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MCB CAMP LEJUENE
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NO ACTION DECISION DOCUMENT SITES 4, 13, 18, 23, 38, 42, 46, 51, 55, 61, 62, 66 AND 67 MCB CAMP LEJEUNE NC

7/13/2012

CH2M HILL

Final

No Action Decision Document

IRP Sites 4, 13, 18, 23, 38, 42, 46, 51, 53, 55, 61, 62, 66, 67

Marine Corps Base Camp Lejeune, North Carolina

April 2012

1 Declaration

This No Action Decision Document (NADD) presents the No Further Action (NFA) determination for 14 Installation Restoration Program (IRP) Sites 4, 13, 18, 23, 38, 42, 46, 51, 53, 55, 61, 62, 66, and 67. MCB CamLej was placed on the United States Environmental Protection Agency (USEPA) National Priorities List (NPL) effective November 4, 1989 (EPA ID: NC6170022580). As a result of the NPL listing and pursuant to Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the USEPA Region 4, North Carolina Department of Environment and Natural Resources (NCDENR), the Navy, and the Marine Corps entered into a Federal Facilities Agreement (FFA) for MCB CamLej in 1991. The primary purpose of the FFA is to ensure that the environmental impacts associated with past and present activities at the Base are thoroughly investigated and to determine whether additional investigation and/or remediation activities are necessary. Sites 4, 13, 18, 23, 38, 42, 46, 51, 53, 55, 61, 62, 66, and 67 were investigated under CERCLA and are recommended for NFA in the current version of the Site Management Plan (CH2M HILL, 2011), which is updated annually to reflect the site investigation status and schedule.

The NFA determination has been made in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This NFA decision is based on the results of the Confirmatory Site Assessments (CSAs) conducted between 2007 through 2010 and the Administrative Record for MCB CamLej. As a result of the environmental investigation and risk screenings, there is no unacceptable risk to human health or the environment at these sites. The Navy and the Marine Corps issue this NADD and obtained concurrence from the USEPA Region 4 and NCDENR on the NFA decision. Copies of the USEPA and NCDENR approval letters are presented in **Attachment A**.

1.1 Authorizing Signature

T. A. GORRY
Brigadier General, U.S. Marine Corps
Commanding General
Marine Corps Installations East-Marine Corps Base Camp Lejeune

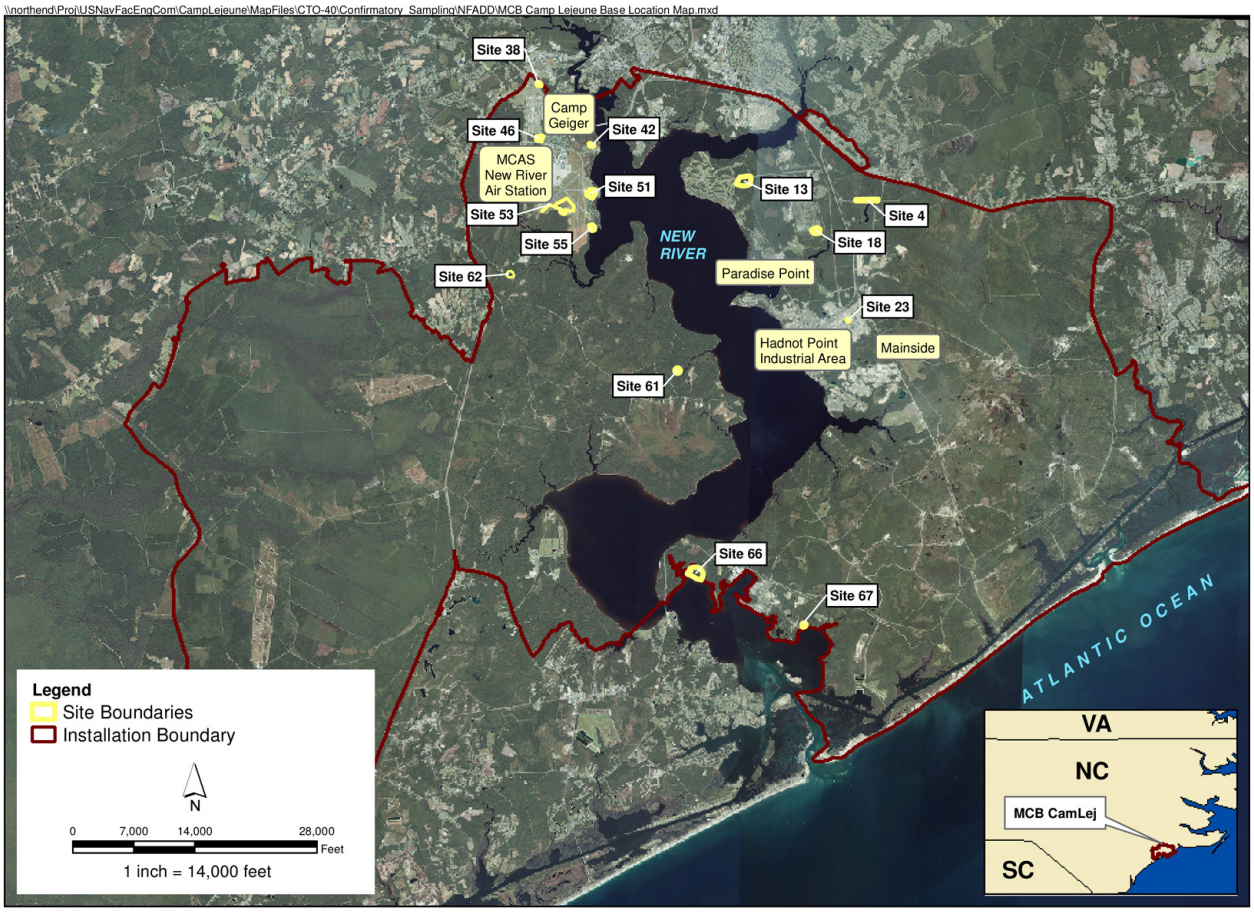
Date

2 Decision Summary

2.1 Base Description and History

MCB CamLej is a 156,000-acre facility located in Onslow County, North Carolina, adjacent to the southern side of the City of Jacksonville (**Figure 2-1**). The mission of MCB CamLej is to maintain combat-ready units for expeditionary deployment. The Base provides housing, training facilities, and logistical support for Fleet Marine Force units and other assigned units.

FIGURE 2-1
Base and Site Location Map



2.2 Site Description and Investigation Summary

CSAs were conducted at 14 MCB CamLej IRP sites (**Figure 2-1**) between 2007 through 2010. This section presents site descriptions and summary of environmental investigations, including the results of human health and ecological risk screenings for each site. The methodology used for the risk screenings is provided in **Attachment B.**

2.2.1 Site 4 – Sawmill Road Construction Debris Dump

Site 4, the Sawmill Road Construction Debris Dump, encompasses approximately 0.3 acres of land bisected by the eastern end of Old Sawmill Road in the Mainside area of the Base (**Figure 2-1**). Site 4 was reportedly used as a general surface disposal area for an unknown period of time. Site 4 is primarily wooded with the exception of Sawmill Road and other unpaved and unnamed roads that provide access to Henderson Pond in the southern portion of the site.

Initial Assessment Study (WAR, 1983)

The Initial Assessment Study (IAS) was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS, Site 4 was used for surface disposal of construction debris including asphalt, old bricks, and concrete; however, no hazardous wastes were reportedly disposed of at Site 4, and no further assessment was recommended.

Confirmatory Site Assessment (CH2M HILL, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 4 in 2009 based on its history as a dump. Eight subsurface soil and three groundwater samples were collected and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals (**Figure 2-2)**. Only aluminum and methylene chloride were detected at concentrations exceeding regulatory screening criteria and background (for aluminum) in soil (**Table 2-1**). A human health risk screening (HHRS) and an ecological risk screening (ERS) were conducted using the subsurface soil and groundwater data obtained during the CSA. No unacceptable human health (**Table 2-2**) or ecological risks (**Table 2-3**) were identified due to exposure to soil or groundwater and the site was recommended to remain closed with NFA.

FIGURE 2-2
IRP Site 4 - Sample Locations

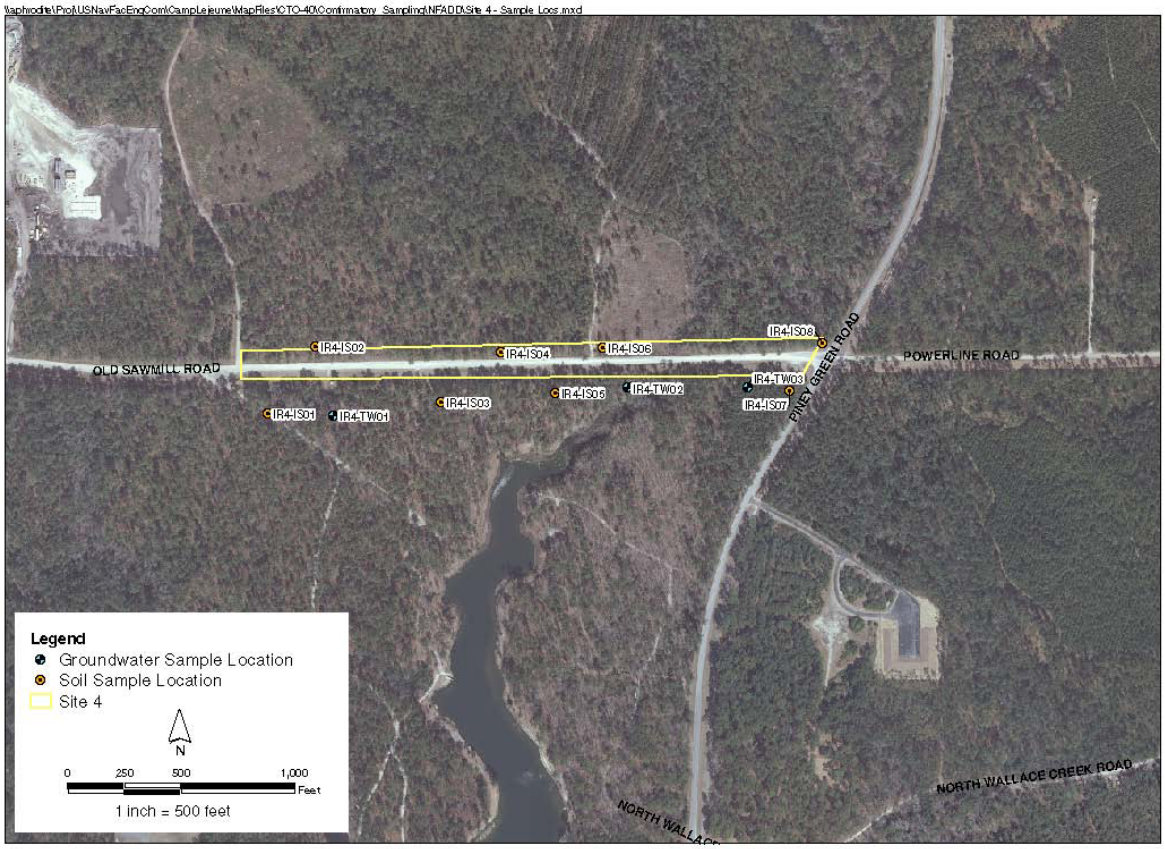


TABLE 2-1
Summary of Subsurface Soil Exceedances - Site 4

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Methylene chloride (µg/kg)	55 J	IR4-IS02	23	11,000	--
Aluminum (mg/kg)	15,600	IR4-IS02	--	7,700	10,329

Notes:
J - Analyte present, value may or may not be accurate or precise
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-2
Summary of Human Health Risk Screening- Site 4

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Aluminum	None	None	No unacceptable risks expected from exposure to subsurface soil.
Groundwater	None	None	None	No unacceptable risks expected from exposure to groundwater.

TABLE 2-3
Summary of Ecological Risk Screening- Site 4

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Iron Vanadium	Iron and vanadium results were consistent with background and the maximum aluminum concentration was within the range of background levels. No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Aluminum Iron Vanadium	All concentrations were either consistent with or within the range of background levels. No unacceptable risks are expected due to exposure to groundwater based on migration to surface water.

Notes:
HQ: Hazard Quotient

2.2.2 Site 13 – Golf Course Construction Dump Site

Site 13, the Golf Course Construction Dump Site, encompasses approximately 10 acres in the Paradise Point area of the Base (**Figure 2-1**). In 1944, Site 13 was reportedly used for surface disposal of construction debris in 1944. The site is currently undeveloped and heavily wooded.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS Site 13 was used as a surface dump for the disposal of clippings, branches, asphalt, and other construction related debris that was associated with the golf course. No hazardous wastes were reportedly disposed of at Site 13 and no further assessment was recommended.

Limited Site Assessment (Osage, 2008)

To verify the presence or absence of contamination, a Limited Site Assessment (LSA) was initiated at Site 13 in 2007 based on its history as a dump. Eight subsurface soil and three groundwater samples were collected from across the site and analyzed for VOCs, SVOCs, pesticides, polychlorinated biphenyls (PCBs), herbicides, and metals

(**Figure 2-3**). Analytical results indicated two SVOCs (benzo(b)flouranthene and bis(2-ethylhexyl)phthalate) in groundwater at concentrations exceeding regulatory screening criteria (**Table 2-4**). However, the SVOC concentrations were estimated. Additionally, benzo(b)flouranthene can be formed during the burning of petroleum, garbage, or plant material and is commonly found in smoke and soot; therefore, it is reasonable to assume that the detection is a result of forest fires and their residuals and not historical dumping at the site. Bis(2-ethylhexyl)phthalate is a plasticizing agent used in production of poly vinyl chloride (PVC) pipe and other plastics including sample tubing; therefore, it is reasonable to assume that the detection in the groundwater sample is a result of cross contamination from the PVC well casing and/or the sample tubing as opposed to historical dumping at the site. The LSA recommended the site remain closed with NFA.

