

DRAFT FINAL

DECISION DOCUMENT

NO FURTHER RESPONSE ACTION PLANNED (NFRAP)

NON-DEPARTMENT OF DEFENSE PROPERTY

MUNITIONS RESPONSE SITE

AT THE

OLD GRENADE COURTS MUNITIONS RESPONSE AREA

JOINT BASE CAPE COD, MASSACHUSETTS

Contract Number FA8903-14-C-0012

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Prepared for



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LIST OF ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
%	Percent
AFCEC	Air Force Civil Engineer Center
amsl	Above mean sea level
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMR	Code of Massachusetts Regulations
CSE	Comprehensive Site Evaluation
CSM	Conceptual site model
DERP	Defense Environmental Restoration Program
DGM	Digital geophysical mapping
DMM	Discarded military munitions
DoD	U.S. Department of Defense
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
ft	Foot (feet)
in.	Inch(es)
IRP	Installation Restoration Program
ISM	Incremental sampling methodology
JBCC	Joint Base Cape Cod
LUC	Land use control
MAARNG	Massachusetts Army National Guard
MassDEP	Massachusetts Department of Environmental Protection
MassWildlife	Commonwealth of Massachusetts Division of Fisheries and Wildlife
MC	Munitions constituents
MCP	Massachusetts Contingency Plan
MD	Munitions debris
MEC	Munitions and explosives of concern
mm	Millimeter
MMRP	Military Munitions Response Program
MRA	Munitions Response Area
MRS	Munitions Response Site
NA	Not applicable
NCP	National Oil and Hazardous Substances Pollution Contingency Plan

NFRAP	No Further Response Action Planned
NPL	National Priorities List
SC	Site Closeout
USAF	U.S. Air Force
U.S.C.	U.S. Code
USDA	U.S. Department of Agriculture
UU/UE	Unlimited Use/Unrestricted Exposure
UXO	Unexploded ordnance

DECLARATION

Site Name and Location

Site Name: Non-Department of Defense (DoD) Property Munitions Response Site (MRS) at the Old Grenade Courts Munitions Response Area (MRA)

Installation/Location: Joint Base Cape Cod (JBCC), Barnstable County, Massachusetts

Comprehensive Environmental Response, Compensation, and Liability (CERCLA) Information System Number for JBCC: MA2570024487

Statement of Basis and Purpose

This selected action addresses one Military Munitions Response Program (MMRP) site, the Non-DoD Property MRS at the Old Grenade Courts MRA. This decision is based on the results of the Final Comprehensive Site Evaluation (CSE) Phase II Report JBCC, Massachusetts (Air Force Civil Engineer Center [AFCEC] 2018) and the Final CSE (CSE) Phase II Report Addendum 2 Supplemental Investigation Old Grenade Courts MRA (AFCEC 2023). This Decision Document has been developed for the MMRP in accordance with the Defense Environmental Restoration Program (DERP) statute, 10 U.S. Code (U.S.C.) 2701, et seq. consistent with the CERCLA, 42 U.S.C. 9601, et seq. and Executive Order 12580 (52 Federal Register 2923), and with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300.

The DoD designed the MMRP to follow the CERCLA process to address the remediation of munitions constituents (MC) and munitions and explosives of concern (MEC), which includes unexploded ordnance (UXO), discarded military munitions (DMM), and MC. MC, as defined in 10 U.S.C. Section 2710, are any materials originating from UXO, DMM, or other military munitions including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. Defense sites are defined in 10 U.S.C. Section 2710 as locations that are or were owned by, leased to, or otherwise possessed or used by the DoD. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions.

The CSE Phase II Report (inclusive of the Report Addendum for the Supplemental Investigation) is analogous to a CERCLA Site Inspection Report. The Federal Facility Agreement (FFA) for JBCC (with U.S. Environmental Protection Agency [EPA], amended 2002) states in Section 3.1, (jj): "...If a Site Inspection determination that no further action is warranted, a Decision Document shall be prepared to remove the Study Area from the remedial process."

In accordance with Executive Order 12580, the U.S. Air Force (USAF) is the lead agency for response actions at JBCC, including this No Further Response Action Planned (NFRAP) for the Non-DoD Property MRS at the Old Grenade Courts MRA. JBCC (formerly known as the Massachusetts Military Reservation) was added to the National Priorities List (NPL) in 1989 as Otis National Guard/Camp Edwards. The CERCLA Information System number for JBCC is MA2570024487. An FFA, which provided the legal framework for investigating and remediating numerous operable units at the JBCC, was signed in 1991. In 1996, the FFA was amended to add the USAF as the lead agency for the cleanup at JBCC (EPA et al. 1991, 2002).

The FFA, as amended, requires the USAF to implement CERCLA requirements at JBCC. In addition to the USAF, the EPA and National Guard Bureau are parties to the FFA for the JBCC. AFCEC is managing the soil and groundwater contamination sites under the Installation Restoration Program (IRP) and MMRP in accordance with CERCLA as required by the DERP. The Massachusetts Department of Environmental Protection (MassDEP) is not a signatory of the FFA but is an active participant in the cleanup process and provides guidance and input to the remedy selection and oversight process.

Description of the Decision

Based on the conditions at the Non-DoD Property MRS, AFCEC at JBCC has determined: (1) there is no evidence of MEC or MC and (2) the MRS does not present a risk to human health or the environment (inclusive of soil and groundwater). Therefore, no further actions under CERCLA are required for MEC and MC, and the Non-DoD Property MRS can be classified as NFRAP.

Determinations

This NFRAP Decision Document represents the selected decision for MEC and MC associated with the Non-DoD Property MRS at the Old Grenade Courts MRA developed in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act and the NCP. AFCEC has reviewed the results of site specific MEC and MC investigation data and has determined that no further action for MEC and MC at the Non-DoD Property MRS is protective of human health and the environment. Site data confirmed the conceptual site model (CSM) because there was no source of MEC associated with the historic use of the Site for the training and handling of practice (i.e., inert) grenades at the Non-DoD Property MRS. Therefore, all MEC and MC pathways through soil are incomplete to all receptors (humans), and AFCEC recommends no further action and Site Closeout (SC) to unlimited use/unrestricted exposure (UU/UE) for this MRS.

The NFRAP decision points associated with the MMRP have been met, and therefore, the MRS qualifies for SC for MEC and MC. SC signifies that the Non-DoD Property MRS at the Old Grenade Courts MRA meets UU/UE conditions and that no Land Use Controls (LUCs) are required. Note that sites that meet similar closure conditions under the MassDEP Massachusetts Contingency Plan (MCP)¹ are referred to as achieving a “Permanent Solution with No Conditions” (310 Code of Massachusetts Regulations [CMR]40.1041 [1]) for those hazardous substances subject to this Decision Document. The foregoing represents the NFRAP decision for MEC and MC at the Non-DoD Property MRS by AFCEC and EPA, with the concurrence of MassDEP, which will be provided in **Attachment A** after the public comment period.

The selected action outlined in this NFRAP Decision Document is based upon the assessment of MMRP-related contaminants only and applies only to those hazardous substances subject to the MMRP remedial actions.

¹ Massachusetts Department of Environmental Protection (MassDEP). 2020. *Massachusetts Contingency Plan, 310 CMR 40*. March. <https://www.mass.gov/doc/310-cmr-40-massachusetts-contingency-plan/download>.

