4 Conclusions and Recommendations

The purpose of the SI is to close data gaps identified during the Phase I ECP. This investigation report can be used to augment the Phase I ECP report in documenting the environmental condition of FTMM. The goals of the SI are to provide information to aide in the further assessment of the level of environmental liability of each parcel and to close data gaps that were identified from the Phase I ECP.

4.1 Conclusions

Based on field sampling activities and laboratory results, the following conclusions were reached.

4.1.1 Geophysical Surveys

Geophysical surveys conducted at FTMM revealed that site conditions at all of the Parcels are consistent with expected conditions based on previous historical use. The areas in which geophysical surveys were conducted have been developed for many years and in most locations multiple generations of buildings have existed in these areas. As a result, small pieces of metal and other small remnants from previous uses are likely to be dispersed throughout the areas. The objectives of the geophysical surveys were to determine the absence/presence of USTs, septic tanks and in one location, a possible burial area. No anomalies indicative of burial areas were identified during the geophysical surveys. Results of the geophysical surveys of note include the identification of 24 suspected USTs and two suspected septic tanks (one tank also contained suspected associated piping) as follows:

- CWA:
    - Parcel 14 – One suspected UST was identified.
    - Parcel 28 – One suspected UST, one suspected septic tank, and one suspected septic distribution box with piping were identified.
- MP:
    - Parcel 51 – Eleven suspected USTs were identified.
    - Parcel 76 – Seven suspected USTs were identified.
    - Parcel 79 – Four suspected USTs were identified.

4.1.2 Surface and Subsurface Soil Investigations

Surface and subsurface soil investigations conducted at FTMM identified a total of 17 soil samples that contained B/Ns at concentrations greater than NJDEP NRDCSCC, 2

soil samples that contained one or more metals at concentrations greater than the NJDEP NRDCSCC and the CW/MPBC, and one sample that contained Aroclor 1260 (a PCB) at a concentration greater than the NJDEP NRDCSCC. Parcels at which COCs were identified in soil at concentrations greater than the NRDCSCC are the following:

- Parcel 49 – Five surface soil samples contained B/Ns at concentrations above the NJDEP NRDCSCC, and one surface soil sample contained Aroclor 1260 (a PCB) at a concentration above the NJDEP NRDCSCC. Further evaluation is recommended.
- Parcel 57 – Three surface soil samples contained B/Ns at concentrations above the NJDEP NRDCSCC. Further evaluation is recommended.
- Parcel 61 – One surface soil sample contained B/Ns at concentrations above the NJDEP NRDCSCC. Further evaluation is recommended.
- Parcel 83 – Eight surface soil samples contained B/Ns at concentrations above the NJDEP NRDCSCC. Two surface soil samples contain lead at concentrations above the NJDEP NRDCSCC and MPBC. Further evaluation is recommended.

4.1.3 Groundwater Investigations

Groundwater investigations conducted at FTMM revealed a total of three groundwater samples containing VO COCs at concentrations exceeding NJDEP GWQC, one sample containing a B/N COC exceeding the NJDEP GWQC, and four groundwater samples containing metals COCs at concentrations exceeding NJDEP GWQC and FTMM MBCs. Parcels at which groundwater COCs were identified include the following:

- CWA – no COCs were identified in groundwater. NFA is recommended.
- MP:
  - Parcel 49 – Two groundwater samples contained VO COCs at concentrations slightly above the GWQC. Groundwater at Parcel 49 is recommended for inclusion in the M-18 CEA.
  - Parcel 51 – One groundwater sample contained a B/N COC at a concentration above the NJDEP GWQC. Further evaluation is recommended.
  - Parcel 57 – Three groundwater samples contained COCs (metals) at concentrations above the NJDEP GWQC and FTMM MPBCs. Further evaluation is recommended.
  - Parcel 69 – One groundwater sample contained a VO COC at a concentration above the NJDEP GWQC. Further evaluation is recommended.

- Parcel 80 – One groundwater sample contained a COC (beryllium) at a concentration above the NJDEP GWQC and FTMM MBCs. Further evaluation is recommended.