FIGURE 2-3
IRP Site 13 - Sample Locations

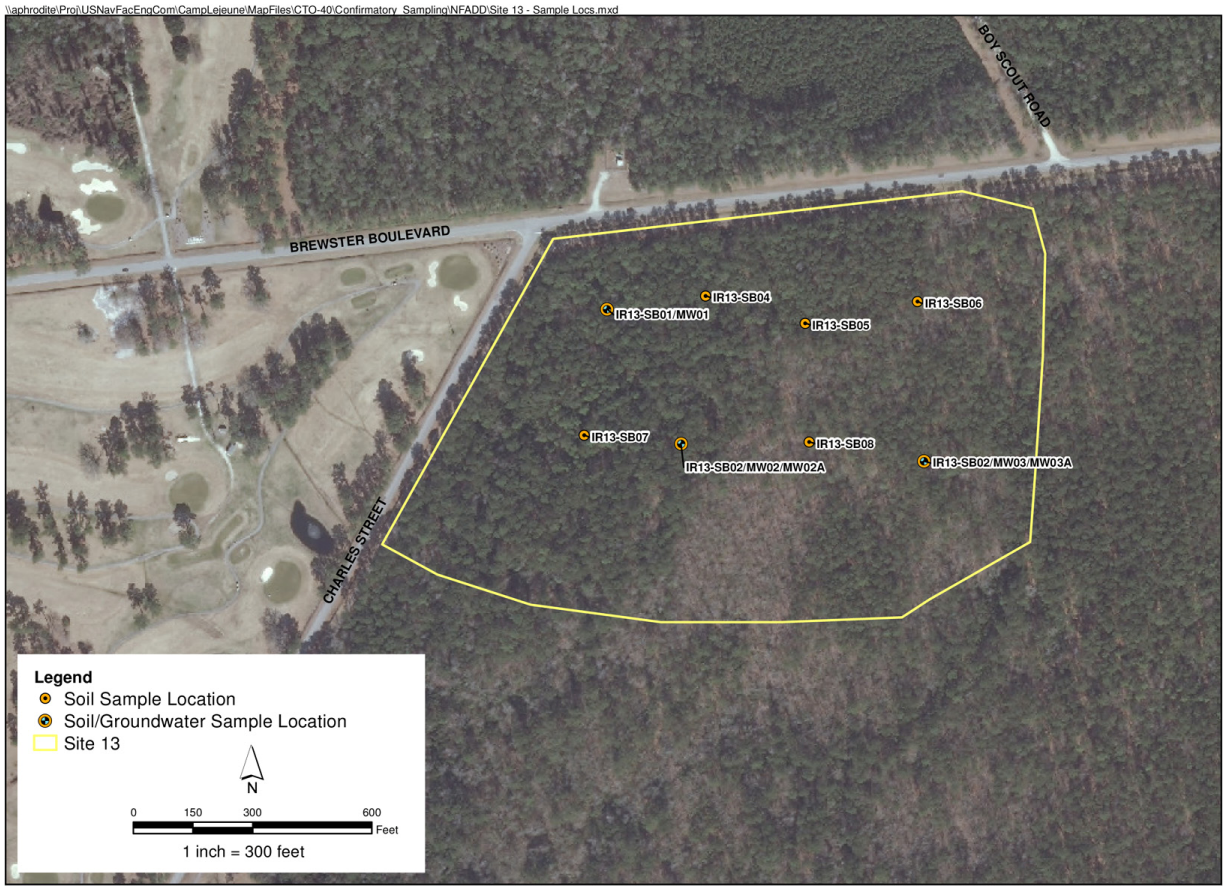


TABLE 2-4
Summary of Groundwater Exceedances - Site 13

Analyte	Max Concentration	Location of Max Concentration	NCGWQS	Adjusted Tapwater RSL	Background 2X Mean
Bis(2-ethylhexyl)phthalate (µg/L)	3.52 J	IR13-MW03	2.5	4.8	--
Benzo(b)fluoranthene (µg/L)	0.723 J	IR13-MW03	0.0479	0.029	--

Notes:
J - Analyte present, value may or may not be accurate or precise
NCGWQS - NCAC Title 15A, Subchapter 2L Groundwater Quality Standards
Screening criteria reflect values that were current at the time that the report was submitted.
µg/L - micrograms per liter

2.2.3 Site 18 – Watkins Village (E) Site

Site 18, the Watkins Village (E) Site, encompasses approximately 1 acre and is located in the Paradise Point area of the Base (**Figure 2-1**). From 1976 to 1978, construction materials and debris were reportedly buried at Site 18. Currently, Site 18 is primarily wooded with the exception of a housing development in the northwest and western portion of the site bordering Bicentennial Avenue and Mississippi Street which is still in use.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS Site 18 was used as a landfill burial for construction material and debris from 1976 to 1978. No hazardous wastes were reportedly disposed of at Site 18, and no further assessment was recommended.

Confirmatory Site Assessment (Osage, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 18 in 2010 based on its history as a burial site for construction materials and debris. Eight subsurface soil and three groundwater samples (**Figure 2-4**) were collected and analyzed for VOCs, SVOCs, pesticides, herbicides, and metals. Metals were detected in soil at concentrations exceeding regulatory screening criteria and background (**Table 2-5**). An HHRS and an ERS were conducted using the subsurface soil and groundwater data obtained during the CSA. No unacceptable human health (**Table 2-6**) or ecological risks (**Table 2-7**) were identified due to exposure to soil or groundwater and the CSA recommended that the site remained closed with NFA.

FIGURE 2-4
IRP Site 18 - Sample Locations

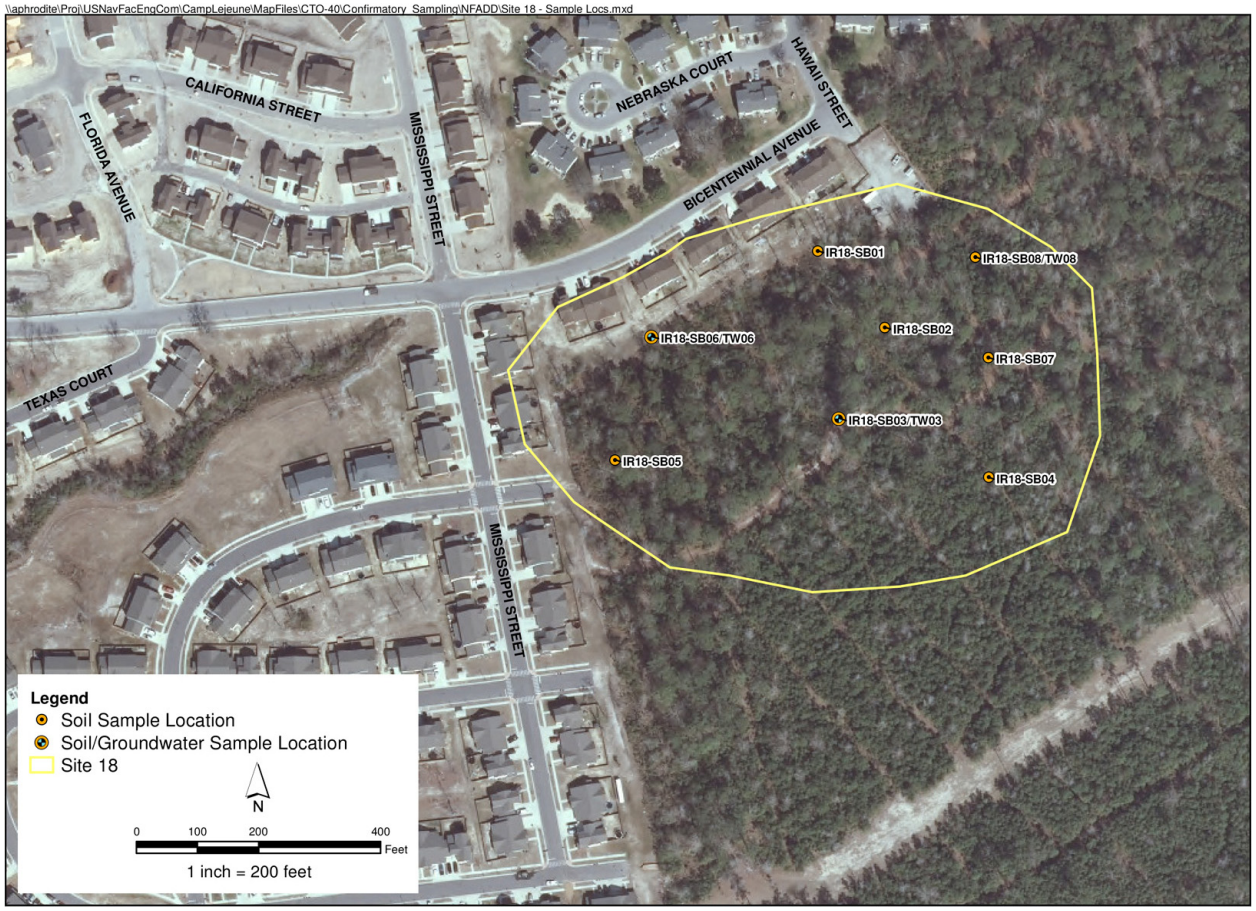


TABLE 2-5
Summary of Subsurface Soil Exceedances – Site 18

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Aluminum (mg/kg)	20,000	IR18-SB05 & IR18-SB06D	--	7,700	10,369
Chromium (mg/kg)	15 J	IR18-SB05 & IR18-SB06D	3.8	0.39	14.5
Iron (mg/kg)	5,700 J	IR18-SB05	15	5,500	5,439

Notes:
J - Analyte present, value may or may not be accurate or precise
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-6
Summary of Human Health Risk Screening- Site 18

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Aluminum Chromium Iron	None	None	No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Chloroform	Chloroform	N/A*	Chloroform is considered a common laboratory contaminant and no unacceptable risks are expected due to exposure to groundwater.

Notes
* - Step 3 was not conducted because a 95% upper confidence limit (UCL) could not be calculated based on the number of samples.

TABLE 2-7
Summary of Ecological Risk Screening- Site 18

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Iron Lead Mercury Vanadium	The maximum concentration of aluminum exceeded two times the mean background; however, the concentration was comparable to the highest concentrations in the background data set. No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Aluminum Iron	Results were consistent with background levels. No unacceptable risks are expected due to exposure to groundwater based on migration to surface water.

Notes:
HQ: Hazard Quotient

2.2.4 Site 23 – Roads and Grounds Building 1105

Site 23, Building 1105, encompasses approximately 0.1 acre and is located in the Hadnot Point Industrial Area (HPIA), within the boundaries of IRP Site 78 (**Figure 2-1**). Site 23 consists of Building 1105 and its parking lot that was historically used for storage of insecticides and herbicides. Since 1977 Building 1105 has been used as an office for maintenance and utilities.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS, the Pest Control Shop moved its activities from Building 712 (IRP Site 2) to Building 1105 in 1958. From 1958 until 1977, Building 1105 was used for storage of insecticides and herbicides. Procedures at Building 1105 were reportedly adequate to prevent any large spills. Supposed chemicals stored in Building 1105 included chlorinated hydrocarbons such as

dichlorodiphenyltrichloroethane (DDT) and chlordane as well as diazinon, malathion, lindane, mirex, 2,4-D, dalapon, and dursban. Although the site had been listed as a potential hazardous waste site, no spills or disposal of materials had been reported and no further assessment was recommended.

Confirmatory Site Assessment (CH2M HILL, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 23 in 2009 based on its use as a storage facility for insecticides and herbicides. Eight subsurface soil and four groundwater samples (**Figure 2-5**) were collected and analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, and metals. Two SVOCs (benzo(a)pyrene and benzo(b)flouranthene) and arsenic were detected in soils at concentrations regulatory exceeding screening criteria and background (for arsenic) (**Table 2-8**). Four VOCs (1,2-dichloroethane [1,2-DCA], 1,2-dichloropropane, benzene, and tetrachloroethene [PCE]) were detected in groundwater at concentrations exceeding regulatory screening criteria (**Table 2-9**) at one well (IR78-GW17-4). An HHRS and an ERS were conducted using the subsurface soil and groundwater data obtained during the CSA. The four VOCs with concentrations exceeding screening criteria in groundwater were identified as chemicals of potential concern (COPCs) during the HHRS (**Table 2-10)**. Monitoring well IR78-GW17-4 is part of the Site 78 monitoring well network and the VOCs identified as COPCs at this well are currently being addressed as part of the Site 78 remedial action; no unacceptable risks were identified for ecological receptors from exposure to any media at Site 23 (**Table 2-11**), and the CSA recommended the site remain closed with NFA.

FIGURE 2-5
IRP Site 23 - Sample Locations

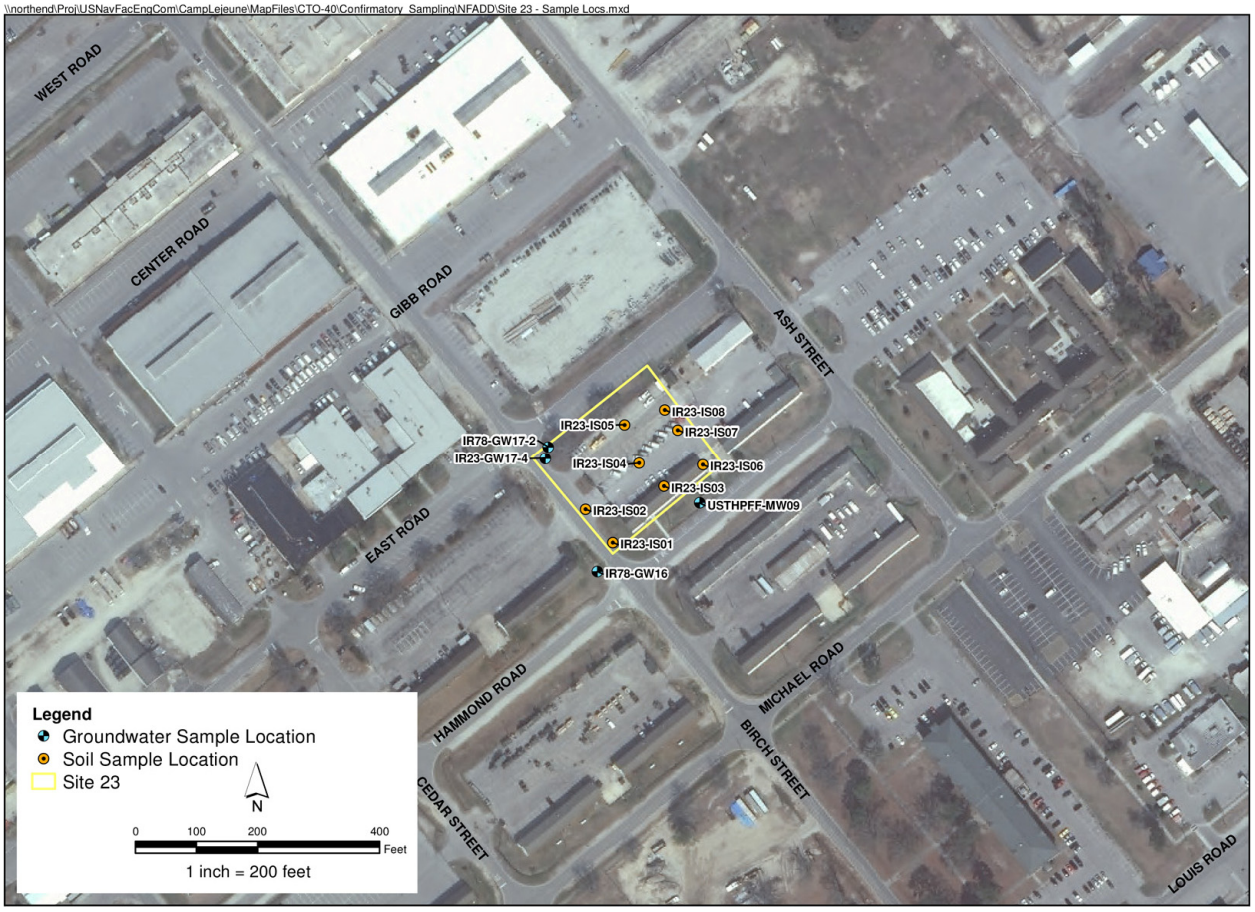


TABLE 2-8
Summary of Subsurface Soil Exceedances - Site 23

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Benzo(a)pyrene (µg/kg)	100	IR23-IS02	59	15	--
Benzo(b)fluoranthene (µg/kg)	170 J	IR23-IS02	600	150	--
Arsenic (mg/kg)	2.4	IR23-IS06	5.8	0.39	2.12

Notes:
J - Analyte present, value may or may not be accurate or precise
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-9
Summary of Groundwater Exceedances - Site 23

Analyte	Max Concentration	Location of Max Concentration	NCGWQS *	Adjusted Tap Water RSL	Background 2X Mean
1,2-DCA (µg/L)	9.5	IR78-GW17-4	0.4	0.15	--
1,2-Dichloropropane (µg/L)	0.78 J	IR78-GW17-4	0.6	0.39	--
Benzene (µg/L)	6.3	IR78-GW17-4	1	0.41	--
PCE (µg/L)	0.74 J	IR78-GW17-4	0.7	0.11	--

Notes:
J - Analyte present, value may or may not be accurate or precise
NCGWQS - NCAC Title 15A, Subchapter 2L Groundwater Quality Standards
Screening criteria reflect values that were current at the time that the report was submitted.
RSL – Regional Screening Level
µg/L - micrograms per liter
* - The Federal Maximum Contaminant Level (MCL) is reported in place of the NCGWQS where the MCL is more conservative.

TABLE 2-10
Summary of Human Health Risk Screening- Site 23

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Arsenic Benzo(a)pyrene Benzo(b)fluoranthene Chrysene	None	None	No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	1,2-DCA 1,2-Dichloropropane Benzene PCE	1,2-DCA 1,2-Dichloropropane Benzene PCE	N/A *	VOC contamination is likely attributed to historical activities at Site 78 and is being addressed by the remedial action.

Notes:
* - Step 3 was not conducted because a 95% UCL could not be calculated based on the number of samples.

TABLE 2-11
Summary of Ecological Risk Screening- Site 23

Media *	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Iron Vanadium	Results were consistent with background levels. No unacceptable risks are expected due to exposure to subsurface soil.

Notes:
HQ: Hazard Quotient
*Groundwater was not evaluated because the site is located approximately 1.5 miles from the nearest surface water body.