U.S. AIR FORCE

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1. INTRODUCTION

This Decision Document provides information on the NFRAP MMRP site decision selected for the Non-DoD Property MRS at the Old Grenade Courts MRA (**Figure 1**). This decision is based on the results of the Final CSE Phase II Investigation (AFCEC 2018) and CSE Phase II Supplemental Investigation (AFCEC 2023). Based on the conditions at the Site and a review of investigation data, AFCEC at JBCC has determined that a source of MEC from the historic use of the Site (training and handling of practice [i.e., inert] grenades) does not remain at the Non-DoD Property MRS. As no source of MEC was identified at the MRS, there is no source of MC present (i.e., explosives residues); as such, the Site does not present an unacceptable risk to human health or the environment, including any risk of leaching from soil to groundwater.

This NFRAP Decision Document has been developed in accordance with DERP statute, 10 U.S.C. 2701, et seq. and Air Force Instruction 32-7020, 14.3, consistent with CERCLA, 42 U.S.C. 9601, et seq. and Executive Order 12580 (52 Federal Register 2923), and, to the extent practicable, with the NCP, 40 CFR Part 300.

1.1 INSTALLATION LOCATION AND REGULATORY FRAMEWORK

JBCC is located in the upper western portion of Cape Cod in Barnstable County, Massachusetts, approximately 60 miles south of Boston, with Cape Cod Bay to the north, Buzzards Bay to the west, and Nantucket Sound to the south (**Figure 1**). JBCC occupies approximately 22,000 acres (34 square miles) within the towns of Bourne, Falmouth, Mashpee, and Sandwich and is a multi-use base with multi government agencies (Massachusetts Army National Guard [MAARNG] operating Camp Edwards, Air National Guard/Massachusetts Air National Guard operating Otis Air National Guard Base, United States Space Force operating Cape Cod Space Force Station, U.S. Coast Guard operating Air Station Cape Cod and Base Cape Cod, and Veterans Affairs operating the Massachusetts National Cemetery).

JBCC was formally added to the NPL in 1989. An FFA, which provided the legal framework for investigating and remediating numerous operable units at the JBCC, was signed in 1991 (EPA et al. 1991). In 1996, the FFA was amended to add the USAF as the lead agency for the cleanup at JBCC (EPA et al. 2002). The FFA, as amended, requires the USAF to implement CERCLA requirements at JBCC. In addition to the USAF, the EPA and National Guard Bureau are parties to the FFA for the JBCC. AFCEC is managing the soil and groundwater contamination sites under the IRP and MMRP in accordance with CERCLA as required by the DERP. The MassDEP is not a signatory of the FFA but is an active participant in the cleanup process and provides guidance and direction to the process.

AFCEC remediation activities at JBCC are governed under CERCLA per the FFA of 1991, unless they involve underground storage tanks. DERP is the statutory authority establishing the DoD environmental restoration program. The goal of DERP is to remediate DoD property to be protective of human health and the environment for current and reasonably anticipated future land use.

Munitions response actions are authorized by the DoD DERP statute (10 U.S.C. Section 2701 et seq.). The DoD designed the MMRP to follow the process established by CERCLA to address the remediation of MC and MEC. “Defense sites” are defined in 10 U.S.C. Section 2710 as “locations that are or were owned by, leased to, or otherwise possessed or used by the DoD.”

1.2 SITE DESCRIPTION

The Non-DoD Property MRS is an approximately 20.4-acre site located off the JBCC installation south of the intersection of Generals Boulevard and Kittredge Road (**Figure 1**). This MRS is on property owned and controlled by the Commonwealth of Massachusetts Division of Fisheries and Wildlife (MassWildlife) and operating as the Francis A. Crane Wildlife Management Area (**Figure 1**). The Wildlife Management Area contains a network of trails that are maintained to promote wildlife management, hunting access, and other recreational uses (e.g., hiking, biking, horseback riding). The Non-DoD Property MRS is segmented into parcels of cleared areas with mainly shrubs and grasses, and a sparsely forested area. A clearing for a power transmission line bisects the Non-DoD Property MRS in the eastern portion of the Site. An unmaintained access road (i.e., Dunbar Road) is located along the northern boundary of the MRS and connects the MRS with the JBCC installation to the north.

1.2.1 Adjacent Land Use

JBCC is an active military installation with restricted public access, with the majority of the perimeter of JBCC being fenced. The Non-DoD Property MRS is situated south of the installation boundary along the southeastern edge of JBCC, where the boundary is not fenced (**Figure 2**). The southeastern portion of JBCC adjacent to the MRS is a mix of forested and industrialized areas and includes a waste transfer station and access roads. Adjacent property south of the Non-DoD Property MRS is part of the MassWildlife Francis A. Crane Wildlife Management Area.

1.2.2 Location and Distance to Nearby Populations

Approximately 70 percent (%) of the perimeter of JBCC is surrounded by residential development, with residents within 0.5 miles of the installation boundary and some directly adjacent to the installation fence (MAARNG 2020). The Non-DoD Property MRS is located in the towns of Sandwich and Falmouth. The town of Mashpee is located to the east of the MRS.

Access to the Non-DoD Property MRS is unrestricted; the MRS is not fenced and can be accessed by the public via the Francis A. Crane Wildlife Management Area (**Figure 2**). However, access to the Non-DoD Property MRS along Kittredge Road is currently restricted by a locked access gate.

1.2.3 General Surface and Groundwater Resources

There are no surface water bodies at the Non-DoD Property MRS. The nearest surface water bodies are to the east and include Ashumet Pond (0.7 miles east), Johns Pond (1.4 miles east), and Moody Pond (1.8 miles northeast). The ponds are used for recreational purposes including swimming and fishing.

JBCC is located over the Sagamore Lens of the Cape Cod aquifer, which is designated as a sole source aquifer by EPA and is the principal source of drinking water for the towns of the Upper Cape (Sandwich, Bourne, Mashpee, and Falmouth) (AFCEC 2015). LUCs have been established for areas on the installation and south of JBCC due to groundwater contamination from IRP sites (**Attachment B**).

1.2.4 Sensitive Environments

There are no wetlands or sensitive environments at the MRS. Conservation areas adjoin the southern boundary of JBCC, including the Frances A. Crane Wildlife Management Area where the MRS is located (**Figure 1**).

The northern long-eared bat, which was federally listed by the U.S. Fish and Wildlife Service as an endangered species (as of March 2023), is suspected to inhabit areas of JBCC, however, it is not known whether the species inhabits the MRS. The closest documented hibernaculum for the northern long-eared bat is in the northeastern corner of JBCC, approximately six miles to the northeast of the MRS (MassWildlife 2019, 2021). In addition, there are more than 40 state-listed special concern, threatened or endangered species at JBCC. There is no specific documentation of their presence on the MRS, and it is unknown if any of these species have inhabited the MRS (AFCEC 2018).