4.1.4 Sediment Investigations

Sediment investigations conducted at FTMM revealed sediment samples that contained B/Ns and metals at concentrations greater than applicable NJDEP criteria. Parcels at which sediment COCs were identified and are recommended for further evaluation as part of a facility-wide baseline ecological evaluation are the following:

- CWA:
  - Parcel 15 – Three samples contained metals and one sample contained B/Ns at concentrations above the NJDEP LEL and CWBC but below the SEL.
  - Parcel 27 – Four samples contained metals at concentrations above the NJDEP LEL and CWBC; two of which contained one metal at concentrations above the NJDEP SEL.
  - Parcel 28 – Three samples contained one metal (chromium) at concentrations above the NJDEP LEL and CWBC but below the SEL.
- MP:
  - Parcel 39 – Two samples contained B/Ns at concentrations above the NJDEP LEL and MPBC but below the SEL. Four samples contained metals at concentrations above the NJDEP LEL and MPBC; two samples contained one metal above the SEL.
  - Parcel 43 – Two samples contained B/Ns at concentrations above the NJDEP ER-L and MPBC. Six samples contained metals at concentrations above the NJDEP ER-L and MPBC, and one sample contained one metal at a concentration above the ER-M.
  - Parcel 49 – Seven samples (including one duplicate) contained metals at concentrations above the NJDEP ER-L and MPBC; three samples contained metals at concentrations above the ER-M.
  - Parcel 61 – Four samples contained B/Ns at concentrations above the NJDEP ER-L and MPBC, and one sample contained metals at concentrations above the NJDEP ER-L and MPBC. Three samples contained a B/N above the ER-M. No metals were present at concentrations above the ER-M.
  - Parcel 69 – Two samples contained metals at concentrations above the NJDEP ER-L and MPBC, and one sample contained metals at concentrations above the ER-M. Three samples contained B/Ns at concentrations above the NJDEP ER-L and MPBC. One sample contained a B/N above the ER-M.

4.1.5 Vapor Intrusion Investigations

VI is the migration of organic compounds from the subsurface into overlying buildings (11). Soil gas and indoor air samples were collected at five parcels to evaluate the potential for the intrusion of COCs present in groundwater in close proximity to existing facilities. Even though the groundwater VOs identified as COCs in groundwater were the targeted analytes being investigated, samples were analyzed for the comprehensive VO analytical list, which includes the targeted compounds as well as others that have not been detected in groundwater. No groundwater constituents were identified at concentrations greater than applicable comparison criteria in indoor air in the buildings investigated as detailed below in **Section 4.1.5.2**.

4.1.5.1 Soil Gas

A total of 27 soil gas samples contained one or more VOs at concentrations exceeding NJDEP Soil Gas NRS. Parcels at which soil gas constituents were detected at concentrations greater than applicable NJDEP criteria are the following:

- CWA:
    - Parcel 15 – Fourteen soil gas samples contained VOs at concentrations greater than the NJDEP NRSGSLs.
    - Parcel 34 – Two soil gas samples contained VOs at concentrations greater than the NJDEP NRSGSLs.
- MP:
    - Parcel 43 – Five soil gas samples contained VOs at concentrations greater than the NJDEP NRSGSLs.
    - Parcel 50 – Four soil gas samples contained VOs at concentrations greater than the NJDEP NRSGSLs.
    - Parcel 52 – Two soil gas samples contained VOs at concentrations greater than the NJDEP NRSGSLs.

4.1.5.2 Indoor Air

Indoor Air investigations conducted at FTMM revealed one indoor air sample contained two VOs at concentrations greater than the NJDEP Non-Residential Indoor Air Screening Levels (NRIASLs). The compounds benzene and dichloromethane were detected in indoor air at Parcel 43 (Bldg 1122). Neither compound was detected above criteria in soil gas and/or groundwater and both are suspected to be attributable to activities within the building. No VOs were detected above Immediate Action Levels in any indoor air samples, and no VOs were detected at concentrations above the NRIASLs in indoor air samples collected in Parcel 15 (Bldg 2700) or Parcel 50 (Bldg

283). One additional round of indoor air sampling is recommended for Parcels 15, 34, 43, 50, and 52.

4.1.6 Other Investigations

Results of other investigations conducted as part of this SI include the following:

- Substation surface soil investigations conducted at FTMM revealed that all concentrations of PCBs were below NJDEP NRDCSCC. NFA is recommended.
- Sanitary aqueous investigations conducted at FTMM revealed that mercury was not detected in aqueous samples collected from the sanitary sewer system. NFA is recommended.