2.2.5 Site 38 – Camp Geiger Area Surface Dump

Site 38, the Camp Geiger Area Surface Dump, encompasses approximately 3 acres in the Camp Geiger area of the Base and is adjacent to NC Highway 24 (**Figure 2-1**). Site 38 was reportedly used as a dump until 1983 and received construction and landscape debris. Debris piles consisting of concrete, metal, and asphalt were discovered at the site during sampling activities in February 2010. Site 38 is primarily wooded.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS the Camp Geiger Area Construction Dump was used until at least 1983 for surface disposal of construction and landscape debris. During the IAS, evidence of dumping activities was observed, but no known hazardous wastes were involved and no further assessment was recommended.

Confirmatory Site Assessment (CH2M HILL, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 38 in 2010 based on its history as a dump. Eight subsurface soil and three groundwater samples (**Figure 2-6**) were collected and analyzed for VOCs, SVOCs, and metals. Arsenic was detected in soil at concentrations exceeding regulatory screening criteria and background (**Table 2-12**) Chromium was detected in groundwater at concentrations exceeding regulatory screening criteria and background (**Table 2-13**). An HHRS and an ERS were conducted using the subsurface soil and groundwater data obtained during the CSA. No unacceptable human health (**Table 2-14**) or ecological (**Table 2-15**) risks were identified due to exposure to soil or groundwater and the CSA recommended the site remain closed with NFA.

FIGURE 2-6
IRP Site 38 - Sample Locations

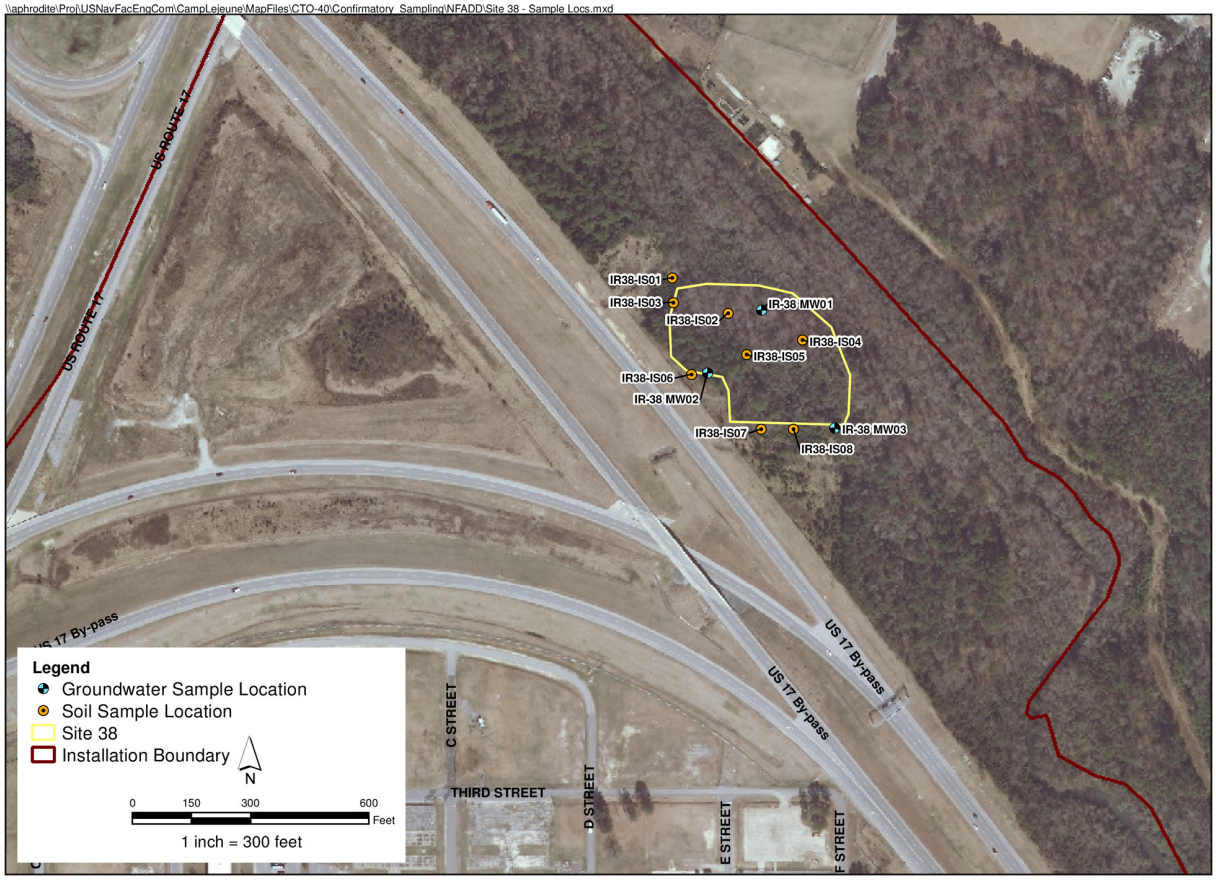


TABLE 2-12
Summary of Subsurface Soil Exceedances - Site 38

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Arsenic	8.78	IR38-IS05	5.8	0.39	2.12

Notes:
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-13
Summary of Groundwater Exceedances - Site 38

Analyte	Max Concentration	Location of Max Concentration	NCGWQS*	Adjusted Tap Water RSL	Background 2X Mean
Chromium (µg/L)	3.53	IR38-GW01	10	0.043	3.13

Notes:
NCGWQS - NCAC Title 15A, Subchapter 2L Groundwater Quality Standards
* - The Federal Maximum Contaminant Level (MCL) is reported in place of the NCGWQS where the MCL is more conservative.
RSL – Regional Screening Level
µg/L - micrograms per liter
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-14
Summary of Human Health Risk Screening- Site 38

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Arsenic	Arsenic	None	No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Chromium	Chromium	N/A*	Total chromium concentrations did not exceed screening criteria and no unacceptable risks are expected due to exposure to groundwater.

Notes:
* - Step 3 was not conducted because a 95% UCL could not be calculated based on the number of samples.

TABLE 2-15
Summary of Ecological Risk Screening- Site 38

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Iron Vanadium	Results were consistent with background levels. No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Cobalt Iron	Results were consistent with background levels. No unacceptable risks are expected due to exposure to groundwater based on migration to surface water.

Notes:
HQ: Hazard Quotient

2.2.6 Site 42 – Building 705 Bachelor Officers Quarters Dump

Site 42, the Building 705 Bachelor Officers Quarters (BOQ) Dump, encompasses approximately 2.8 acres located in the Marine Corps Air Station (MCAS) New River portion of the Base (**Figure 2-1**). The site was reportedly used as a landscape and construction debris dump from 1950 to 1960. An emergency generator is located on the southern border, but the site primarily consists of maintained grass, wetland, and areas of dense vegetation.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS Site 42 was used for surface disposal of debris including trees, tree stumps, and boards from 1950 to 1960. No known hazardous wastes were involved in dumping activities and the IAS recommended no further assessment.

Confirmatory Site Assessment (CH2M HILL, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 42 in 2010 based on its history as a dump. Seven subsurface soil and three groundwater samples (**Figure 2-7**) were collected and analyzed for VOCs, SVOCs, and metals. Metals and one SVOC (benzo(a)pyrene) were detected in soil at concentrations exceeding regulatory screening criteria (**Table 2-16**). Metals were detected in groundwater at concentrations exceeding regulatory screening criteria and background (**Table 2-17**). An HHRS and an ERS were conducted using the subsurface soil and groundwater data obtained during the CSA. No unacceptable human health (**Table 2-18**) or ecological (**Table 2-19**) risks were identified due to exposure to soil or groundwater and the CSA recommended the site remain closed with NFA.

FIGURE 2-7
IRP Site 42 - Sample Locations

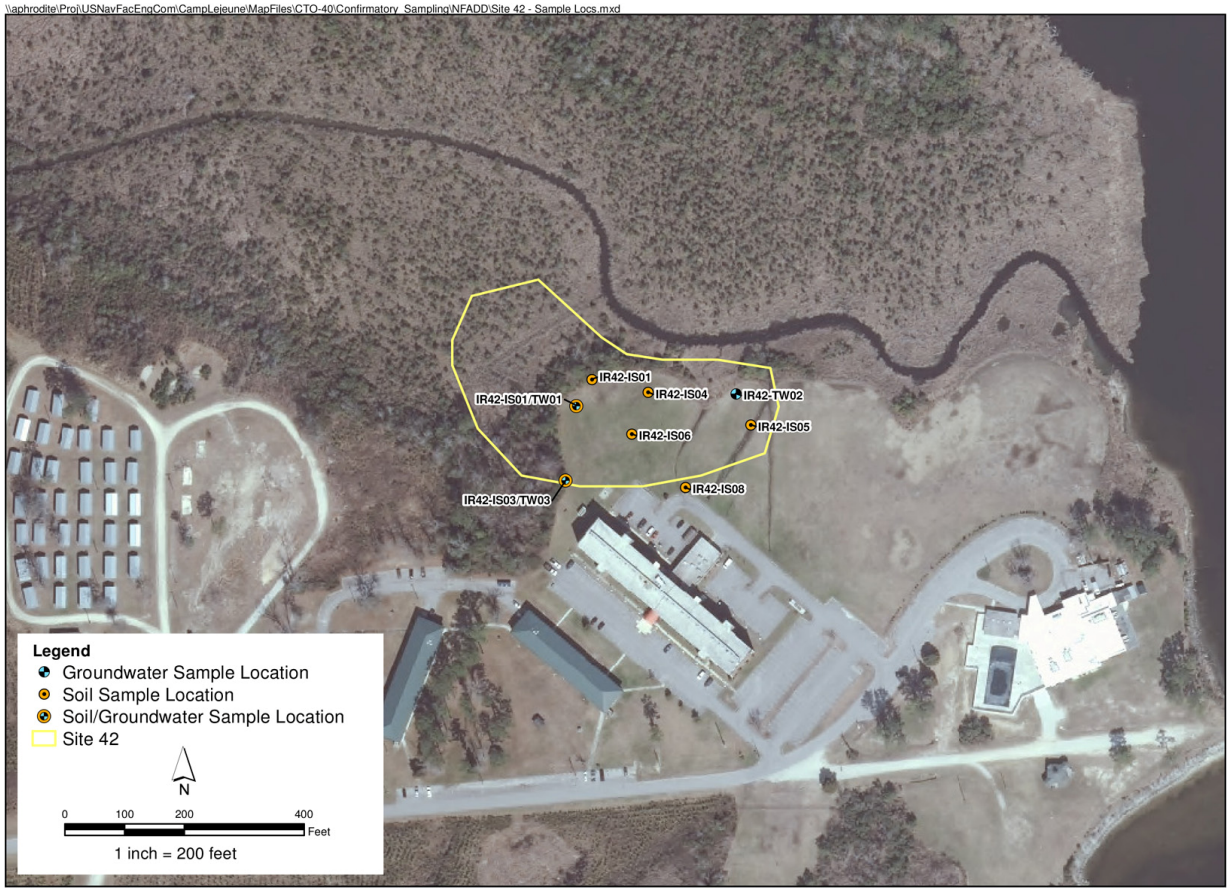


TABLE 2-16
Summary of Subsurface Soil Exceedances - Site 42

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Benzo(a)pyrene (µg/kg)	24	IR42-IS08	59	15	--
Aluminum (mg/kg)	12,100	IR42-IS01	--	7,700	10,369
Arsenic (mg/kg)	4.6	IR42-IS01	5.8	0.39	2.12
Chromium (mg/kg)	16.9	IR42-IS01	3.8	0.39	14.5
Iron (mg/kg)	13,300	IR42-IS01	150	5,500	5,439
Vanadium (mg/kg)	66.6	IR42-IS01	--	39	17.2

Notes:
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-17
Summary of Groundwater Exceedances - Site 42

Analyte	Max Concentration	Location of Max Concentration	NCGWQS *	Adjusted Tap Water RSL	Background 2X Mean
Aluminum (µg/kg)	8,460 J	IR42-TW03	--	3,700	1,886
Chromium (µg/kg)	10.9	IR42-TW03	10	0.043	3.13
Iron (µg/kg)	31,500	IR42-TW03	300	2,600	5,999
Manganese (µg/kg)	1,280	IR42-TW01	50	88	214

Notes:
J - Analyte present, value may or may not be accurate or precise
NCGWQS - NCAC Title 15A, Subchapter 2L Groundwater Quality Standards
* - The Federal Maximum Contaminant Level (MCL) is reported in place of the NCGWQS where the MCL is more conservative.
RSL – Regional Screening Level
µg/L - micrograms per liter
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-18
Summary of Human Health Risk Screening- Site 42

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Benzo(a)pyrene Benzo(a)anthracene Benzo(b)fluoranthene Aluminum Arsenic Chromium Iron Vanadium	Benzo(a)pyrene Benzo(a)anthracene Benzo(b)fluoranthene Arsenic Chromium	Benzo(a)pyrene Benzo(a)anthracene Benzo(b)fluoranthene Arsenic Chromium	Using the more realistic trivalent chromium screening levels eliminate chromium as a COPC and based on this, the overall potential risk is reduced and no unacceptable risks are expected due to exposure subsurface soil.
Groundwater	Aluminum Chromium Iron Manganese	Aluminum Chromium Iron Manganese	N/A*	Concentrations of aluminum were determined to be attributable to high turbidity. Using the more realistic trivalent chromium screening levels eliminate chromium as a COPC. Iron and manganese are essential nutrients and not associated with adverse effects for human receptors. No unacceptable risks are expected due to exposure to groundwater.

Notes:
* - Step 3 was not conducted because a 95% UCL could not be calculated based on the number of samples.

TABLE 2-19
Summary of Ecological Risk Screening- Site 42

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Cadmium Iron Lead Selenium Vanadium	Results were either consistent with background levels, mean based HQs were < 1, or the mean concentration was less than the maximum background concentration. No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Copper Iron Manganese Nickel	Results were either consistent with background levels, magnitude of exceedance was low, or no other risk drivers were identified. No unacceptable risks are expected due to exposure to groundwater based on migration to surface water.

Notes:
HQ: Hazard Quotient

2.2.7 Site 46 – MCAS Main Gate Dump

Site 46, the MCAS Main Gate Dump, encompasses less than 1 acre in MCAS New River in the northwest portion of the Base (**Figure 2-1**). The site is located at the intersection of Curtis Road and White Street and encompasses Building AS1000, the associated parking lot and a heavily wooded area in the western portion of the site. The site was reportedly used as a construction and demolition debris dump from 1958 to 1962.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS Site 46 was used for disposal of construction and demolition debris from 1958 to 1962. No known hazardous wastes were involved in dumping activities and the IAS recommended no further assessment.

Confirmatory Site Assessment (Osage, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 46 in 2010 based on its history as a dump. Eight subsurface soil and three groundwater samples (**Figure 2-8**) were collected and analyzed for VOCs, SVOCs, pesticides, herbicides, and metals. One VOC (carbon tetrachloride), three SVOCs (benzo(a)pyrene, benzo(b)flouranthene and indeno(1,2,3-cd)pyrene), one pesticide (dieldrin), and metals were detected in soil at concentrations exceeding regulatory screening criteria (**Table 2-20**). One SVOC (indeno(1,2,3-cd)pyrene) and metals were detected in groundwater at concentrations exceeding regulatory screening criteria. No metals concentrations exceeded both regulatory screening criteria and background (**Table 2-21**). An HHRS and an ERS were conducted using the subsurface soil and groundwater data obtained during the CSA. No unacceptable human health (**Table 2-22**) or ecological (**Table 2-23**) risks were identified due to exposure to soil or groundwater and the CSA recommended the site remain closed with NFA.