1.3 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Non-DoD Property MRS at the Old Grenade Courts MRA was used for training in the handling and throwing of practice (i.e., inert) grenades from the 1940s through the beginning of the 1950s (AFCEC 2018). The extent of the practice grenade courts included within the boundaries of the Non-DoD Property MRS were observed on historical aerial photographs (**Figure 2**). The practice courts had mock targets (e.g., doorways, windows, pits, etc.) to train for the throwing of practice grenades from various specified distances. A review of the available historical documentation indicated that only practice grenades (i.e., inert) were permitted for use at the MRS which contained several practice courts, including the portions of those located on the Non-DoD Property MRS. There was no historical documentation that showed structures present at the Site or that the MRS was used for military purposes before or after practice grenade training. The northern portion of the MRS between Dunbar Road and the Sandwich and Falmouth town boundary line (**Figure 2**) was transferred to the Commonwealth of Massachusetts (MassWildlife) by a Special Military Reservation Commission on 11 September 2017.

A letter dated 27 July 2010 from the EPA identified the disposition of the Old Grenade Courts MRA and stated that the Site would be addressed in the MMRP under the FFA (**Attachment B**).

1.4 COMMUNITY PARTICIPATION

AFCEC maintains an Administrative Record for CERCLA documents, related to JBCC. Public access to the Administrative Record is available by appointment at the AFCEC office at JBCC and at <https://ar.afcec-cloud.af.mil>.

In accordance with the JBCC Community Involvement Plan, the NFRAP decision for the Non-DoD Property MRS at the Old Grenade Courts will be announced via a news release and paid advertisement. A presentation at the JBCC Cleanup Team meeting will also be scheduled after the press release. Public notice will be given for a 30-day public comment period on this Decision Document prior to a final decision regarding NFRAP designation. Comments and responses will be included as a Responsiveness Summary, which will be included in **Attachment C** of this Decision Document. Questions about this Decision Document may be directed to the Remediation Program Manager, JBCC, AFCEC, at 508-968-4670 x5613.

1.5 SCOPE AND ROLE OF RESPONSE ACTION

JBCC was placed on the NPL in 1989 and is administered under the amended FFA. The CERCLA Information System number for JBCC is MA2570024487. The assessment of the Non-DoD Property MRS at the Old Grenade Courts MRA is being conducted consistent with CERCLA requirements, and to the NCP, to the extent practicable.

The Old Grenade Courts MRA was identified during the CSE Phase I (AFCEC 2014). The CSE Phase I recommended that a CSE Phase II be performed in accordance with USAF Guidance for conducting the CSE Phase II at USAF MRAs under the MMRP. The CSE Phase II found no evidence of MEC or MC at the Site. The CSE Phase II recommended the Old Grenade Courts MRA be split into two MRSs (DoD Property² and Non-DoD Property [the focus of this NFRAP]) based on a review of property control. Additional recommendations included further investigation and assessment of the presence of potential MEC at the MRSs (AFCEC 2018). A CSE Phase II Supplemental Investigation was conducted and confirmed the Non-DoD Property MRS was used for practice munitions (i.e., inert) only and no risk associated with MEC was identified. Additionally, the CSE Phase II Supplemental Investigation Report Addendum 2 (AFCEC 2023) concluded that no further action was required and SC to UU/UE for the Non-DoD Property MRS at the Old Grenade Courts MRA was recommended.

AFCEC determined that the MRS does not represent an unacceptable risk to human health or the environment and selected NFRAP as the decision for the Non-DoD Property MRS as recommended in the CSE Phase II Supplemental Investigation. Under the amended FFA, no further response action for site inspection sites can be documented in an NFRAP Decision Document. Since the CSE Phase II is the MMRP equivalent to the Site Inspection, this policy applies to the Non-DoD Property MRS. The NFRAP decision points have been met, and therefore, the Site qualifies for SC. SC signifies that the Site meets UU/UE conditions and that no LUCs or Five-Year Reviews are required. Note that sites that meet similar closure conditions under the MassDEP MCP are referred to as achieving a “Permanent Solution with No Conditions” (310 CMR 40.1041 [1]) (MassDEP 2020) for those hazardous substances subject to this Decision Document.

² The DoD Property MRS at the Old Grenade Courts MRA is being addressed in a Streamlined Remedial Investigation/Feasibility Study report and is not discussed in subsequent sections of this document.

2. SUMMARY OF SITE CHARACTERISTICS

2.1 CLIMATE

The upper western portion of Cape Cod has a humid continental climate influenced by the proximity to the Atlantic Ocean, resulting in warmer winters and cooler summers than areas farther inland (AFCEC 2018). The average annual temperature is approximately 50°F, with an average monthly temperature in February of 31.2°F and an average monthly temperature in July of 71.3°F (National Oceanic and Atmospheric Administration 2023). Total annual precipitation is approximately 54.7 inches (in.), with precipitation that is generally distributed throughout the year at 4.6 in. per month and a variation of 2.9-6.4 in. per month. July is typically the driest month. Prevailing winds are from the northwest from November to March at an average of 12 miles per hour and from the southwest from April to October with an average of 9 miles per hour.

2.2 TOPOGRAPHY AND HYDROLOGY

2.2.1 Topography

JBCC is in the Seaboard Lowlands of the New England Physiographic Province (AFCEC 2018). The northern and western portions of JBCC are part of the Buzzards Bay Moraine, extending north-south in the western portion, and the Sandwich Moraine, extending west-east in the northern portion. The moraines are ridges characterized by hummocky topography with high rolling hill areas and deep kettle holes, slopes ranging from 0 to 15%, and variations in topographic relief. The highest point on Cape Cod, Pine Hill (318 ft above mean sea level [amsl]), is situated in this western portion of Camp Edwards in the Buzzards Bay moraine. The Mashpee pitted outwash plain is situated between the moraines and slopes from the moraines toward the Atlantic Ocean.

Topography at the Non-DoD Property MRS is generally flat to slightly sloping and partially vegetated with grass, shrubs, and a sparsely forested area (AFCEC 2022). The MRS elevation is approximately 100 ft amsl and slopes gently toward the west/northwest.

2.2.2 Hydrology

The Sagamore Lens of the Cape Cod aquifer is unconfined and recharged by infiltration of precipitation at a rate of approximately 30 in. per year (AFCEC 2018). No major rivers or streams exist within the JBCC boundaries. However, intermittent streams are present during moderate or heavy rainfall events. Freshwater kettle hole ponds are present primarily in the northern and western portions of JBCC.

There are no wetlands, surface water bodies, or drainage ditches at the DoD Property MRS; however, shallow groundwater discharges to nearby surface water bodies, with ponds generally representing an expression of the water table (AFCEC 2023). The nearest surface water bodies to the Non-DoD Property MRS are south and east of the JBCC boundary (**Figure 1**).

2.3 SOILS AND VEGETATION

2.3.1 Soils

Soils at JBCC primarily consist of the Plymouth-Gloucester-Eastchop-Carver and Riverhead-Enfield-Carver soil series (U.S. Department of Agriculture [USDA] 2013). Specifically, the Enfield-Carver soil series is found within glacial outwash plain areas at the installation that are level to gently sloping, where slopes range from 0 to 8%, such as at the Non-DoD Property MRS. The Riverhead-Enfield-Carver series are characterized by deep, well-drained soils. The series are typically composed of sandy silt loams with an organic layer at the surface and some coarse sand and gravel at depth. Frost heave is the expansion and contraction of soil due to freezing and thawing. The frost line is located approximately 38 in. below ground surface at JBCC (AFCEC 2023).

