shot fall-zone of the D-9 Skeet Range. Planned and ongoing construction consists of barracks support buildings (e.g., mess hall, fitness center) and parking areas.

FIGURE 5-4
MMRP Site UXO-23, ASR #2.82



Previous investigations are listed in **Table 5-4**.

TABLE 5-4
Previous Investigations Summary, MMRP Site UXO-23, ASR #2.82

Previous Investigation/Action	Date	Activities
Focused SI (CH2M HILL, 2008)	2007 - 2008	A field investigation was conducted to evaluate the distribution of lead within the area south of Bearhead Creek. Surficial soil samples were field screened using XRF to identify potential lead impacts. Soil and groundwater samples were also collected and analyzed for lead to confirm the XRF results. The highest concentrations of lead were generally found to correspond with the theoretical shot fall-zone for the range. Additional sampling of surface soils and groundwater and a human health risk assessment (HHRA) was recommended.
Focused PA/SI (CH2M HILL, 2010)	2008 - 2010	The Focused PA/SI was conducted to evaluate potential impacts to human health and the environment in the area north of Bearhead Creek. Soil, groundwater, surface water, and sediment samples were collected and were analyzed for perchlorate, polycyclic aromatic hydrocarbons (PAHs), and metals. Potential human health risks to future residents from PAHs in groundwater north of Bearhead Creek and potential ecological risks from metals and PAHs in Bearhead Creek were identified.
Wallace Creek ESI (CH2M HILL, 2010)	2009 - 2010	Additional soil sampling was conducted in the theoretical shot fall-zone to delineate the horizontal and vertical extents of lead impacts and to investigate potential impacts to drainage features that convey surface water runoff from the theoretical shot fall-zone. A human health risk screening (HHRS) and an ecological risk screening (ERS) were performed on the data collected to-date. In the north area, potential risks have been identified from PAHs in groundwater, metals and PAHs in surface water, and sediment within Bearhead Creek and associated wetlands and drainages. In the southern area of the Skeet Range, outside of the shot fall-zone, no unacceptable risks were identified in soil and groundwater. In the vicinity of the theoretical shot fall-zone, potential unacceptable risks to human health and the environment were identified from exposure to lead and PAHs in surface soil, and a removal action was recommended once the Skeet Range is closed.
Draft EE/CA (CH2M HILL, 2010)	2010	The EE/CA evaluated alternatives for the NTCRA to address potential unacceptable risks from lead and PAHs in the shot fall-zone. The alternatives were no action, excavation with offsite disposal, excavation with particle separation and backfill, excavation with stabilization and offsite disposal, and <i>In situ</i> stabilization.
Environmental Update (CH2M HILL, 2011)	2011	After submission of the Draft EE/CA, several MILCON projects were planned/initiated adjacent to the NTCRA area and additional investigation was conducted in 2011. Additional soil sampling for lead and PAH analysis was conducted in the theoretical shot fall zone to verify and update the NTCRA removal area. Lead concentrations exceeded the cleanup level at three soil sample locations within the proposed NTCRA area. Soil samples were also screened using a XRF analyzer and three surface soil samples contained lead concentrations in exceedance of the cleanup level. The proposed NTCRA area was modified based on these results.
Final EE/CA (CH2M HILL, 2012)	2011 – 2012	The EE/CA evaluating alternatives for the NTCRA to address potential unacceptable risks from lead and PAHs in the theoretical shot fall zone was updated with the modified NTCRA area based on the Environmental Update.
AM (CH2M HILL, 2012)	2012	An AM was completed to propose <i>in situ</i> stabilization followed by excavation and offsite disposal as the NTCRA to address lead and PAHs in soil.
Wallace Creek BEQ Confirmation Sampling (CH2M HILL, 2012)	2012	In support of MILCON activities for a Bachelor Enlisted Quarters (BEQ) facility located northwest of the theoretical shot fall zone, soil and groundwater sampling was conducted to evaluate whether environmental impacts related to historical activities could pose unacceptable risks to construction workers and future residents. The samples were analyzed for VOCs, SVOCs, pesticides/PCBs, and metals. There were no unacceptable risks for human and ecological receptors at the proposed BEQ location. Therefore, MILCON activities were recommended to proceed as planned.
NTCRA (Osage)	2012	The NTCRA to treat and remove lead and PAH contaminated soil in the theoretical shot fall zone and three drainages connected to the southern portion of the shot fall zone was completed in 2012. Approximately 52,000 tons of soil was removed. Some residual skeet debris remains post 1-ft of removal and a geotextile liner was installed over the area for further evaluation in an RI.

5.2.3.1 Future Activities

The NTCRA report is scheduled to be complete in FY 2013. An RI was initiated in FY 2012 to evaluate PAHs in North Area shallow groundwater and lead in Bearhead Creek sediment and drainage features. In FY 2013-2014 additional RI activities will include further evaluation of lead and PAHs in subsurface soil in the theoretical shot fall zone, lead in groundwater in the theoretical shot fall zone, lead and PAHs in Beaver Dam Creek, and a munitions response investigation based on potential for MEC identified during the NTCRA (**Schedule 5-4**).