FIGURE 2-8
IRP Site 46 - Sample Locations

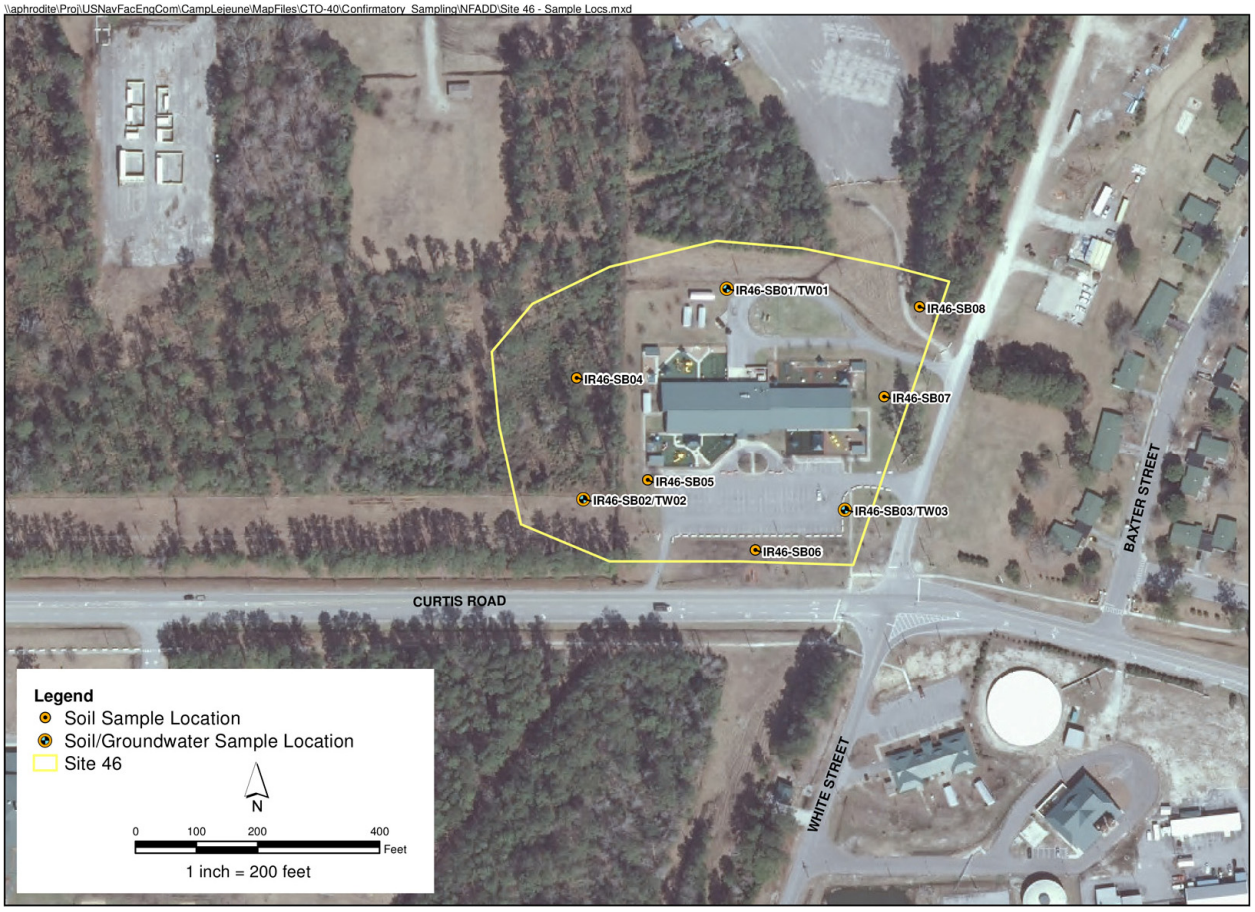


TABLE 2-20
Summary of Subsurface Soil Exceedances - Site 46

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Carbon tetrachloride (µg/kg)	5.4	IR46-SB02	2	610	--
Benzo(a)pyrene (µg/kg)	300 J	IR46-SB03D	59	15	--
Benzo(b)fluoranthene (µg/kg)	630 J	IR46-SB03D	600	150	--
Indeno(1,2,3-cd)pyrene (µg/kg)	170 J	IR46-SB03	2,000	150	--
Dieldrin (µg/kg)	5.6 J	IR46-SB03	0.81	30	--
Aluminum (mg/kg)	14,000	IR46-SB08	--	7,700	10,369
Iron (mg/kg)	7,400 J	IR46-SB08	150	5,500	5,439

Notes:
J - Analyte present, value may or may not be accurate or precise
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-21
Summary of Groundwater Exceedances - Site 46

Analyte	Max Concentration	Location of Max Concentration	NCGWQS *	Adjusted Tap Water RSL	Background 2X Mean
Indeno(1,2,3-cd)pyrene (µg/L)	0.63 J	IR46-TW03	0.05	--	--

Notes:
J - Analyte present, value may or may not be accurate or precise
NCGWQS - NCAC Title 15A, Subchapter 2L Groundwater Quality Standards
* - The Federal Maximum Contaminant Level (MCL) is reported in place of the NCGWQS where the MCL is more conservative.
RSL – Regional Screening Level
µg/L - micrograms per liter
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-22
Summary of Human Health Risk Screening- Site 46

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Chrysene Indeno(1,2,3-cd)pyrene Aluminum Iron	None	None	No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Indeno(1,2,3-cd)pyrene Arsenic Chromium	Indeno(1,2,3-cd)pyrene Arsenic Chromium	N/A*	No unacceptable risks are expected due to exposure to groundwater.

Notes:
* - Step 3 was not conducted because a 95% UCL could not be calculated based on the number of samples.

TABLE 2-23
Summary of Ecological Risk Screening- Site 46

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	4,4'-DDE Dieldrin Aluminum Iron Selenium Vanadium	Concentrations were either consistent with or within the range of background criteria or had mean concentrations with an HQ < 1. No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Aluminum Iron Lead	Concentrations were either within the range of background levels or had low magnitudes of exceedance. No unacceptable risks are expected due to exposure to groundwater based on migration to surface water.

Notes:
HQ: Hazard Quotient

2.2.8 Site 51 – MCAS Football Field

Site 51, the MCAS Football Field, encompasses approximately 20 to 30 acres in MCAS New River, in the northwest portion of the Base (**Figure 2-1**). From 1967 to 1968, Site 51 was reportedly used as a disposal site for empty containers such as paint cans and hydraulic fluid cans. Currently, the site consists of Building AS842, a parking lot and maintained grass.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS Site 51 was utilized as a disposal site for empty containers such as paint cans and hydraulic fluid cans from 1967 and 1968. Due to low potential for negative, site related impacts on the environment the IAS recommended Site 53 for no further assessment.

Confirmatory Site Assessment (CH2M HILL, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 51 in 2010 based on its history as a dump. Eight subsurface soil and three groundwater samples (**Figure 2-9**) were collected and analyzed for VOCs, SVOCs, pesticides, herbicides, PCBs, and metals. Metals were detected in soil (**Table 2-24**) and groundwater (**Table 2-25**) at concentrations exceeding regulatory screening criteria and background. An HHRS and an ERS were conducted using the subsurface soil and groundwater data obtained during the CSA. No unacceptable human health (**Table 2-26**) or ecological (**Table 2-27**) risks were identified due to exposure to soil or groundwater and the CSA recommended the site remain closed with NFA.

FIGURE 2-9
IRP Site 51 - Sample Locations

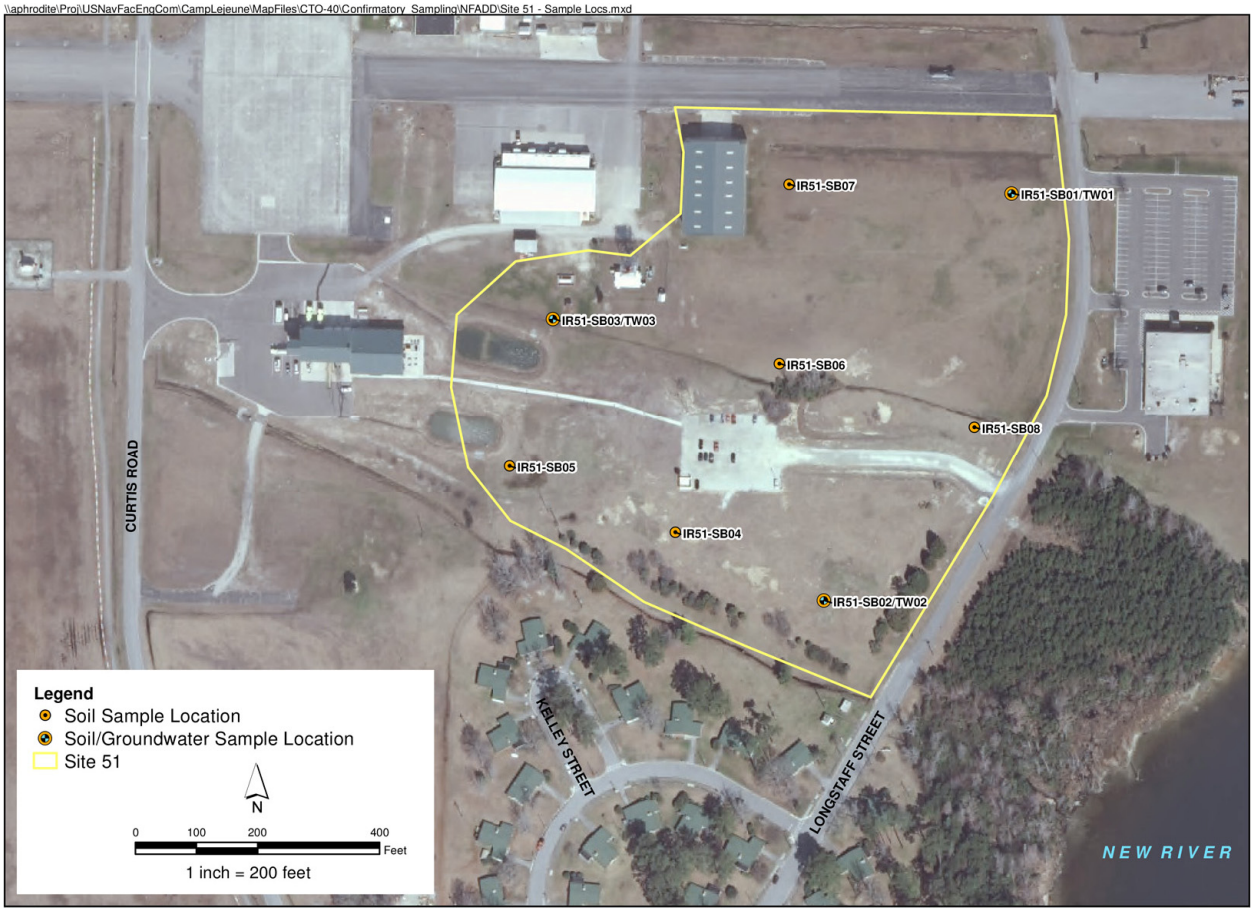


TABLE 2-24
Summary of Subsurface Soil Exceedances - Site 51

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Aluminum (mg/kg)	47,000	IR51-SB03	--	7,700	10,369
Arsenic (mg/kg)	13	IR15-SB02	5.8	0.39	2.12
Chromium (mg/kg)	48	IR51-SB03	3.8	0.39	14.5
Cobalt (mg/kg)	2.9 J	IR51-SB03	--	2.3	0.822
Iron (mg/kg)	22,000 J	IR51-SB03	150	5,500	5,439
Vanadium (mg/kg)	66	IR51-SB03	1,200	2,300	17.2

Notes:
J - Analyte present, value may or may not be accurate or precise
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-25
Summary of Groundwater Exceedances - Site 51

Analyte	Max Concentration	Location of Max Concentration	NCGWQS*	Adjusted Tap Water RSL	Background 2X Mean
Arsenic (µg/L)	12	IR51-TW02	10	0.045	5.77
Chromium (µg/L)	13	IR51-TW03	10	0.043	3.13
Iron (µg/L)	13,000	IR51-TW01	300	2,600	5,999

Notes:
NCGWQS - NCAC Title 15A, Subchapter 2L Groundwater Quality Standards
* - The Federal Maximum Contaminant Level (MCL) is reported in place of the NCGWQS where the MCL is more conservative.
RSL – Regional Screening Level
µg/L - micrograms per liter
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-26
Summary of Human Health Risk Screening- Site 51

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Aluminum Arsenic Cobalt Chromium Iron Vanadium	Aluminum Arsenic Chromium	Arsenic Chromium	Using the more realistic trivalent chromium screening levels eliminate chromium as a COPC and based on this, the overall potential risk is reduced and no unacceptable risks are expected due to exposure subsurface soil.
Groundwater	Aluminum Arsenic Chromium Iron	Arsenic Chromium	N/A*	Concentrations of arsenic were determined to be attributable to background. Using the more realistic trivalent chromium screening levels eliminate chromium as a COPC. No unacceptable risks are expected due to exposure to groundwater.

Notes:
* - Step 3 was not conducted because a 95% UCL could not be calculated based on the number of samples.

TABLE 2-27
Summary of Ecological Risk Screening- Site 51

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Chromium Lead Iron Selenium Vanadium	Concentrations were either consistent with or within the range of background criteria, had mean concentrations with an HQ < 1, or had ratios consistent with a natural occurrence. No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Aluminum Nickel Zinc	Subsurface soil results for nickel and zinc were consistent with background concentrations, suggesting that groundwater concentrations are not release-related. Aluminum results were likely naturally occurring.

Notes:
HQ: Hazard Quotient

2.2.9 Site 53 – MCAS Warehouse Building Area

Site 53, the MCAS Warehouse Building Area, consists of approximately 3 miles of roadway in the southwest portion of the MCAS New River area of the Base (**Figure 2-1**). Drainage ditches connect the site to an equipment storage and vehicle fueling area that contains aboveground storage tanks and oil-water separators. Currently Site 53 is used as a roadway.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS used crankcase oil, waste oils, jet propulsion fuels, and paint thinners were sprayed on the unimproved dirt roads for dust control between 1970 and 1975. Due to low potential for negative, site related impacts on the environment the IAS recommended Site 53 for no further assessment.

Confirmatory Site Assessment (CH2M HILL, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 53 in 2009. Eight subsurface soil and three groundwater samples (**Figure 2-10**) were collected and analyzed for VOCs, SVOCs, PCBs, and metals. Metals were detected in soil at concentrations exceeding regulatory screening criteria and background (**Table 2-28**). Elevated levels of arsenic in groundwater during initial sampling prompted the installation and sampling of a permanent monitoring well at the same location. Results from the newly installed well did not indicate detectable levels of arsenic. Other metals were detected in groundwater at concentrations exceeding regulatory screening criteria and background (**Table 2-29**). An HHRS and an ERS were conducted using the subsurface soil and groundwater data obtained during the CSA. No unacceptable human health (**Table 2-30**) or ecological (**Table 2-31**) risks were identified due to exposure to soil or groundwater and the CSA recommended the site remain closed with NFA.