4.2 Recommendations

Table 4-1 summarizes recommendations for all parcels investigated. Based upon field sampling activities and information collected to date, further evaluation of COCs identified in soil is recommended for the following parcels on MP:

- Parcel 49
- Parcel 57
- Parcel 61
- Parcel 83

Further evaluation of COCs identified in groundwater is recommended for the following parcels on MP:

- Parcel 51
- Parcel 57
- Parcel 69
- Parcel 80

COCs identified in Parcel 49 groundwater are recommended to be captured in the existing M-18 CEA.

Sediment is recommended for further evaluation and will be addressed as part of a facility-wide baseline ecological evaluation for the following parcels:

- CWA:
  - Parcel 15
  - Parcel 27
  - Parcel 28

- MP:
    - Parcel 39
    - Parcel 43
    - Parcel 49
    - Parcel 61
    - Parcel 69

One additional round of indoor air sampling is recommended to confirm constituents present in groundwater are not present above applicable criteria in indoor air the following Parcels:

- CWA:
    - Parcel 15
    - Parcel 34
- MP:
    - Parcel 43
    - Parcel 50
    - Parcel 52

NFA is recommended for soil in the following parcels:

- CWA:
    - Parcel 13
    - Parcel 14
    - Parcel 15
    - Parcel 27
    - Parcel 28
- MP:
    - Parcel 38
    - Parcel 39
    - Parcel 51
    - Parcel 69
    - Parcel 70
    - Parcel 76
    - Parcel 79
    - Parcel 80
    - Substation soils

NFA is recommended for groundwater in the following parcels:

- CWA:
    - Parcel 13
    - Parcel 14
    - Parcel 15
    - Parcel 28
- MP:
    - Parcel 76
    - Parcel 79
    - Parcel 83

Table 4-1
Summary of Parcel Recommendations

Parcel	Area	Soil		Groundwater		Sediment		Soil Gas		Indoor Air		Geophysical Surveys		Aqueous Sanitary	
		NFA	Further Evaluation	NFA	Further Evaluation	NFA	Further Evaluation	NFA	Further Evaluation	NFA	Further Evaluation	NFA	Further Evaluation	NFA	Further Evaluation
Parcel 13	CWA	x	-	x	-	-	-	-	-	-	-	x	-	-	-
Parcel 14	CWA	x	-	x	-	-	-	-	-	-	-	x	-	-	-
Parcel 15	CWA	x	-	x	-	-	x	x	-		x	x	-	-	-
Parcel 27	CWA	x	-	-	-	-	x	-	-	-	-	x	-	-	-
Parcel 28	CWA	x	-	x	-	-	x	-	-	-	-	x	-	-	-
Parcel 34	CWA	-	-	-	-	-	-	x	-	-	x	-	-	-	-
Parcel 38	MP	x	-	-	-	-	-	-	-	-	-	-	-	-	-
Parcel 39	MP	x	-	-	-	-	x	-	-	-	-	-	-	-	-
Parcel 43	MP	-	-	-	-	-	x	x	-	-	x	-	-	-	-
Parcel 49	MP	-	x	-	x	-	x	-	-	-	-	-	-	-	-
Parcel 50	MP	-	-	-	-	-	-	x	-	-	x	-	-	-	-
Parcel 51	MP	x	-	-	x	-	-	-	-	-	-	x	-	-	-
Parcel 52	MP	-	-	-	-	-	-	x	-	-	x	-	-	-	-
Parcel 57	MP	-	x	-	x	-	-	-	-	-	-	-	-	-	-
Parcel 61	MP	-	x	-	-	-	x	-	-	-	-	-	-	-	-
Parcel 69	MP	x	-	-	x	-	x	-	-	-	-	-	-	-	-
Parcel 70	MP	x	-	-	-	x	-	-	-	-	-	-	-	-	-
Parcel 76	MP	x	-	x	-	-	-	-	-	-	-	x	-	-	-
Parcel 79	MP	x	-	x	-	-	-	-	-	-	-	x	-	-	-
Parcel 80	MP	x	-	-	x	-	-	-	-	-	-	-	-	-	-
Parcel 83	MP	-	x	x	-	-	-	-	-	-	-	-	-	-	-
Substations	MP	x	-	-	-	-	-	-	-	-	-	-	-	-	-
Sanitary	MP	-	-	-	-	-	-	-	-	-	-	-	-	x	-

5 References

(1) U.S. Army BRAC, 2007. Environmental Condition of Property Report - Fort Monmouth, Monmouth County, New Jersey. Final. January 29, 2007.