2.3.2 Vegetation

Vegetation at JBCC consists of seven major plant communities that are generally classified as mid to late successional forest with kettle-hole ponds and wetlands (MAARNG 2020). These communities include mixed wood forest, pitch pine-scrub oak forest, hardwood forest, scrub oak barrens, grasslands, wetlands, and disturbed communities. The plant communities have been influenced by several factors such as fires, insect infestations, storms, drought, and historical logging and grazing; however, fires are the most influential in maintaining the communities.

Vegetation at the Non-DoD Property MRS includes sections of cleared grasslands and sparsely forested areas (AFCEC 2023). The forested areas mainly consist of pitch pine (*Pinus rigida*) and dense undergrowth in many areas, including scrub oak (*Quercus ilicifolia*), blueberry (*Vaccinium* spp.), black huckleberry (*Gaylussacia baccata*), sheep laurel (*Kalmia augustifolia*), cat brier (*Smilax glauca*), and wintergreen (*Gaultheria procumbens*) (AFCEC 2018). Other common plants include holly and bayberry. Common grassland species include filiform fescue (*Festuca tenuifolia*), little bluestem (*Schizachyrium scoparium*), and switchgrass (*Panicum virgatum*).

2.4 GEOLOGY AND HYDROGEOLOGY

2.4.1 Geology

JBCC is in the Seaboard Lowlands of the New England Physiographic Province. Unconsolidated overburden at JBCC is dominated by glacial deposits (USDA 2013). The Buzzards Bay and Sandwich moraines in the western and northern portions of JBCC consist of bouldery ablation till (unsorted material ranging from clay to boulder size) overlying reworked basal till. The Mashpee pitted outwash plain between the moraines consists of unconsolidated outwash deposits of sand, gravel, and cobble overlying fine-grained glaciolacustrine deposits (silts and clays) and basal till. The total thickness of unconsolidated overburden ranges from approximately 175 ft near the Cape Cod Canal to 325 ft beneath the thickest portion of the Buzzards Bay Moraine, and 250 ft near Nantucket Sound to the south. The thickness of outwash sediments ranges from approximately 225 ft near the moraines to 80 ft near the shore of Nantucket Sound.

The Non-DoD Property MRS is located over the Mashpee pitted outwash plain (AFCEC 2023). According to the USDA Natural Resources Conservation Service, soil and shallow subsurface material at Non-DoD Property consists of Merrimac fine sandy loam, characterized by very deep, somewhat excessively drained soils formed in outwash plains and Carver loamy coarse sand, characterized by very deep, excessively drained soils formed in outwash plains (USDA 2023).

2.4.2 Hydrogeology

JBCC is located over the Sagamore Lens of the Cape Cod Aquifer, which is designated as a sole source aquifer by EPA (AFCEC 2015). The aquifer is unconfined and recharged by infiltration of precipitation. The water table is mounded, with the top of the mound located beneath the northern portion of JBCC (**Figure 1**). Groundwater flows radially outward and discharges to Buzzards Bay to the west, Cape Cod Bay to the north, and Nantucket Sound to the south.

In the southern portion of JBCC where the Non-DoD Property MRS is located, groundwater flows to the south (AFCEC 2023). Groundwater flow is predominantly horizontal, with stronger vertical gradients near surface water bodies, including kettle ponds hydraulically connected to the aquifer.

2.5 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

2.5.1 Current Site Use

The Non-DoD Property MRS is located off the JBCC installation south of the intersection of Generals Boulevard and Kittredge Road (**Figure 2**). This MRS is on property owned and controlled by MassWildlife and is operated as the Francis A. Crane Wildlife Management Area. The Wildlife Management Area contains a network of trails that are maintained to promote wildlife management, hunting access, and other recreational uses (e.g., hiking, biking, horseback riding). The Non-DoD Property MRS is segmented into parcels of partially cleared areas with mainly shrubs and grasses, and a sparsely forested area. A clearing for a power transmission line bisects the Non-DoD Property MRS in the eastern portion of the Site. An unmaintained access road (i.e., Dunbar Road) is located along the northern boundary of the MRS and connects the Site with the JBCC installation to the north.

2.5.2 Future Site Use

The future use of the Non-DoD Property MRS is anticipated to remain consistent with current use and will continue to be maintained as the MassWildlife Francis A. Crane Wildlife Management Area. As a Wildlife Management Area, the Site is very unlikely to be converted to another land use.

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3. DATA ANALYSIS FOR SITE RISKS

The purpose of the CSE Phase II Investigation (AFCEC 2018) was to determine the presence or absence of MEC and MC within the MRS and to subsequently determine the potential hazards and risks posed to human and ecological receptors from exposure to these constituents. The purpose of the CSE Phase II Supplemental Investigation (AFCEC 2023) was to collect sufficient MEC data to confirm the CSM for the Site and to obtain SC to UU/UE for the Non-DoD Property MRS. The CSE Phase II Report and Addendum 2 are analogous to a CERCLA Site Inspection Report.

The objectives of the CSE Phase II and CSE Phase II Supplemental Investigation were satisfied, and a summary of the investigation results are presented in **Table 1**.

Table 1. Summary of CSE Phase II and Supplemental CSE Phase II Results

Investigation	MEC Investigation Methods	Area Investigated (acres)	MEC Found?	MC Detected? ¹
CSE Phase II	Magnetometer-assisted visual surface survey for MEC (approximately 1.19 miles of transects walked)	0.72	No	NA
Supplemental CSE Phase II	100% Surface removal of all metallic debris with handheld magnetometers, DGM and intrusive investigation of all anomalies above the selected threshold at as close to 100% of the MRS as achievable given vegetation removal constraints by ownership/operation	20.4	No	NA
Notes: ¹ No breached or leaking MEC were found during the CSE Phase II Investigation or CSE Phase II Supplemental Investigation; therefore, there is no risk present from MC. CSE = Comprehensive site evaluation DGM = Digital geophysical mapping DoD = U.S. Department of Defense MC = Munitions constituents MEC = Munitions and explosives of concern MRS = Munitions Response Site NA = Not applicable				

3.1 SUMMARY OF COMPREHENSIVE SITE EVALUATION PHASE II INVESTIGATION ACTIVITIES

CSE Phase II activities at the Non-DoD Property MRS included a magnetometer-assisted surface survey to identify the presence or absence of potential MEC (**Figure 2**). The data were reviewed and utilized to develop and refine the CSMs for potential exposures to MEC and MC.

3.1.1 Magnetometer-Assisted Visual Munitions and Explosives of Concern Surface Survey Observations

The MRS was surveyed by a UXO team using a White's all-metals detector and handheld GPS unit with pre-loaded boundaries to assess the presence of MEC at the surface. The MEC survey was biased toward the footprints of the former practice grenade courts at the Non-DoD Property MRS (**Figure 2**). No evidence of MEC or munitions debris (MD) was observed during the CSE Phase II visual survey.

The CSE Phase II recommended further assessment and/or action at the Non-DoD Property MRS. It was subsequently decided by AFCEC, EPA, and MassDEP that a CSE Phase II Supplemental Investigation would be conducted including an intrusive investigation as close to 100% of the Non-DoD Property MRS as achievable.

3.1.2 Munitions Constituents Sampling

No MEC or source of MC was identified, and as such no MC sampling was required during the CSE Phase II at the Non-DoD Property MRS. As such, all pathways (soil, surface water/sediment, and groundwater) are incomplete to both human and ecological receptors.