FIGURE 2-10
IRP Site 53 - Sample Locations

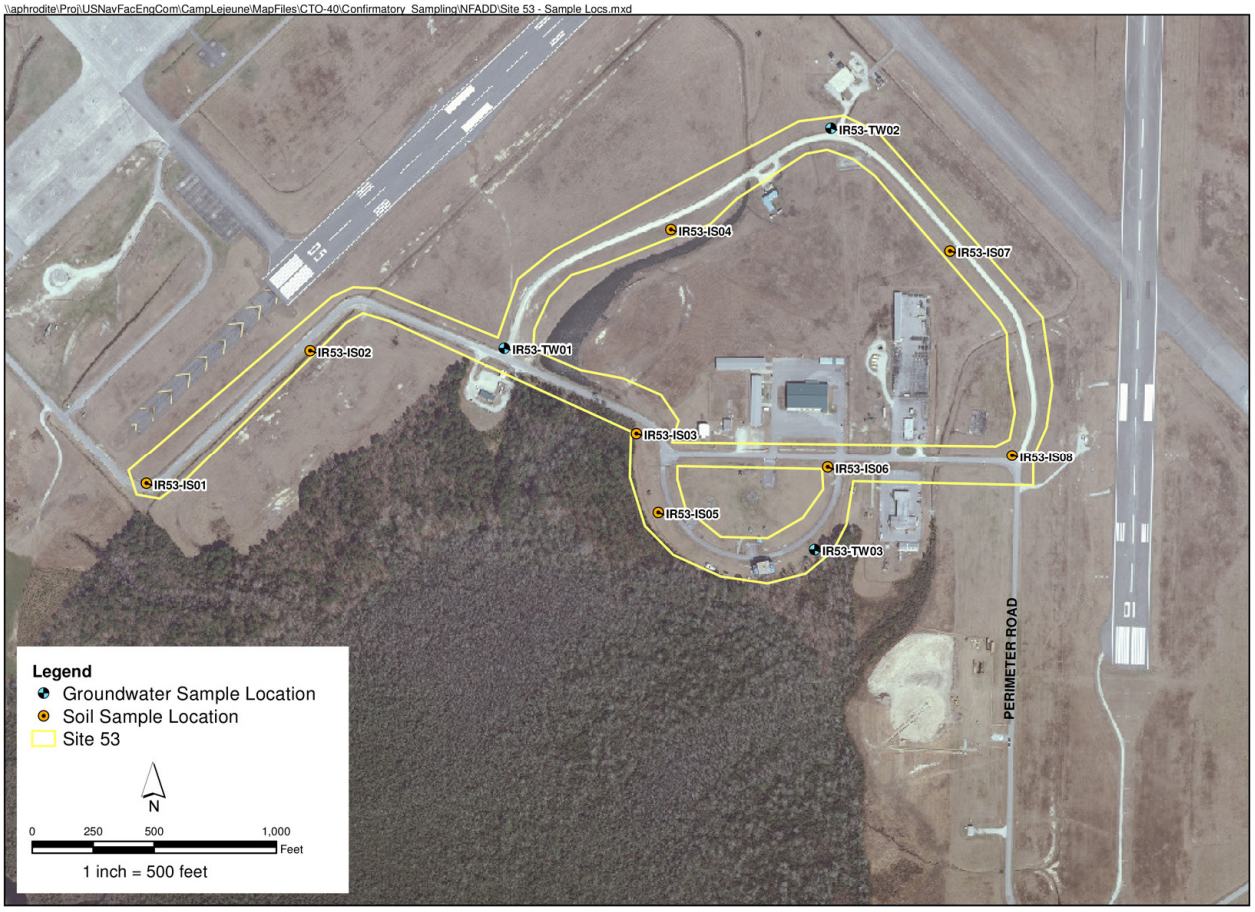


TABLE 2-28
Summary of Subsurface Soil Exceedances - Site 53

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Aluminum (mg/kg)	15,400	IR53-IS05	--	7,700	10,369
Arsenic (mg/kg)	7.5	IR53-IS06	5.8	0.39	2.12
Chromium (mg/kg)	26.9 J	IR53-IS06	3.8	0.39	14.5
Iron (mg/kg)	12,300 J	IR53-IS06	150	5,500	5,439

Notes:
J - Analyte present, value may or may not be accurate or precise
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-29
Summary of Groundwater Exceedances - Site 53

Analyte	Max Concentration	Location of Max Concentration	NCGWQS*	Adjusted Tap Water RSL	Background 2X Mean
Aluminum (µg/L)	50,300	IR53-TW03	--	3,700	1,886
Arsenic (µg/L)	25.7	IR53-TW03**	10	0.045	5.77
Chromium (µg/L)	71.2	IR53-TW03	10	0.043	3.13
Cobalt (µg/L)	28.9	IR53-TW03	--	1.1	3.4
Iron (µg/L)	93,900	IR53-TW03	300	2,600	5,999
Lead (µg/L)	28.8	IR53-TW03	15	15	2.8
Vanadium (µg/L)	80.20	IR53-TW03	--	18	4.72

Notes:
NCGWQS - NCAC Title 15A, Subchapter 2L Groundwater Quality Standards
RSL – Regional Screening Level
µg/L - micrograms per liter
* - The Federal Maximum Contaminant Level (MCL) is reported in place of the NCGWQS where the MCL is more conservative.
** - IR53-MW03 was installed at the same location and sampled in February 2010 and no arsenic concentrations were detected.
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-30
Summary of Human Health Risk Screening- Site 53

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Aluminum Arsenic Chromium Iron	Arsenic Chromium	Arsenic Chromium	Based on conservative screening criteria for chromium and elimination of this COPC, no unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Aluminum Chromium Cobalt Lead Iron Vanadium	Aluminum Chromium Cobalt Iron	N/A*	Based on the high turbidity of groundwater samples from temporary wells, no unacceptable results are expected due to exposure to groundwater.

Notes:
* - Step 3 was not conducted because a 95% UCL could not be calculated based on the number of samples.

TABLE 2-31
Summary of Ecological Risk Screening- Site 53

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Lead Iron Selenium Vanadium	All concentrations were either consistent within the range of background levels or the concentration barely exceeded the background value. No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Aluminum Cadmium Copper Iron Lead Nickel Vanadium	Concentrations either had low magnitudes of exceedance or corresponding subsurface soil concentrations were within background ranges. No unacceptable risks are expected due to exposure to groundwater based on migration to surface water.

Notes:
HQ: Hazard Quotient

2.2.10 Site 55 – Air Station East Perimeter Dump

Site 55, the Air Station East Perimeter Dump, consists of approximately 3.5 acres of developed and wooded land, roughly 2.5 acres of the New River, and includes a marina and recreational area in the MCAS New River portion of the Base (**Figure 2-1**). Site 55 was reportedly used as a dump from the 1950s through the 1960s. Currently the site is used as a marina and recreation area and an underground storage tank is located along the eastern shore of the site. There are no plans to further develop or modify the site.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS, Site 55 was used as a disposal area for barrels, tires, trash, metal planking, and telephone poles from the 1950s through the 1960s. No known hazardous wastes were involved in dumping activities and the IAS recommended no further assessment.

Confirmatory Site Assessment (CH2M HILL, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 55 in 2009 based on its history as a dump. Seven subsurface soil and three groundwater samples (**Figure 2-11**) were collected and analyzed for VOCs, SVOCs, pesticides, herbicides, PCBs, and metals. One VOC (methylene chloride), one SVOC (pentachlorophenol), were detected in soil at concentrations exceeding regulatory screening criteria (**Table 2-32**). Metals were detected in soil and groundwater at concentrations exceeding regulatory screening criteria and background (**Tables 2-32 and 2-33**, respectively). An HHRS and an ERS were conducted using the subsurface soil and groundwater data obtained during the CSA. Several metals were initially identified as COPCs in groundwater during the HHRS. Additional sampling in February 2010 confirmed that the elevated metals concentrations in the initial groundwater samples collected were attributable to high turbidity in the groundwater samples. No unacceptable human health (**Table 2-34**) or ecological (**Table 2-35**) risks were identified due to exposure to soil or groundwater and the CSA recommended the site remain closed with NFA.

FIGURE 2-11
Sample Locations – Site 55

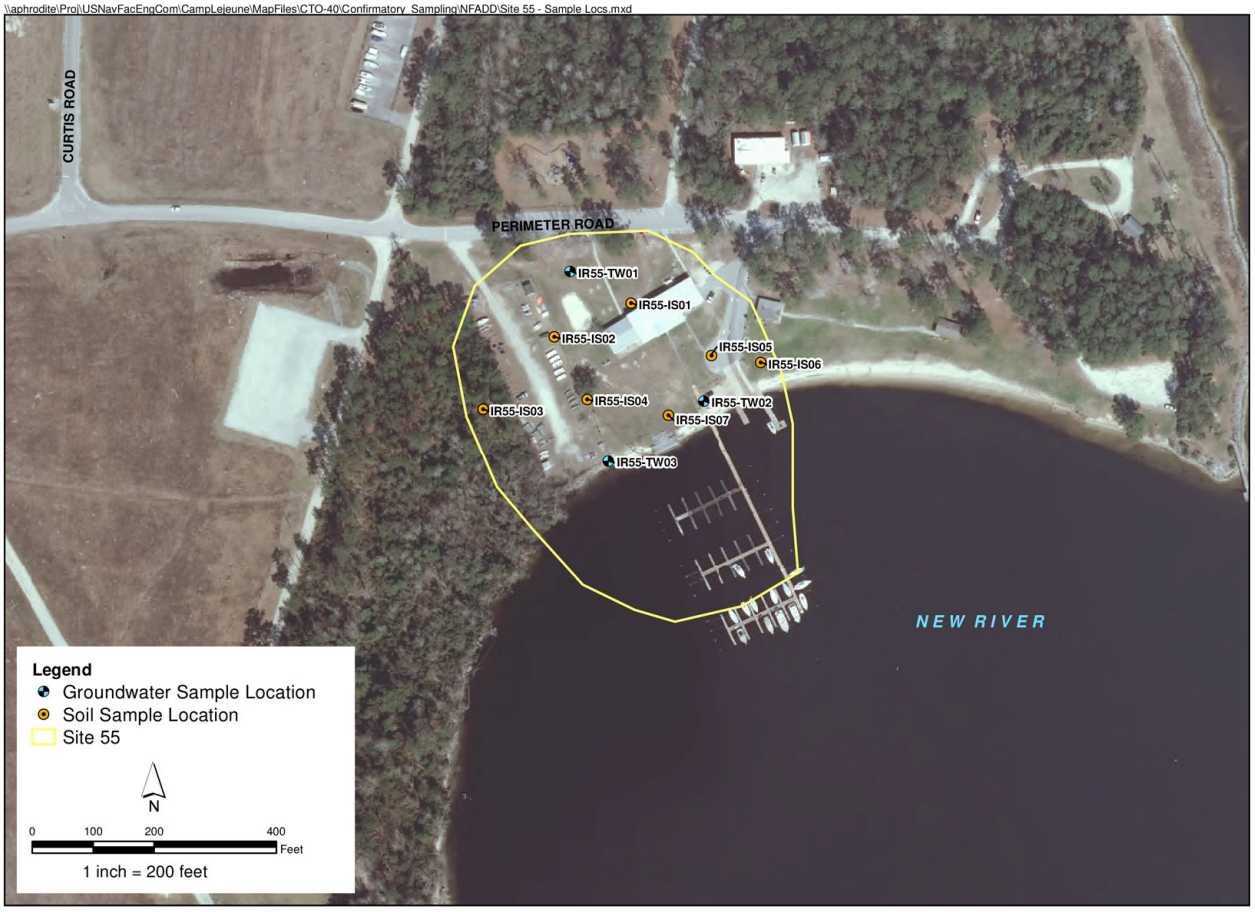


TABLE 2-32
Summary of Subsurface Soil Exceedances - Site 55

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Methylene chloride (µg/kg)	43	IR55-IS03	23	11,000	--
Pentachlorophenol (µg/kg)	61 J	IR55-IS02	31	3,000	--
Aluminum (mg/kg)	17,500	IR55-IS06	--	7,700	10,369
Arsenic (mg/kg)	7	IR55-IS01	5.8	0.39	2.12
Chromium (mg/kg)	21.8	IR55-IS06	3.8	0.29	14.5
Iron (mg/kg)	9,010	IR55-IS06	150	5,500	5,439

Notes:
J - Analyte present, value may or may not be accurate or precise
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-33
Summary of Groundwater Exceedances - Site 55

Analyte	Max Concentration	Location of Max Concentration	NCGWQS*	Adjusted Tap Water RSL	Background 2X Mean
Aluminum (µg/L)	29,900	IR55-TW03	--	3,700	1,886
Arsenic (µg/L)	17.9	IR55-TW03	10	0.045	5.77
Chromium (µg/L)	44.3	IR55-TW03	10	0.043	3.13
Iron (µg/L)	59,700	IR55-TW03D	300	2,600	5,999
Lead (µg/L)	13.5	IR55-TW03	15	15	2.8
Manganese (µg/L)	353	IR55-TW03D	50	88	214
Vanadium (µg/L)	45.3	IR55-TW03	--	18	4.72

Notes:
NCGWQS - NCAC Title 15A, Subchapter 2L Groundwater Quality Standards RSL - Regional Screening Level
µg/L - micrograms per liter
* - The Federal MCL is reported in place of the NCGWQS where the MCL value is more conservative.
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-34
Summary of Human Health Risk Screening- Site 55

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Aluminum Arsenic Chromium Iron	Aluminum Arsenic Chromium Iron	Arsenic Chromium	Based on conservative screening criteria for chromium and elimination of this COPC, no unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Aluminum Arsenic Chromium Iron Manganese Vanadium	Aluminum Arsenic Chromium Iron Manganese	N/A*	Based on background concentrations and high turbidity from temporary well samples, aluminum, arsenic, iron, and manganese were eliminated as COPCs. Chromium can also be eliminated based on total chromium concentrations. No unacceptable risks are expected due to exposure to groundwater.

Notes:
* - Step 3 was not conducted because a 95% UCL could not be calculated based on the number of samples.

TABLE 2-35
Summary of Ecological Risk Screening- Site 55

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Iron Lead Selenium Vanadium Gamma BHC	Concentrations were either within the range of background levels, the average concentration was within the range of background levels, or had a low magnitude of exceedance. No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Copper Iron Lead Nickel	Concentrations were either overestimated based on total and not dissolved results and/or within the range of background levels for corresponding subsurface soil samples. No unacceptable risks are expected due to exposure to groundwater based on migration to surface water.

Notes:
HQ: Hazard Quotient

2.2.11 Site 61 – Rhodes Point Road Dump

Site 61, the Rhodes Point Road Dump, encompasses approximately 8 to 10 acres located south of the MCAS New River operations area (**Figure 2-1**). Site 61 has been and is used for training activities. Access and use of the site is restricted.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS Site 61 was used for training activities that may have included the disposal of 'bivouac waste' (e.g. Meals Ready to Eat [MRE] wrappers). Dates of operation are unknown. No known hazardous wastes were involved in training and disposal activities and the IAS recommended no further assessment.

Confirmatory Site Assessment (CH2M HILL, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 61 in 2009 based on its history as a dump. Eight subsurface soil and three groundwater samples (**Figure 2-12**) were collected and analyzed for VOCs, SVOCs, and metals. Methylene chloride and metals were detected in soil at concentrations exceeding regulatory screening criteria and background (for metals) (**Table 2-36**). Elevated levels of arsenic in groundwater collected during the initial sampling prompted the installation of a permanent monitoring well at the same location to resample the groundwater for arsenic. Results from the newly installed well did not indicate arsenic concentrations at levels exceeding background. Other metals and one VOC (chloroform) were detected in groundwater at concentrations exceeding regulatory screening criteria and background (for metals) (**Table 2-37**). An HHRS and an ERS were conducted using the subsurface soil and groundwater data obtained during the CSA. No unacceptable human health (**Table 2-38**) or ecological risks (**Table 2-39**) were identified due to exposure to soil or groundwater and the CSA recommended the site remain closed with NFA.