(2) U.S. Army BRAC, 2007. Site Investigation Work Plan - Fort Monmouth, Monmouth County, New Jersey. Final. September 25, 2007.

(3) Cabrera Services, Inc., 2007. Historical Site Assessment and Addendum to Environmental Conditions of Property Report, Fort Monmouth, Eatontown, New Jersey. January 2007.

(4) U.S. Army Corps of Engineers (USACE) Mobile District, 2003. Integrated Cultural Resources Management Plan, Fort Monmouth, New Jersey. Prepared by John Milner Associates, Inc.

(5) USACE Mobile District, 1999. Final Integrated Natural Resources Management Plan, Fort Monmouth, New Jersey.

(6) Brown, Louis, 2006. Interview. December 7, 2006.

(7) Fort Monmouth Base Realignment and Closure Plans, Analysis, and Integration Office. December 8, 2006.

(8) U.S. Army Communications-Electronics Life Cycle Management Command, Office of the Deputy Chief of Staff for Operations and Plans, July 2005. “A Concise History of the U.S. Army Communications-electronics Life Cycle Management Command and Fort Monmouth, New Jersey,” Fort Monmouth, New Jersey.

(9) Kozlowski, Melissa, Summer 2004, Fort Monmouth: Landmarks and Place Names, DCSOPS, Fort Monmouth, New Jersey.

(10) New Jersey Administrative Code. Technical Requirements for Site Remediation (N.J.A.C. 7:26E). July 2005.

(11) U.S. Environmental Protection Agency (USEPA), 2002. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils [Draft Subsurface Vapor Intrusion Guidance]. Office of Solid Waste and Emergency Response, Washington D.C. USEPA530-F-02-052.

(12) New Jersey Department of Environmental Protection (NJDEP), 2005. Vapor Intrusion Guidance. Prepared by staff in the NJDEP Site Remediation and Waste Management Program (SRWMP) and the Division of Science, Research and Technology (DSRT). October 2005.

(13) NJDEP, 2005. Field Sampling Procedures Manual.

(14) Environmental Research, Inc., 1993. Aerial Photographic Site Analysis, Evans Area, Charles Wood Area, Fort Monmouth, New Jersey. December 1993.

(15) U.S. Army Environmental Health Laboratory, 1955. Industrial Hygiene Survey No. 2019 S039-55-5, Signal Corps Center and Fort Monmouth, Fort Monmouth, New Jersey. March 28-April 1, 1955.

(16) U.S. Army Environmental Health Laboratory, 1958. Industrial Hygiene Survey No. 3188 S014-58-9, U.S. Army Signal Corps Center, Fort Monmouth, New Jersey. December 8-15, 1958.

(17) Department of the Army, Office of the Surgeon General, 1972. Occupational Health Survey No. 32-088-72, Fort Monmouth, New Jersey. May 22-25, 1972.

(18) USEPA, 1985. Installation Assessment Relook Program, Working Document, Fort Monmouth Complex, Long Branch, New Jersey. September 1985.

(19) Master Plot Plan – Watson Laboratories, War Department, Army Air Forces, Air Technical Service Command, Office of the Post Engineer. July 30, 1945, last revised August 2, 1950.

(20) U.S. Army Environmental Hygiene Agency (USAEHA), 1976. Water Quality Engineering Special Study No. 24-016-75-76, Sanitary and Industrial Wastewater, Fort Monmouth, New Jersey. September 23-October 9, 1974; April 15-17, 1975; June 10-12, 1975.

(21) Paul F. Sanders, Ph.D., 2003. Ambient Levels of Metals in New Jersey Soils; In Environmental Assessment and Risk Analysis Element. May 2003.

(22) Matthews, Terry (Fort Monmouth employee), 2007. Personal Communication.