3.2 SUMMARY OF COMPREHENSIVE SITE EVALUATION PHASE II SUPPLEMENTAL INVESTIGATION ACTIVITIES

CSE Phase II Supplemental Investigation activities at the Non-DoD Property MRS included a surface sweep, DGM survey, and an intrusive investigation. The DGM survey identifies subsurface anomalies from metallic objects that may result from buried MEC. The objective of the Supplemental Investigation was to collect sufficient data to confirm or refine the CSM for the Non-DoD Property MRS and to determine if MEC remained at the MRS.

3.2.1 Munitions and Explosives of Concern Intrusive Investigation Results

As part of the CSE Phase II Supplemental Investigation, the entire 20.4-acre Non-DoD Property MRS was investigated with a magnetometer-assisted surface sweep to removal all metallic debris, to conduct a DGM survey (i.e., as close to 100% of the area as possible given vegetation removal restrictions), and 100% intrusive investigation of all target anomalies above the selected target threshold of three millivolts (**Figure 3**). A magnetometer and dig investigation was conducted in saturated response areas, noise polygons, and DGM data gap area. An additional MEC investigation was conducted in seven step-out grids using magnetometer and dig (**Figure 3**).

At the Non-DoD Property MRS during the Supplemental Investigation, one M29, 3.5-in. practice rocket; three M68, 81-millimeter (mm) mortar training rounds; three M68, 81-mm mortar tail fins; and Mk2 hand grenade frag were found (**Figure 3**). All munitions-related items at the Non-DoD Property MRS were inspected and positively identified as MD during the Supplemental Investigation and were removed from the Site for disposal as material documented as safe. No MEC or material documented as an explosive hazard were found at the Non-DoD Property MRS.

Based on a review of the surface and subsurface data and historical use of the MRS for grenade training at the Site, it was determined that there is no source of MEC associated with the training and handling of practice grenades at the Non-DoD Property MRS. Therefore, all pathways are incomplete for MEC at the Non-DoD Property MRS. No breached or leaking MEC were found during the Supplemental Investigation; therefore, there is no risk present from MC.

3.2.2 Munitions Constituents Sampling

No MEC or source of MC was found during the CSE Phase II Supplemental Investigation, as such no MC sampling was required at the Non-DoD Property MRS. All pathways (soil, surface water/sediment, and groundwater) are incomplete to both human and ecological receptors.

3.3 CONCEPTUAL SITE MODEL

The CSM was developed to assess the potential MEC and MC contamination sources and receptors and analyze the exposure pathways that link them. CSMs are used as planning tools for integrating information from a variety of resources, evaluating the information with respect to project objectives and data needs, and evolving through an iterative process to additional data collection or action. The information collected during the CSE Phase II and CSE Phase II Supplemental Investigation field activities was used to evaluate and update the CSM for MEC and MC at the Non-DoD Property MRS as appropriate.

3.3.1 Munitions and Explosives of Concern Exposure Analysis

Results of the CSE Phase II Supplemental Investigation confirmed the use of the MRS for historical practice munitions (i.e., inert) use only; as such, all MEC pathways (soil) are incomplete to all receptors (human). There has been no identified source of MEC, and, as such, all relevant pathways (surface and subsurface soil) are incomplete to human and ecological receptors.

3.3.2 Munitions Constituents Exposure Analysis

No MEC was identified; as such there is no source of MC and all pathways are therefore incomplete.

3.4 SUMMARY

A NFRAP decision is recommended when the site can be classified as an Area of No Suspected Contamination and no significant risk or threat to public health or the environment exists. The CSE Phase II Supplemental Investigation determined that there is no remaining source of MEC at the Non-DoD Property MRS associated with the historic use of training with practice (i.e., inert) hand grenades. For the Non-DoD Property MRS at the Old Grenade Courts, no explosive safety hazards or MC risks to human health or the environment have been identified (AFCEC 2018, 2023).

Based on these results, No Further Action is recommended for the Non-DoD Property MRS at the Old Grenade Courts under the MMRP. Under this action, the Site would be considered UU/UE for MMRP with no LUC or Five-Year Reviews. Note that sites that meet similar closure

conditions under the MassDEP MCP are referred to as achieving a “Permanent Solution with No Conditions” (310 CMR 40.1041 [1]) (MassDEP 2020) for those hazardous substances subject to this Decision Document.

4. REFERENCES

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U.S. Environmental Protection Agency (EPA) Region 1, Department of the Air Force National Guard Bureau, and the U.S. Coast Guard. 2002. Federal Facility Agreement (FFA) Under CERCLA. June.

Figures

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No Further Response Action Planned Decision Document
Non-DoD Property MRS, Old Grenade Courts
Joint Base Cape Cod, Massachusetts

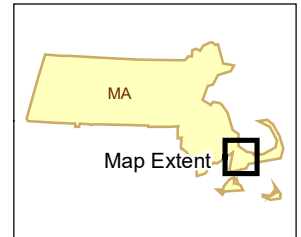
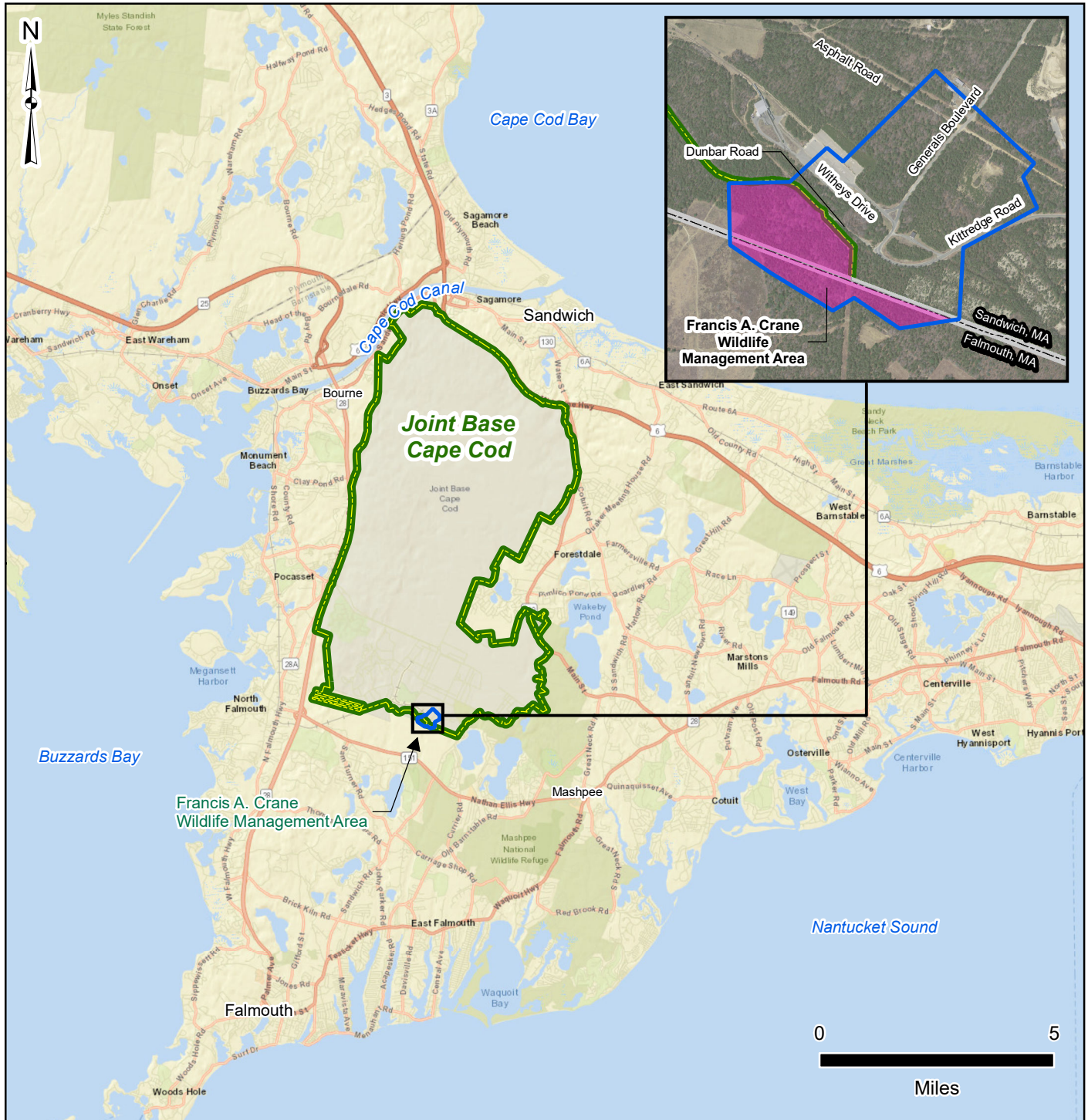