FIGURE 2-12
Sample Locations – Site 61

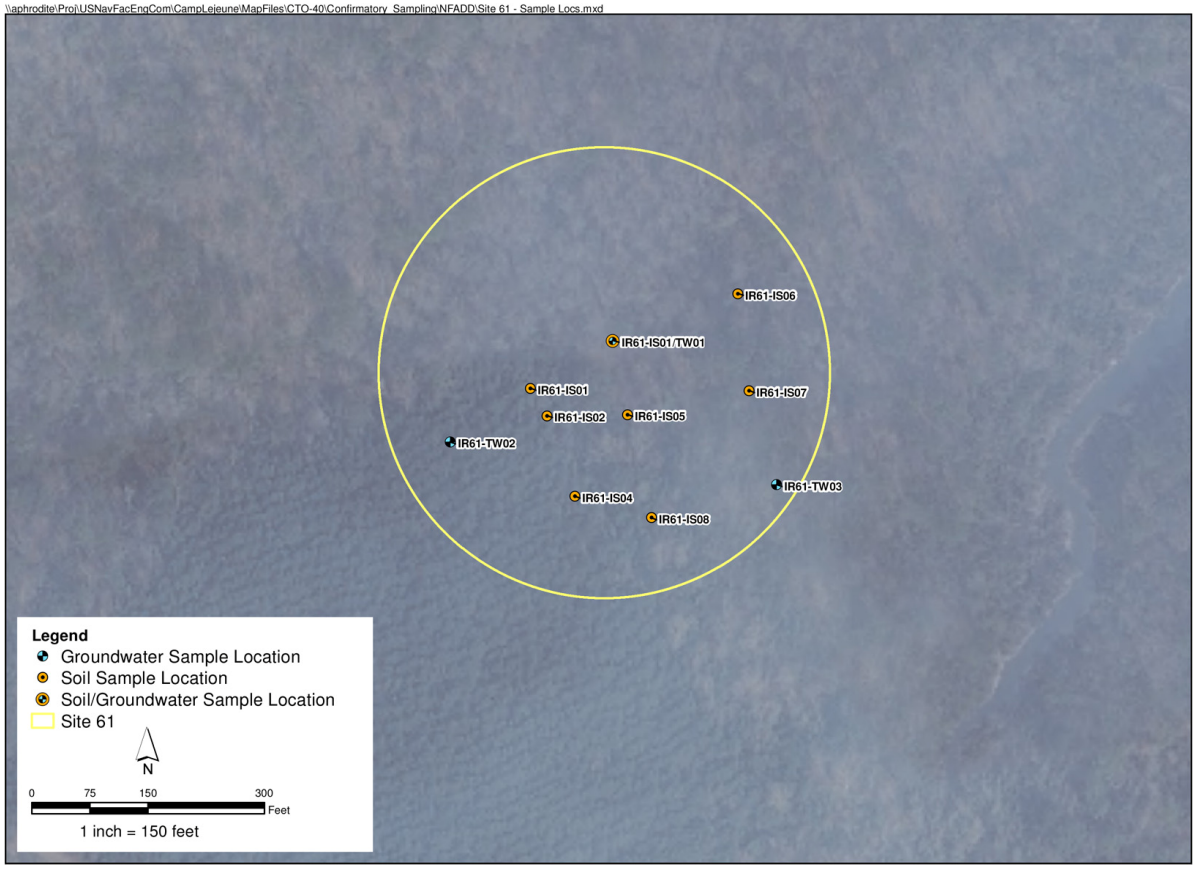


TABLE 2-36
Summary of Subsurface Soil Exceedances - Site 61

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Methylene Chloride (µg/kg)	86	IR61-IS07D	23	11,000	--
Aluminum (mg/kg)	13,500	IR61-IS05	--	7,700	10,369
Iron (mg/kg)	10,200	IR61-TW01	150	5,500	5,439

Notes:
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-37
Summary of Groundwater Exceedances - Site 61

Analyte	Max Concentration	Location of Max Concentration	NCGWQS*	Adjusted Tap Water RSL	Background 2X Mean
Chloroform (µg/L)	2	IR61-TW03	70	0.19	--
Aluminum (µg/L)	109,900	IR61-TW01	--	3,700	1,886
Arsenic (µg/L)	53.6	IR61-TW01*	10	0.045	5.77
Cadmium (µg/L)	2.2 J	IR61-TW01	2	1.8	0.358
Chromium (µg/L)	150	IR61-TW01	10	0.043	3.13
Cobalt (µg/L)	12.9 J	IR61-TW01	--	1.1	3.4
Iron (µg/L)	147,000 J	IR61-TW01	300	2,600	5,999
Lead (µg/L)	93.4	IR61-TW01	15	15	2.8
Manganese (µg/L)	643	IR61-TW01	50	88	214
Vanadium (µg/L)	167	IR61-TW01	--	18	4.72

Notes:
J - Analyte present, value may or may not be accurate or precise
NCGWQS - NCAC Title 15A, Subchapter 2L Groundwater Quality Standards
RSL - Regional Screening Level
µg/L - micrograms per liter
* - The Federal MCL is reported in place of the NCGWQS where the MCL value is more conservative.
** - IR561-GW01 was installed at the same location and sampled in February 2010 and the arsenic concentration was 1.67 µg/L which does not exceed background.
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-38
Summary of Human Health Risk Screening- Site 61

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Aluminum Iron	None	None	No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Chloroform Aluminum Arsenic Cadmium Chromium Cobalt Iron Lead Manganese Vanadium	Chloroform Aluminum Arsenic Chromium Cobalt Iron Manganese Vanadium	N/A*	Chloroform is considered a common laboratory contaminant and was eliminated as a COPC. Chromium was eliminated as a COPC based on trivalent screening levels. Arsenic and manganese are within background range or essential nutrient level. All other metals were eliminated based on high turbidity in groundwater samples collected from temporary wells. No unacceptable risks are expected due to exposure to groundwater.

Notes:
* - Step 3 was not conducted because a 95% UCL could not be calculated based on the number of samples.

TABLE 2-39
Summary of Ecological Risk Screening- Site 61

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Iron Vanadium Chloroform	Concentrations of metals were within the range of background levels. Only one chloroform concentration exceeded the ecological screening value and is a common laboratory contaminant. No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Aluminum Beryllium Cadmium Chromium Copper Iron Lead Manganese Nickel Vanadium Zinc	Concentrations were either consistent with or within the background range in corresponding soil sample or overestimated based on total and not dissolved results. No unacceptable risks are expected due to exposure to groundwater based on migration to surface water.

Notes:
HQ: Hazard Quotient

2.2.12 Site 62 – Race Course Area Dump

Site 62, the Race Course Area Dump, encompasses approximately 2 acres south of MCAS New River (**Figure 2-1**). The site is primarily wooded and is bisected by Mett Road. Site 62 has been used for training activities and is still currently used for military training. Site access and use are restricted.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS Site 62 was used for training activities that may have included the disposal of 'bivouac waste'. The exact dates of operation are unknown. No known hazardous wastes were involved in training and disposal activities and the IAS recommended no further assessment.

Confirmatory Site Assessment (CH2M HILL, 2011)

To verify the presence or absence of hazardous wastes, a CSA was initiated at Site 62 in 2009. Eight subsurface soil samples (**Figure 2-13**) were collected and analyzed for VOCs, SVOCs, and metals. Due to the thickness of the clay lithology overlying the water table aquifer, it is unlikely that groundwater could have been impacted from historical operations at Site 62; therefore, groundwater was not assessed during the CSA. Metals were detected in soil at concentrations exceeding regulatory screening criteria and background (**Table 2-40**). An HHRS and an ERS were conducted using the subsurface soil and groundwater data obtained during the CSA. No unacceptable human health (**Table 2-41**) or ecological (**Table 2-42**) risks were identified due to exposure to soil and the CSA recommended the site remain closed with NFA.

FIGURE 2-13
Sample Locations – Site 62

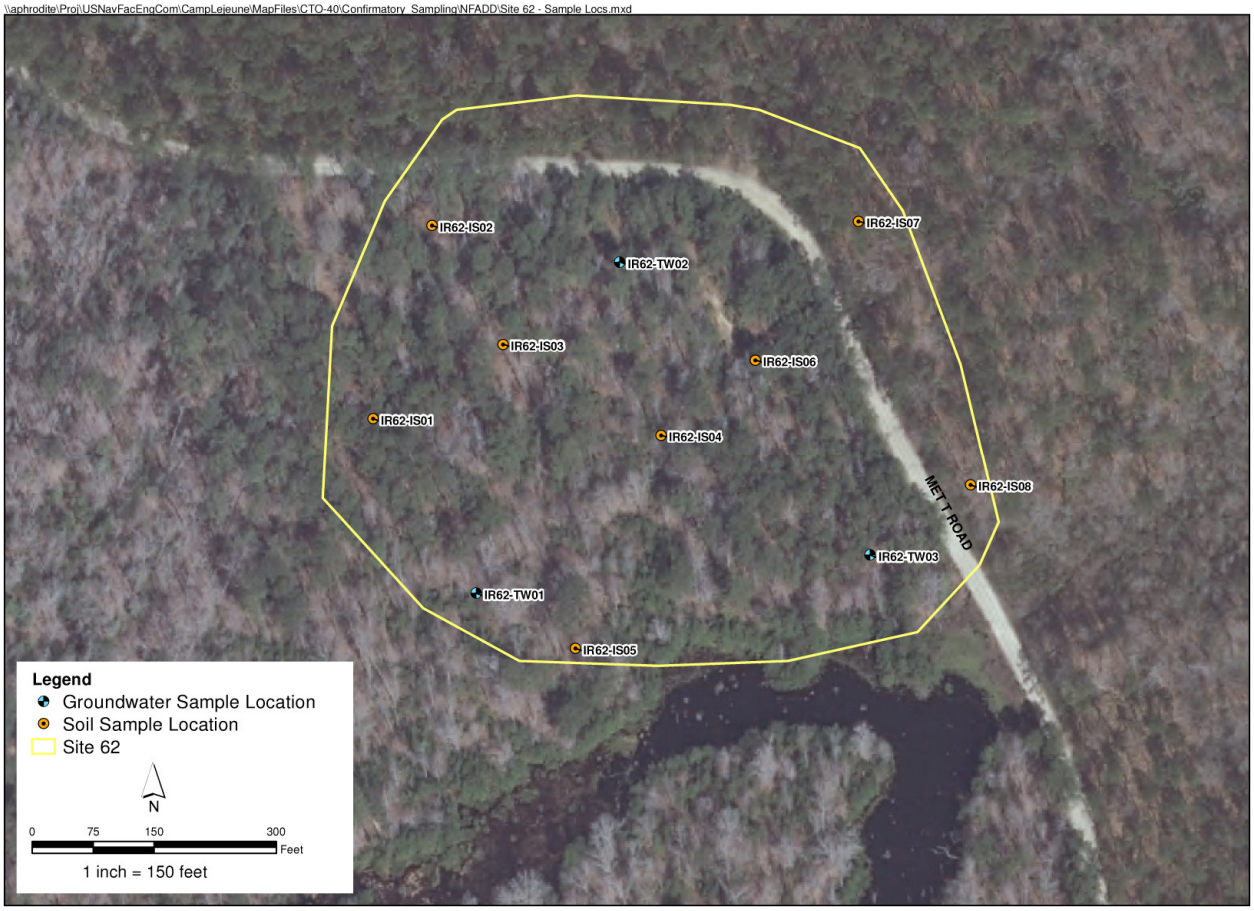


TABLE 2-40
Summary of Subsurface Soil Exceedances - Site 62

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Aluminum (mg/kg)	18,100	IR62-IS08	--	7,700	10,369
Arsenic (mg/kg)	7.8	IR62-IS08	5.8	0.39	2.12
Chromium (mg/kg)	27.2 J	IR62-IS04	3.8	0.39	14.5
Iron (mg/kg)	21,400	IR62-IS04	150	5,500	5,439

Notes:
J - Analyte present, value may or may not be accurate or precise
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-41
Summary of Human Health Risk Screening- Site 62

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Aluminum Arsenic Chromium Iron	Arsenic Chromium	Arsenic Chromium	Based on conservative screening criteria for chromium and elimination of this COPC, no unacceptable risks are expected due to exposure to subsurface soil.

TABLE 2-42
Summary of Ecological Risk Screening- Site 62

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Iron	Concentrations were consistent with background levels. No unacceptable risks are expected due to exposure to subsurface soil.

Notes:
HQ: Hazard Quotient

2.2.13 Site 66 – AMTRAC Landing Site and Storage

Site 66, the Amphibious Tractor (AMTRAC) Landing Site and Storage Area, is located adjacent to Gun Position 32, along the New River near Courthouse Bay and encompasses approximately 40 acres of densely vegetated woodlands (**Figure 2-1**). Site 66 was reportedly used for AMTRAC maintenance; however, shallow depressions were observed throughout the site and are presumed to be 'foxholes' excavated and used by marines during training. The site is currently utilized as an observatory for bald eagle nesting along the New River a.

Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS, Site 66 was utilized for AMTRAC maintenance during training activities beginning in the 1950s; however, the exact nature of operations are unknown. Due to low potential for negative, site related impacts on the environment the IAS recommended Site 66 for no further assessment.

Confirmatory Site Assessment (CH2M HILL, 2011)

To verify the presence or absence of contamination, a CSA was initiated at Site 66 in 2009. Seventeen subsurface soil, twelve groundwater, two surface water, and four sediment samples (**Figure 2-14**) were collected and analyzed for VOCs, SVOCs, and metals. One VOC (methylene chloride) and metals were detected in soil at concentrations exceeding regulatory screening criteria and background (for metals) (**Table 2-43**). Metals and one

VOC (chloroform) were detected in groundwater at concentrations exceeding regulatory screening criteria and background (for metals) (**Table 2-44**). Surface water samples collected in 2009 indicated elevated metals concentrations and thus a confirmation sample was collected in 2010 (**Table 2-45**). Because the results of the 2010 sample did not indicate any metals results in exceedance of screening criteria, the elevated metals in the 2009 sample were determined to be attributable to stagnant water with high turbidity. One SVOC (dibenz(a,h)anthracene) and metals were detected in sediment at concentrations exceeding screening criteria (**Table 2-46**). An HHRS and an ERS were conducted using the data obtained during the CSA. No unacceptable human health (**Table 2-47**) or ecological (**Table 2-48**) risks were identified due to exposure to subsurface soil, groundwater, surface water, or sediment and the CSA recommended the site remain closed with NFA.

FIGURE 2-14
Sample Locations – Site 66

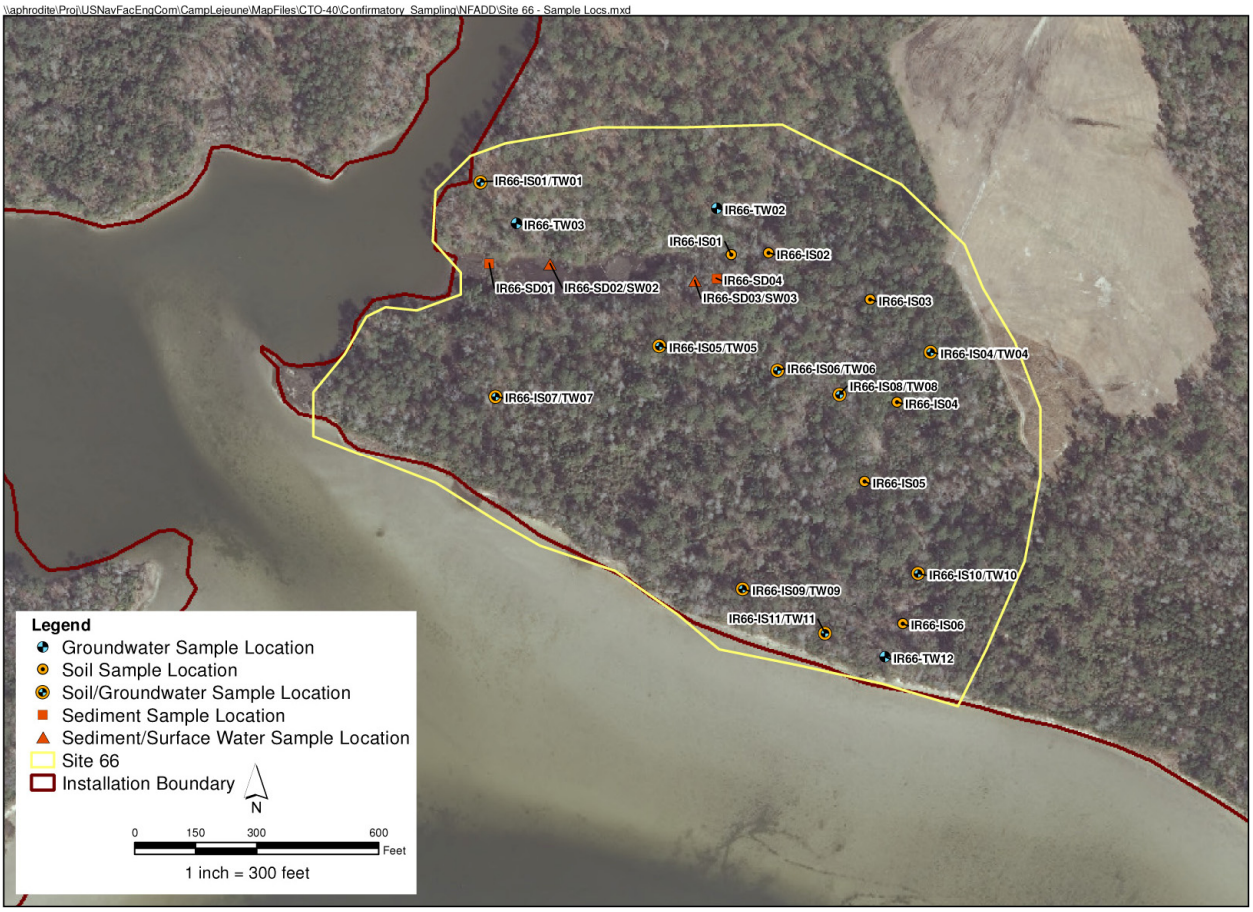


TABLE 2-43
Summary of Subsurface Soil Exceedances - Site 66

Analyte	Max Concentration	Location of Max Concentration	NC SSL	Adjusted Residential Soil RSL	Background 2X Mean
Methylene chloride (µg/kg)	53	IR66-TW06	23	11,000	--
Aluminum (mg/kg)	11,500	IR66-TW03	--	7,700	10,369
Arsenic (mg/kg)	10	IR66-IS03	5.8	0.39	2.12
Chromium (mg/kg)	20.2 J	IR66-IS03	3.8	0.39	14.5
Cobalt (mg/kg)	5.6	IR66-IS03	--	2.3	0.822
Iron (mg/kg)	16,200 J	IR66-IS03	150	5,500	5,439
Manganese (mg/kg)	212 J	IR66-TW04	65	180	9.25