(23) Eatontown Area, Fort Monmouth, NJ, Field Laboratory, All Buildings, Plumbing Layout & Sections, Plan Number 6148/1033. September 26, 1941.

(24) U.S. Army Environmental Health Laboratory, 1952. Industrial Hygiene Survey No. 1033 S083-52-2, Fort Monmouth Signal Laboratories, Fort Monmouth, New Jersey. April 7-11, 1952.

(25) U.S. Army Environmental Health Laboratory, 1954. Industrial Hygiene Survey No. 1559 S181-53-3, Signal Corps Engineering Laboratories, Fort Monmouth, New Jersey. January 4-8, 1954.

(26) USAEHA, 1976. Industrial Hygiene Survey No. 35-0001-78, Fort Monmouth, New Jersey. October 17-November 5, 1976.

(27) Revitalize Bays 3 and 5, BLDG. 2525, Kitchens & Bathroom Plumbing Plan, Drawing Number 10913-12, PR. NO.: 99-0697.

(28) Fort Monmouth, 2005. Spill Prevention Control and Countermeasures Plan (SPCCP) and Installation Spill Contingency Plan (ISCP). Revision Date February 2005.

(29) Malcolm Pirnie, Inc., 2006. Final Historical Records Review Fort Monmouth, Fort Monmouth, New Jersey.

(30) USAEHA, 1973. Industrial Hygiene Survey No. 35-050-73-74, Fort Monmouth, New Jersey. July 9-27, 1973.

(31) Parsons Engineering, Inc., 2003. Final Fort Monmouth Pollution Prevention Plan. June 2003.

(32) Skill Development Center/Autocraft Shop, Heating & Plumbing Floor Plan, Project No. 00913.00, Drawing No. M1. April 9, 1993.

(33) Fort Monmouth, 2006. Stormwater Pollution Prevention Plan (SPPP) Public Complex Permit (R-11), Main Post and Charles Wood Areas. March 2006.

(34) Tetra Tech EM, Inc., 2005. Final Remedial Action Report for the 800, 700, and 400 Areas, U.S. Army Installation Fort Monmouth, Fort Monmouth, New Jersey. October 2005.

(35) USAEHA, 1993. Air Pollution Emission Statement No. 43-21-N1W1-93, USAG Fort Monmouth. May 17-21, 1993.

(36) USAEHA, 1978. Hearing Conservation Survey No. 51-34-0102-79, Fort Monmouth, New Jersey. August 28-September 1, 1978.

(37) USAEHA, 1983. Hearing Conservation Survey No. 51-34-0075-83, Fort Monmouth, New Jersey. June 20-23, 1983.

(38) USAEHA, 1981. Hazardous Waste Management Survey No. 37-26-0137-81, Fort Monmouth, New Jersey. January 26-30, 1981.

(39) Army Industrial Hygiene Laboratory, 1950. Industrial Hygiene Survey No. 0481 S094-50-0, Signal Corps Engineering Laboratories, Fort Monmouth, New Jersey. June 29-July 7, 1950.

(40) U.S. Army Toxic and Hazardous Materials Agency, 1980. Installation Assessment of Fort Monmouth, Report No. 171. May 1980.

(41) USAEHA, 1957. Industrial Hygiene Survey No. 2578 S023-57-7, The Signal Corps Center and Fort Monmouth, Fort Monmouth, New Jersey. April 8-12, 1957.

(42) Fort Monmouth DPW, Master Planning, Facilities Reduction Program database, December 2006.

(43) Guernsey, 1998. Procurement Sensitive Privatization Study, Potable Water Utility System, Wastewater Utility System. April 1998.

(44) Versar, Inc., 2003. Remedial Investigation Report - M-18 Landfill Site. Prepared for U.S. Army DPW, Fort Monmouth, New Jersey. October 2003.

(45) Cabrera Services, Inc., 2007. Radiological Scoping Survey Plan, Fort Monmouth, Eatontown, New Jersey. June 2007.

(46) Roy F. Weston, Inc., 1993. Underground Storage Tank Closure and Site Investigation Report, Building 1122, NJDEPE UST Registration No. 81533-199. October 28, 1993.

(47) Roy F. Weston, Inc., 1995. Site Investigation Report. December 1995.