Figure 1
Site Location



Legend

- Installation Boundary
- Old Grenade Courts MRA Boundary
- Non-DoD Property MRS Boundary
- Subject of this NFRAP DD
- Town Boundary

Notes:

1. MRA = Munitions Response Area
2. MRS = Munitions Response Site
3. DoD = Department of Defense
4. NFRAP = No Further Response Action Planned
5. DD = Decision Document

Service Layer Credits: ESRI Street Map, 2016
Final CSE Phase II Report for Joint Base Cape
Cod, Massachusetts, February 2018.



No Further Response Action Planned Decision Document
Non-DoD Property MRS, Old Grenade Courts
Joint Base Cape Cod, Massachusetts

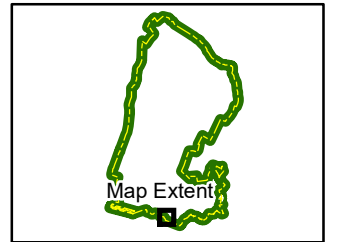
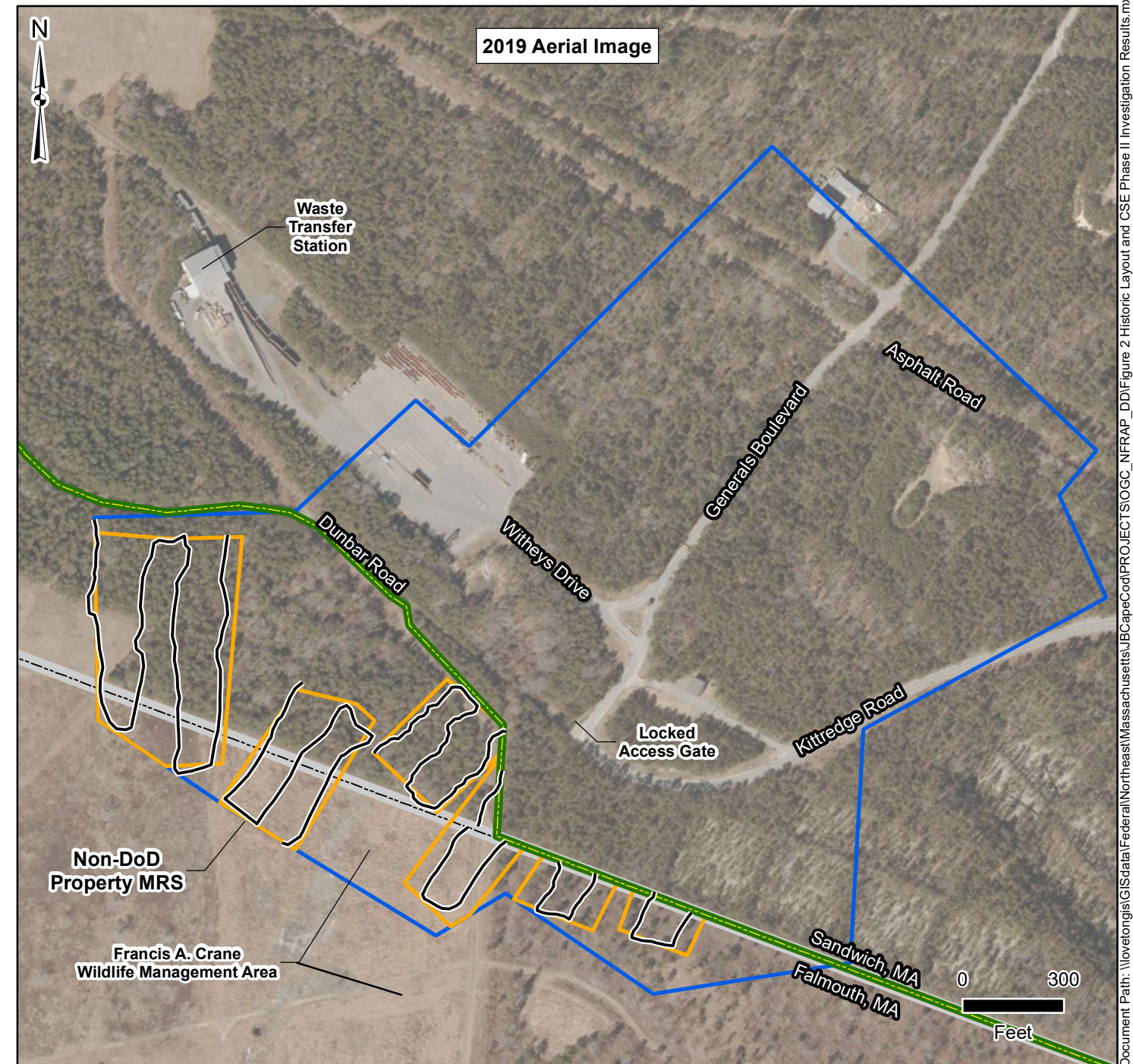
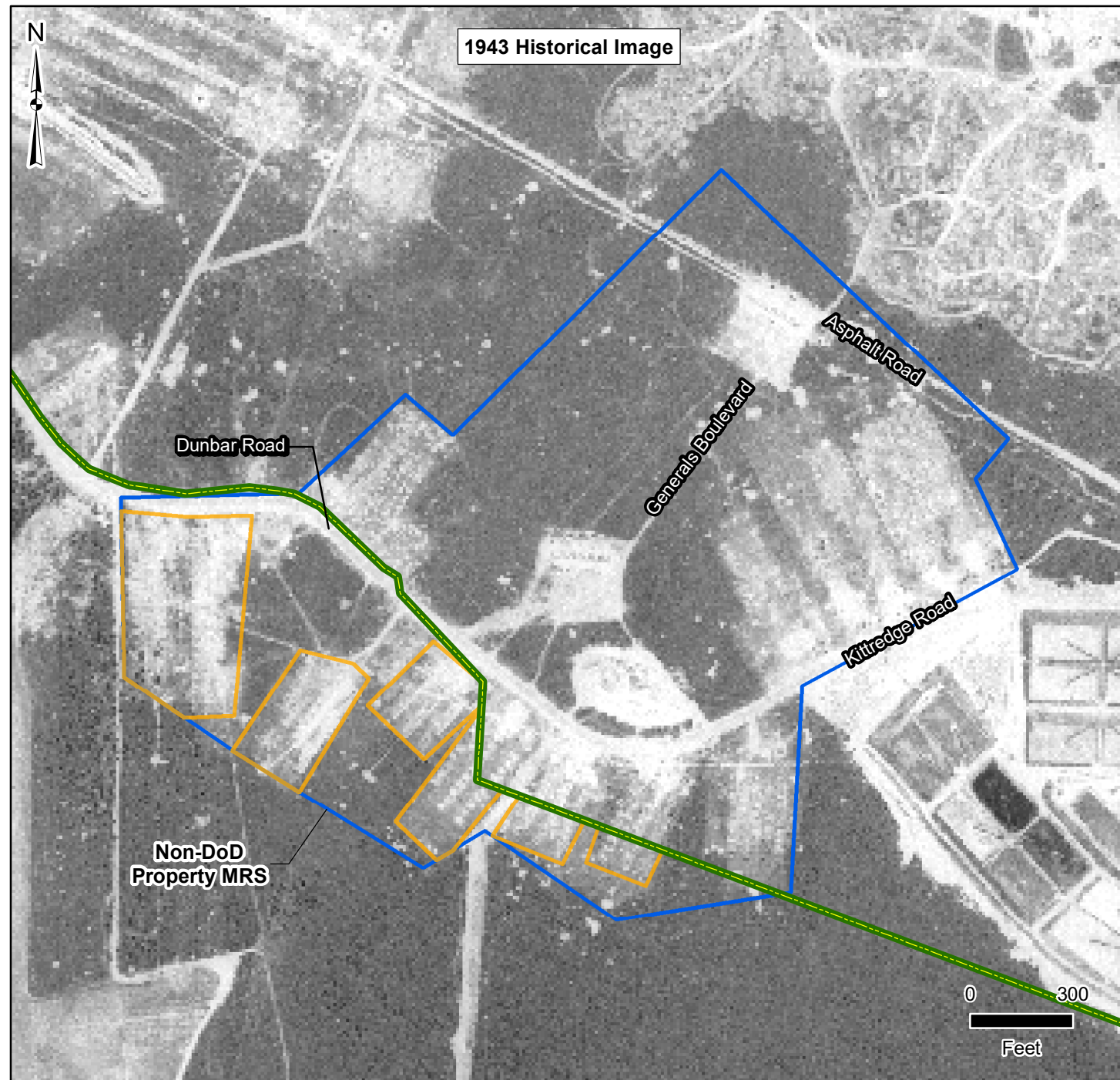