Notes:
J - Analyte present, value may or may not be accurate or precise
NC SSL - North Carolina Soil Screening Level
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-44
Summary of Groundwater Exceedances - Site 66

Analyte	Max Concentration	Location of Max Concentration	NCGWQS*	Adjusted Tap Water RSL	Background 2X Mean
Chloroform (µg/L)	1.7	IR66-TW01	70	0.19	--
Aluminum (µg/L)	6,600	IR66-TW03	--	3,700	1,886
Chromium (µg/L)	30.2	IR66-TW06	10	0.043	3.13
Cobalt (µg/L)	17.2	IR66-TW10D	--	1.1	3.4
Iron (µg/L)	26,600	IR66-TW09	300	2,600	5,999
Manganese (µg/L)	2,710	IR66-TW10D	50	88	214

Notes:
NCGWQS - NCAC Title 15A, Subchapter 2L Groundwater Quality Standards
RSL - Regional Screening Level
* - The Federal MCL is reported in place of the NCGWQS where the MCL value is more conservative.
µg/L - micrograms per liter
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-45
Summary of Surface Water Exceedances - Site 66

Analyte	Max Concentration	Location of Max Concentration	NC2B - SW Human Health + Water Supply/NRWQC-Human Health-Water + Organism *	Adjusted Tap Water RSLs
Arsenic (µg/L)	27.4 J	IR66-SW02 **	0.018	0.045
Cadmium (µg/L)	8.5 J	IR66-SW02 **	5	1.8
Iron (µg/L)	169,000 J	IR66-SW02 **	300	2,600
Manganese (µg/L)	220 J	IR66-SW02 **	50	88

Notes:
J - Analyte present, value may or may not be accurate or precise
RSL - Regional Screening Level
µg/L - micrograms per liter
* - The NC2B-SW Human Health + Water Supply and NRWQC-Human Health-Water + Organism criteria were combined to show the most conservative value.
** - IR66-SW02 was resampled in February 2010 and no metals were detected at concentrations in exceedance of screening criteria.
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-46
Summary of Sediment Exceedance - Site 66

Analyte	Max Concentration	Location of Max Concentration	NC SRG	Adjusted Residential Soil RSL
Dibenz(a,h)anthracene (µg/kg)	64	IR66-SD02	251	15
Arsenic (mg/kg)	4	IR66-SD02	5.8	0.39
Iron (mg/kg)	7,360	IR66-SD02	150	5,500

Notes:
NC SRG - North Carolina Soil Remedial Goal
RSL - Regional Screening Level
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
Screening criteria reflect values that were current at the time that the report was submitted.

TABLE 2-47
Summary of Human Health Risk Screening- Site 66

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusions
Subsurface Soil	Aluminum Arsenic Chromium Cobalt Iron Manganese	Arsenic Chromium	None	No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Chloroform Aluminum Chromium Cobalt Iron Manganese	Chloroform Aluminum Chromium Cobalt Iron Manganese	Chloroform Aluminum Chromium Cobalt Manganese	Chloroform is considered a common laboratory contaminant and was eliminated as a COPC. Chromium was eliminated as a COPC based on more realistic trivalent screening levels. Manganese is within background range or essential nutrient level. Cobalt and aluminum were eliminated based on high turbidity in wells. No unacceptable risks are expected due to exposure to groundwater.
Surface Water	Aluminum Arsenic Iron Manganese	Arsenic Iron	N/A*	Because Site 66 is a tidal creek and arsenic and iron were not COPCs in groundwater, it is not likely that arsenic and iron concentrations are associated with Site 66. No unacceptable risks are expected due to exposure to surface water.
Sediment	Dibenz(A,H)Anthracene Benzo(A)Pyrene Indeno(1,2,3-Cd)Pyrene Aluminum Arsenic Chromium Iron	None	None	No unacceptable risks are expected due to exposure to sediment.

Notes:
* - Step 3 was not conducted because a 95% UCL could not be calculated based on the number of samples.

TABLE 2-48
Summary of Ecological Risk Screening- Site 66

Media	Maximum-Based HQs > 1	Conclusions
Subsurface Soil	Aluminum Iron	Concentrations were consistent with background levels. No unacceptable risks are expected due to exposure to subsurface soil.
Groundwater	Cobalt Copper Iron Manganese Nickel	Concentrations in corresponding subsurface soil samples were consistent with background levels and risks are likely overestimated based on total metals rather than dissolved metals. No unacceptable risks are expected due to exposure to groundwater based on migration to surface water.
Surface Water	Copper Iron Lead Manganese	Results for filtered samples either indicated HQs < 1 or only a low magnitude of exceedance. No unacceptable risks are expected due to exposure to surface water.
Sediment	Dibenz(A,H)Anthracene Acetone Selenium	Dibenz(a,h)anthracene concentrations did not exceed the ecological screening value, acetone is a common laboratory contaminant, and the mean-based HQ for selenium was < 1. No unacceptable risks are expected due to exposure to sediment.

Notes:
HQ: Hazard Quotient

2.2.14 Site 67 – Engineer's TNT Burn Site

Site 67, the Engineer's Trinitrotoluene (TNT) Burn Site, is located near the Courthouse Bay area of the Base on the northern shore of Traps Bay (**Figure 2-1**). The site consists of approximately 4 acres of undeveloped wooded land that is bisected by approximately 2.5 acres of jurisdictional wetland areas.

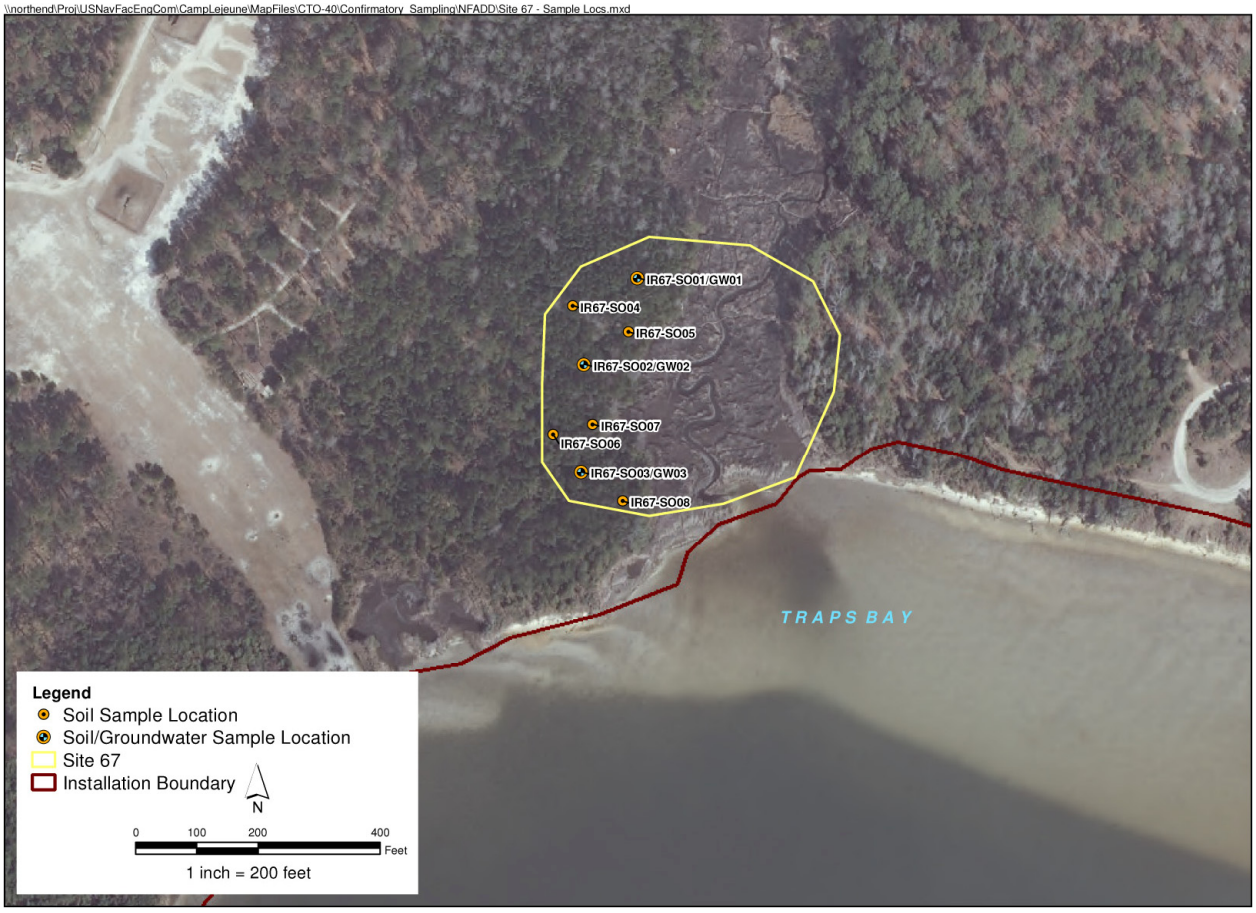
Initial Assessment Study (WAR, 1983)

The IAS was conducted to identify potential hazardous sites at MCB CamLej. According to the IAS, Site 67 was used for TNT disposal in 1951. Unwanted TNT was opened and burned in 2- to 3- feet deep pits. Complete consumption of all TNT was reported during these procedures. Due to the insignificant quantity of waste disposed at Site 67 the IAS recommended no further assessment.

Confirmatory Site Assessment (CH2M HILL, 2010)

To verify the presence or absence of contamination, a CSA was initiated at Site 67 in 2009 based on its history as a burn site. Eight surface soil, seven subsurface soil, and three shallow groundwater samples were collected and analyzed for 2,4,6-trinitrotoluene (TNT), 4-Amino-2,6-dinitrotoluene (DNT), and 2-Amino-4,6-DNT (**Figure 2-15**). Surface and subsurface soil results did not indicate presence of the target explosive residues and although 2-Amino-4,6-DNT was detected in groundwater, the concentration did not exceed regulatory screening criteria. Because there were no exceedances of screening criteria in any media sampled at Site 67, an HHRS and an ERS were not conducted. The CSA recommended the site remain closed with NFA.

FIGURE 2-15
Sample Locations – Site 67



3 NFA Determination

Based on results of the site assessments, there are no unacceptable risks to human health or the environment for current and potential future use at Sites 4, 13, 18, 23, 38, 42, 46, 51, 53, 55, 61, 62, 66, and 67. The Navy and Marine Corps, with concurrence by the USEPA Region 4 and NCDENR, determine NFA is warranted (**Attachment A**). The no action determination meets the statutory requirements of CERCLA and the regulatory requirements of the NCP for protection of human health and the environment.

4 Community Participation

The Navy, MCB CamLej, USEPA, and NCDENR provide information regarding the environmental cleanup of sites at MCB CamLej to the public through the community relations program, which includes a Restoration Advisory Board (RAB), public meetings, the Administrative Record file for the site, and announcements published in local newspapers. RAB meetings are held quarterly and open to the public to provide an information exchange among community members, the Navy, MCB CamLej, USEPA, and NCDENR.

References

CH2M HILL, 2010. *Final Confirmatory Sampling Report Site 67, MCB Camp Lejeune, North Carolina.* November.

CH2M HILL, 2011. *Final Confirmatory Sampling Report Sites 4, 23, 38, 42, 53, 55, 61, 62 and 66 MCB Camp Lejeune, North Carolina.* April.

Osage, 2008. *Report of Findings for IR Site 13, MCB Camp Lejeune, North Carolina.* March.

Osage, 2011. *Final Confirmatory Sampling Report Sites 18, 38, 46, and 51, MCB Camp Lejeune, North Carolina.* June.

Water and Air Research. 1983. *Initial Assessment Study of Marine Corps Base, Camp Lejeune. North Carolina*. Prepared for Naval Energy and Environmental Support Activity.

Acronyms and Abbreviations

amsl	above mean sea level
AMTRAC	Amphibious Tractor
AST	aboveground storage tank
Baker	Baker Environmental, Inc.
bgs	below ground surface
BOQ	Bachelor Officers Quarters
BTOC	below top of casing
CamLej	Camp Lejeune
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chain-of-custody
COPC	constituents/chemicals of potential concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CR	carcinogenic risks
CSF	cancer slope factor
CTE	central tendency exposure
CTO	Contract Task Order
DO	dissolved oxygen
DOT	Department of Transportation
DPT	direct push technology
EcoSSL	USEPA Ecological Soil Screening Levels
EPA	Environmental Protection Agency
EPC	exposure point concentration
ERS	ecological risk screen
ESV	Ecological Screening Values
FFA	Federal Facilities Agreement
FID	flame ionization detector
HEAST	Health Effects Assessment Summary Tables
HHRS	Human Health Risk Screening
HI	hazards index
HPIA	Hadnot Point Industrial Area
HQ	hazard quotient
IAS	Initial Assessment Study
ID	Inner Diameter
IRP	Installation Restoration Program
IRIS	Integrated Risk Information System
kg	kilograms
LSA	Limited Site Assessment
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCL	Maximum Contaminant Level
MILCON	military construction

mg/kg	milligrams per kilogram
mg/L	milligrams per Liter
MRE	Meals Ready to Eat
MS/MSD	matrix spike/matrix spike duplicate
NAD	North American Datum
NAVD	North American Vertical Datum
NAVFAC	Naval Facilities Engineering Command
NC	North Carolina
NCAC	North Carolina Administrative Code
NCDENR	North Carolina Department of Environment and Natural Resources
NCEA	National Center for Environmental Assessment
NCGWQS	North Carolina Groundwater Quality Standards
NC SSL	North Carolina Soil Screening Limit
NCGWQS	NCAC Title 15A, Subchapter 2L Groundwater Quality Standards
NFA	no further action
NPL	national priorities list
NRWQC	National Recommended Water Quality Criteria
NTU	Nephelometric Turbidity Units
ORP	oxidation reduction potential
OWS	oil-water separator
PCB	polychlorinated biphenyl
PRG	Preliminary Remediation Goal
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
SSL	soil screening level
SU	Standard Units
SVOC	semi-volatile organic compound
UCL	upper confidence limit
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WAR	Water and Air Research, Inc.

Attachment A
USEPA and NCDENR Concurrence

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, S.W.
ATLANTA, GEORGIA 30303

August 11, 2011

NAVFAC Atlantic
Attn: Bryan Beck
NAVFAC Midlant Environmental RPM, Camp Lejeune
Marine Corps North Carolina IPT
6506 Hampton Blvd
Norfolk, VA 23508-1273

SUBJ: MCB Camp Lejeune
Confirmatory Sampling Report
Sites 4, 23, 38, 42, 49, 53, 55, 61, 62 & 66

Dear Mr. Beck:

The Environmental Protection Agency (EPA) has completed its review of the above subject document, dated April 2011 and concurs with the no further action validation for all sites. This concurrence is based on the information submitted in the above subject report.

If there are any questions, I can be reached at (404) 562-8538.

Sincerely,
Gena Townsend
Digitally signed by Gena Townsend
DN: cn=Gena Townsend, o=Superfund Division, Federal Facilities Branch, ou=Environmental Protection Agency, email=townsend.gena@epa.gov, c=US
Date: 2011.08.11 15:30:43 -04'00'
Gena D. Townsend
Senior Project Manager

cc: Randy McElveen, NCDENR
Charity Rychak, MCB Camp Lejeune

From: Mcelveen, Randy [mailto:randy.mcelveen@ncdenr.gov]
Sent: Monday, September 12, 2011 2:49 PM
To: Wilson, Hope/ATL; Townsend.Gena@epa.gov; charity.rychak@usmc.mil; bryan.k.beck@navy.mil; david.t.cleland@navy.mil; nicholas.a.schultz@usmc.mil
Cc: Henderson, Kimberly/VBO; Louth, Matt/VBO; Bozzini, Chris/CLT; Lubell, David/RDU; White, Martha/ATL
Subject: RE: Final Confirmatory Sampling Report for Sites 4, 23, 38, 42, 53, 55, 61, 62, and 66

September 12, 2011

The NC Superfund Section has no further comments on this Final Version of the Confirmatory Sampling Report for the 9 IAS Sites noted below.
Randy McElveen, NC Superfund Section

From: Hope.Wilson@ch2m.com [mailto:Hope.Wilson@ch2m.com]
Sent: Wednesday, August 24, 2011 6:22 PM
To: Townsend.Gena@epa.gov; Mcelveen, Randy; charity.rychak@usmc.mil; bryan.k.beck@navy.mil; david.t.cleland@navy.mil; nicholas.a.schultz@usmc.mil
Cc: Kimberly.Henderson@CH2M.com; Matt.Louth@CH2M.com; Chris.Bozzini@CH2M.com; David.Lubell@CH2M.com; Martha.White@CH2M.com
Subject: Final Confirmatory Sampling Report for Sites 4, 23, 38, 42, 53, 55, 61, 62, and 66

Good evening all,

The Final Confirmatory Sampling Report for Sites 4, 23, 38, 42, 53, 55, 61, 62, and 66 has been posted to Enterprise. If you have questions or concerns please don't hesitate to contact me.

Thanks!! H

Hope Wilson
Associate Project Manager
Environmental Services
CH2M HILL
1000 Abernathy Road
Suite 1600
Atlanta, GA 30328
T: 678.530.4226
F: 770.604.9183
M:678.656.5411
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, S.W.
ATLANTA, GEORGIA 30303

November 3, 2011

NAVFAC Atlantic
Attn: Bryan Beck
NAVFAC Midlant Environmental RPM, Camp Lejeune
Marine Corps North Carolina IPT
6506 Hampton Blvd
Norfolk, VA 23508-1273

SUBJ: MCB Camp Lejeune
Report of Findings for IR Site 13

Dear Mr. Beck:

The Environmental Protection Agency (EPA) has completed its review of the above subject document, dated March 2008 and the summary presentation presented in 2011 during the Camp Lejeune partnering meeting. EPA concurs with the no further action validation for this site. This concurrence is based on the information submitted in the above subject report and presentation.

If there are any questions, I can be reached at (404) 562-8538.

Sincerely,

Gena D. Townsend
Senior Project Manager

cc: Randy McElveen, NCDENR
Charity Rychak, MCB Camp Lejeune

From: Mcelveen, Randy [randy.mcelveen@ncdenr.gov]
Sent: Tuesday, July 19, 2011 4:19 PM
To: Beck, Bryan K CIV NAVFAC MIDLANT, IPTNC; Townsend.Gena@epamail.epa.gov
Cc: Rychak CIV Charity M
Subject: RE: IR site 13 report

July 19, 2011

The NC Superfund Section has reviewed the "Findings for the IR Site 13" investigation report from confirmatory investigation samples taken at Site 13 in 2007. Based on the results of this investigation the NC Superfund Section concurs with the conclusion that No Further Action be required. All detected soil samples were well below the Soil Screening Levels, therefore, there is no direct contact risk and no consistent or persistent contaminant plumes were noted in groundwater at Site 13.
Randy McElveen, NC Superfund Section

-----Original Message-----
From: Beck, Bryan K CIV NAVFAC MIDLANT, IPTNC [mailto:bryan.k.beck@navy.mil]
Sent: Friday, July 15, 2011 2:22 PM
To: Townsend.Gena@epamail.epa.gov; Mcelveen, Randy
Cc: Rychak CIV Charity M
Subject: FW: IR site 13 report

Gena and Randy,

I request that you review the Report of 'Findings for IR Site 13' which is in the document folder on CH2M-Hill's Enterprise website.

Background:

The IAS closed IR site 13 with no field sampling. In 2007 we performed confirmatory sampling on IR site 13. As you know we subsequently did this for the other IAS sites (4 by Osage and 10 by CH2M-Hill).

I'm not sure why the IR 13 report wasn't reviewed upon initial draft, but I am requesting that you review the IR site 13 report in order for us to be consistent with the other Confirmatory Sampling Sites.

If you would like hard copies, CDs, or have any questions, please contact me.

Thanks,
Bryan

Bryan K. Beck, P.E.
NAVFAC Mid-Atlantic
Marine Corps North Carolina IPT
6506 Hampton Blvd.
Norfolk, Va. 23508-1278
Tel: (757) 322-4734 Fax: (757) 322-8280
Email: bryan.k.beck@navy.mil

From: Townsend.Gena@epamail.epa.gov [mailto:Townsend.Gena@epamail.epa.gov]
Sent: Tuesday, June 14, 2011 8:35 PM
To: Shaun Whitworth
Cc: bryan.k.beck@navy.mil; charity.rychak@usmc.mil; randy.mcelveen@ncdenr.gov
Subject: Re: Draft Confirmatory Sampling Report - Sites 18, 37, 46, and 51

I have reviewed the RTC and accept the responses. The document should be corrected and produced as final.

Gena D. Townsend
US EPA
61 Forsyth Street, SW
Atlanta, Georgia 30303
Tel. No: (404) 562-8538
Townsend.Gena@epa.gov

-----"Shaun Whitworth" <SWhitworth@osageva.com> wrote: -----

To: Gena Townsend/R4/USEPA/US@EPA, <randy.mcelveen@ncdenr.gov>
From: "Shaun Whitworth" <SWhitworth@osageva.com>
Date: 06/14/2011 11:44AM
Cc: <charity.rychak@usmc.mil>, "Beck, Bryan K CIV NAVFAC MIDLANT, IPTNC" <bryan.k.beck@navy.mil>
Subject: Draft Confirmatory Sampling Report - Sites 18, 37, 46, and 51

Gena/Randy,

Attached are the responses to comments for the subject report. An updated version of the Confirmatory Sampling Report has been posted to the web portal. Please let me know if you have any other comments or questions or if the document can be finalized.

Thanks,

Shaun C. Whitworth, P.G.

Osage of Virginia, Inc.

2618 Colley Avenue

Norfolk, Virginia 23517-1132

Office: 757 440-0400 / Facsimile: 757 440-0411

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Native American Women-Owned SDB

8(a) Certified 06Sep05

www.osageva.com <http://www.osageva.com/>

[attachment "RTC - Draft Confirmatory Sampling Report - Sites 18" removed by Gena Townsend/R4/USEPA/US] [attachment " 37" removed by Gena Townsend/R4/USEPA/US] [attachment " 46" removed by Gena Townsend/R4/USEPA/US] [attachment " and 51.docx" removed by Gena Townsend/R4/USEPA/US]

From: Mcelveen, Randy [randy.mcelveen@ncdenr.gov]
Sent: Tuesday, June 14, 2011 2:51 PM
To: Shaun Whitworth; Townsend.Gena@epamail.epa.gov
Cc: charity.rychak@usmc.mil; Beck, Bryan K CIV NAVFAC MIDLANT, IPTNC
Subject: RE: Draft Confirmatory Sampling Report - Sites 18, 37, 46, and 51

Shaun/Bryan,

I concur with the responses to State Comments for the CSI for the subject sites and have no further comments.

Randy McElveen, NC Superfund Section

From: Shaun Whitworth [mailto:SWhitworth@osageva.com]
Sent: Tuesday, June 14, 2011 11:38 AM
To: Townsend.Gena@epamail.epa.gov; Mcelveen, Randy
Cc: charity.rychak@usmc.mil; Beck, Bryan K CIV NAVFAC MIDLANT, IPTNC
Subject: Draft Confirmatory Sampling Report - Sites 18, 37, 46, and 51

Gena/Randy,

Attached are the responses to comments for the subject report. An updated version of the Confirmatory Sampling Report has been posted to the web portal. Please let me know if you have any other comments or questions or if the document can be finalized.

Thanks,

Shaun C. Whitworth, P.G.

Osage of Virginia, Inc.

2618 Colley Avenue

Norfolk, Virginia 23517-1132

Office: 757 440-0400 / Facsimile: 757 440-0411

Cellular: 757 408-2349

e-mail: swhitworth@osageva.com

Native American Women-Owned SDB

8(a) Certified 06Sep05

www.osageva.com <http://www.osageva.com/>

M67001.AR.002925
MCB CAMP LEJUENE
5090.3a

LETTER AND CONCURRENCE FROM U S EPA REGION IV REGARDING DRAFT CONFIRMATORY SAMPLING REPORT FOR SITE 67 ENGINEER'S TNT BURN SITE MCB CAMP LEJEUNE NC
11/15/2010
U S EPA REGION IV

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, S.W.
ATLANTA, GEORGIA 30303

November 15, 2010

NAVFAC Mid-Atlantic
Attn: Bryan Beck NAVFAC Midlant Environmental RPM,
Camp Lejeune Marine Corps North Carolina IPT
6506 Hampton Blvd
Norfolk, VA 23508-1273

SUBJ: MCB Camp Lejeune
Draft Confirmatory Sampling Report
Site 67 Engineer's TNT Burn Site

Dear Mr. Beck:

The Environmental Protection Agency (EPA) has completed its review of the above subject document, dated July 2010 and agrees with the conclusions and recommendations as presented. The sampling investigation did not identify explosive constituents in the surface or subsurface soils and there was only a single detection in a groundwater sample. This detection was below the human health and ecological screening values. Therefore, no further environmental investigation is warranted.

If there are any questions, I can be reached at (404) 562-8538.

Sincerely,
Gena Townsend
Digitally signed by Gena Townsend
DN: cn=Gena Townsend, c=US, o=Superfund Division- Federal Facilities Branch, ou=US EPA, email=townsend.gena@epa.gov
Reason: I am approving this document
Date: 2010.11.15 15:29:27 -05'00'
Gena D. Townsend
Senior Project Manager

cc: Marti Morgan, NCDENR
Charity Rychak, MCB Camp Lejeune

M67001.AR.002924
MCB CAMP LEJUENE
5090.3a

LETTER AND CONCURRENCE FROM NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES REGARDING DRAFT CONFIRMATORY SAMPLING REPORT FOR SITE 67 ENGINEER'S TNT BURN SITE MCB CAMP LEJEUNE NC
08/02/2010
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

North Carolina Department of Environment and Natural Resources
Division of Waste Management

Beverly Eaves Perdue
Governor

Dexter R. Matthews
Director

Dee Freeman
Secretary

August 2, 2010

NAVFAC Atlantic
Attn: Bryan Beck NAVFAC Mid-Atlantic Marine Corps
6506 Hampton Blvd
Norfolk, VA 23508

RE: Draft Confirmatory Sampling Report for
Site 67 Engineer's TNT Burn Site
Marine Corps Base Camp Lejeune
Jacksonville, North Carolina

Dear Mr. Beck:

The Superfund Section of the Division of Waste Management has completed its review of the Draft Confirmatory Sampling Report for Site 67 Engineers TNT Burn Site and concurs with the recommendations. Specifically, Section 5, Conclusions and Recommendations, states that no further environmental investigation of Site 67 is recommended.

If you have any questions, please contact me at (919) 508-8447.

Sincerely,

Marti Morgan
Environmental Engineer
NCDENR Superfund Section

Cc: Robert Lowder, MCB Camp Lejeune
Gena Townsend, US EPA
Randy McElveen

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Attachment B
HHRS and ERS Methodology

Human Health Risk Screening Methodology

The Human Health Risk Screenings (HHRS) were conducted in three steps using a risk ratio technique (Navy, 2000) as follows.

Step 1. The maximum detected constituent concentration for each media was screened against the following criteria:

- USEPA-adjusted residential RSLs (USEPA, 2010), or other human health risk screening levels (if appropriate)
- Two times the mean surface and subsurface soil and groundwater background concentration (for metals) (Baker, 2001 and Baker, 2002)
- Surface water data were compared to RSLs only when the North Carolina Water Quality Standards for human health and water supply (if available) did not exist for a constituent.

Step 2. If the maximum detected concentration exceeded the screening criteria the constituent was retained as a chemical of potential concern (COPC) and a corresponding risk level was calculated in Step 2 using the following equation:

$$\text{corresponding risk level} = \frac{\text{concentration} \times \text{acceptable risk level}}{\text{RSL}}$$

The acceptable risk level is 1 for noncarcinogens and 10^{-6} for carcinogens. The corresponding risk levels for each media were summed to calculate the hazard index (HI) for noncarcinogens and the cancer risk for carcinogens. An HI for each target organ/effect was also calculated. If any target organ/effect HI exceeded 0.5 or cancer risk exceeds 5×10^{-5}, the chemicals corresponding to these values were retained as COPCs and carried forward to Step 3.

Step 3. Step 3 follows the same procedure as Step 2 with one exception: a corresponding risk level for each COPC was calculated using the 95 percent upper confidence limit (UCL) in place of the maximum concentration, if more than 5 samples were available for that media. If fewer than five samples were available, the maximum concentration was used. Pro UCL Version 4.00.04 (USEPA, 2009) was used to calculate the 95 percent UCL.

References

Baker Environmental. 2001. Final Base Background Soil Study, Marin Crops Base Camp Lejeune, North Carolina. April 25.

Baker Environmental. 2002. Draft Base Background Groundwater Study Report, Marine Corps Base Camp Lejeune, North Carolina. August.

USEPA. 2010. *Regional Screening Levels for Chemicals at Superfund Sites.* November.

U.S. Navy. 2000. *Overview of Screening, Risk Ratio, and Toxicological Evaluation*. Procedures for Northern Division Human Health Risk Assessments. May.

Ecological Risk Screening Methodology

The Ecological Screenings (ERS) were conducted as follows.

For each medium (subsurface soil, groundwater, sediment, and/or surface water), the maximum and average concentrations are presented along with representative Ecological Screening Values (ESVs) intended to be protective of ecological receptors. Hazard Quotients (HQs) were calculated by dividing these statistics by the ESVs.

The following screening criteria were selected as ESVs:

- For soil, Region 4 values (EPA, 2001) were selected when there was no value for the EPA Ecological Soil Screening Levels (EcoSSL) (EPA, 2009a).
- For groundwater, the Region 4 values were selected when there was no value for the National Recommended Water Quality Criteria (NRWQC) (EPA, 2009b). Marine or freshwater ESVs were also used to screen groundwater concentrations and were selected based on nearby water bodies.
- For surface water, Region 4 values were selected when there was no value for the NRWQC was preferentially selected over the Region 4 value.
- For sediment, EPA Region 4 values were selected.

When ESVs were not available using the selected hierarchy above, supplemental ESVs were identified as available.

A base background study was conducted at MCB Camp Lejeune in June and July 2000 (Baker, 2001). As part of the ERS, subsurface soil and groundwater background concentrations were compared to site-specific media concentrations. Additional lines of evidence in the evaluation include the frequency of detection, frequency of exceedance, magnitude of exceedance, and identification of potential laboratory contaminants.

References

Baker Environmental, Inc. 2001. Final Base Background Study (Soil), Marine Corps Base Camp Lejeune, North Carolina. Prepared for the Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia. April 2001.

USEPA. 2001. Region 4 Recommended Ecological Screening Values. http://www.epa.gov/region04/waste/ots/ecolbul.htm.

USEPA. 2009a. Ecological Soil Screening Levels. http://www.epa.gov/ecotox/ecossl/

USEPA. 2009b. National Recommended Water Quality Criteria. Originally published May 2005. Website version updated in 2009. http://epa.gov/waterscience/criteria/wqctable/