Figure 2
Historic Layout and CSE Phase II Investigation Results



- Legend**
- Installation Boundary
 - Old Grenade Courts MRA Boundary
 - Former Practice Grenade Courts

- Notes:**
1. MRA = Munitions Response Area
 2. MRS = Munitions Response Site
 3. CSE = Comprehensive Site Evaluation
 4. DoD = Department of Defense

Service Layer Credits: Aerial Orthoimagery - MassGIS 2009
AFCEC, 2015A. Final CSE Phase II for Joint Base Cape Cod,
Massachusetts. February 2018.
Parcel data from Office of Geographic Information (MassGIS),
Commonwealth of Massachusetts, MassIT

- Legend**
- Installation Boundary
 - Old Grenade Courts MRA Boundary
 - Former Practice Grenade Courts
 - Magnetometer - Assisted CSE Phase II Survey Transects

Town Boundary

Document Path: \\lovetongis\GIS\data\Federal\Northeast\Massachusetts\JBCapeCod\PROJECTS\OGC_NFRAP_DD\Figure 2 Historic Layout and CSE Phase II Investigation Results.mxd



No Further Response Action Planned Decision Document
Non-DoD Property MRS, Old Grenade Courts
Joint Base Cape Cod, Massachusetts

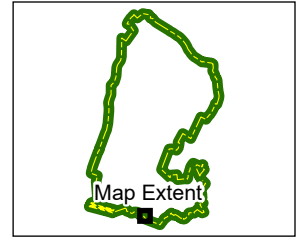
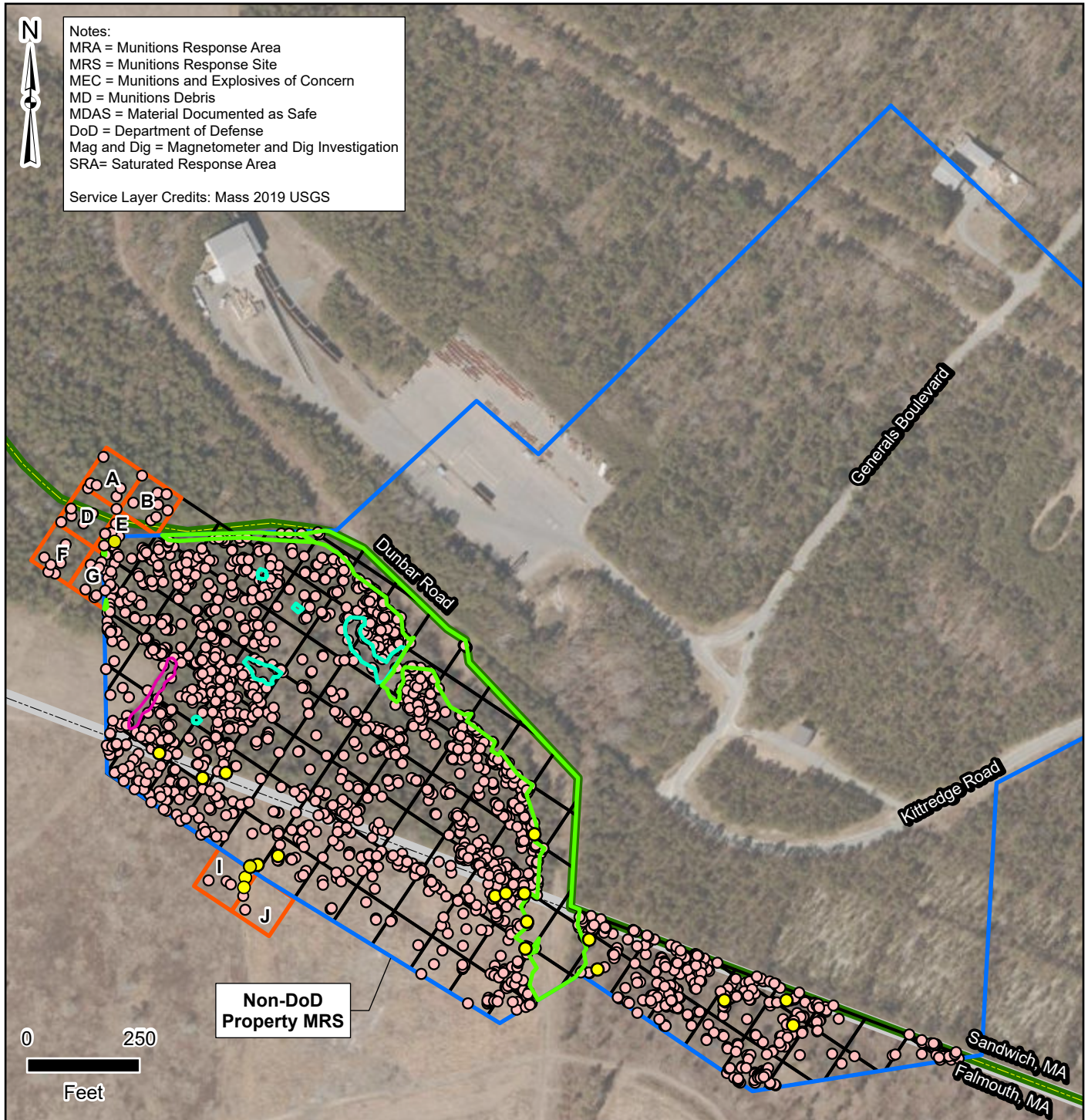


Figure 3
CSE Phase II Supplemental Investigation Results



Legend

- Installation Boundary
- Old Grenade Courts MRA Boundary
- 100x100 foot Investigation Grid
- Town Boundary

Anomalies

- MD/MDAS
- Investigated Anomaly

Mag and Dig Investigation Areas

- Additional MEC Investigation Grid
- Noise Polygon
- SRA Polygon
- Western Mound Area

Attachment A

MassDEP Concurrence

(To be provided after Public Comment Period)

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Attachment B

**Memorandum for Distribution: AFCEC and IAGWSP
Land Use Control Programs and EPA MMRP Letter**

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DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
INSTALLATION RESTORATION PROGRAM
OTIS AIR NATIONAL GUARD BASE, MA 02542-1320

5 Apr 2018

MEMORANDUM FOR DISTRIBUTION

FROM: AFCEC/CZO AND IAGWSP

SUBJECT: AFCEC and IAGWSP Land Use Controls (LUC) Programs

1. The Air Force Civil Engineer Center (AFCEC) and the Army National Guard's Impact Area Groundwater Study Program (IAGWSP) at Joint Base Cape Cod (JBCC) are required to provide an annual update on the Land Use Control Programs that ensures public safety on and off JBCC with regards to drinking water and the groundwater contaminant plumes that our programs are remediating.
2. In addition to the prohibition currently in effect on JBCC there are also similar policies in effect for the Towns of Falmouth, Mashpee, Sandwich and Bourne which are coordinated and implemented through their respective Boards of Health. The status of those policies is verified annually.
3. The Massachusetts Department of Environmental Protection (MassDEP) manages wells serving greater than 25 customers. AFCEC and IAGWSP annually verify with the MassDEP that no new well permits serving more than 25 customers have been issued in groundwater plume areas.
4. As part of our LUC programs we conduct daily reviews of dig safe notices for areas where our groundwater plumes, source areas, and treatment system infrastructure are located both on and off JBCC. This is done to ensure that potential new wells are identified and evaluated to be sure there are no public health concerns, to ensure intrusive work does not occur in source areas, and to protect our infrastructure from potential damage.
5. For questions regarding the IAGWSP LUC program please contact Pam Richardson at the IAGWSP at 508-968-5630, or email pamela.j.richardson.nfg@mail.mil. For questions regarding the AFCEC LUC program, please contact me at 508-968-4670 x 5613, email rose.forbes@us.af.mil.

A handwritten signature in blue ink, appearing to read "Rose H. Forbes", is located above the typed name.

Rose H. Forbes, P.E., GS-13
AFCEC/CZO/JBCC
Remediation Program Manager

Attachment:

1. Combined LUC plume maps (AFCEC and IAGWSP), Feb 2018

cc:

Douglas Karson, AFCEC/CZO

Jennifer DeAngelis, AFCEC/CZO

LTC Shawn Cody, IAGWSP

Pam Richardson, IAGWSP

DISTRIBUTION:

BG Francis B. Magurn, II, Executive Director JBCC

COL Patrick E. Keefe, Commander, Camp Edwards

CAPT Michael A. Hudson, Commanding Officer, USCG Base Cape Cod

Col Virginia I. Doonan, Commander, 102IW

Lt Col Nathan Hippe, Commander, 6SWS

CAPT Timothy A. Tobiasz, Commanding Officer, USCG Air Station Cape Cod

Joint Base Cape Cod Groundwater Plume Map

Issued February 2018

MCL – Maximum Contaminant Level
MMCL – Massachusetts Maximum Contaminant Level
HA – Federal Lifetime Health Advisory
GW-1 – State default cleanup value to be used in lieu of site-specific risk-based level
10⁻⁶ – EPA level resulting in an excess cancer risk of one in a million
RBC - Site Specific Risk Based Concentration



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square, Suite 100
BOSTON, MA 02109



July 27, 2010

Mr. Kent Gonser
Impact Area Groundwater Study Program Office
PB 565/567 West Outer Road
Camp Edwards, MA 02542

Mr. Jonathan S. Davis
Remediation Program Manager
HQ AFCEE/MMR
322 East Inner Road
Otis ANG Base, MA 02542-5028

LTC Michael Speth
Army National Guard Bureau
1411 Jefferson Davis Highway
Arlington, VA 22202-3231

Re: *Final Historical Records Review and Site Inspection Report, Army National Guard Training Site, Camp Edwards, Massachusetts Military Reservation, Massachusetts, Military Munitions Response Program* dated June 2010

Dear Mr. Gonser, Mr. Davis, and LTC Speth:

EPA has reviewed the above referenced *Final Historical Records Review and Site Inspection Report, Army National Guard Training Site, Camp Edwards, Massachusetts Military Reservation, Massachusetts, Military Munitions Response Program* (the "Report") dated June 2010. The Report has been submitted as part of the Military Munitions Response Program in which Department of Defense facilities with unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC) located on current and former military installations are addressed.

EPA has reviewed the Report and approves the changes including the recommended disposition of the fifteen (15) sites and areas of concern as outlined below.

Sites identified on Air Force-leased property and will be addressed by ANG and AFCEE in their MMRP. The ANG is considering the inclusion of these sites within the Federal Facilities Agreement.

- Bayonet Range, BY2
- Bayonet Range, BY4
- Former Otis Bomb Storage Magazine
- Old Grenade Courts
- Otis Target Butt
- Small Arms Range
- Former Ammunition Supply Point

Sites on Coast Guard Property, which are not on operational ranges, will be addressed in accordance with the FFA. These sites will continue with a Remedial Investigation within the MMRP.

- Mock Village
- Old K Range

Sites identified on operational ranges will be addressed by ARNG through the IAGWSPO. These sites will be closed in accordance with the requirements of the SDWA Administrative Orders.

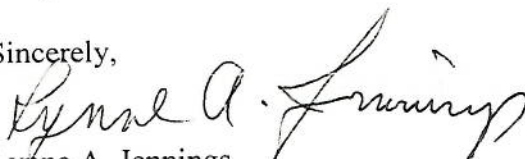
- Bayonet Range, BY1
- Old G Range
- Stables Area

Sites not located on MMR have been referred for consideration by the FUDS Program.

- Scorton Neck AAATC Camp
- Popponesset Beach AAATC Camp
- Off-Base Incidents

If you have any questions, please do not hesitate to call Bob Lim at (617) 918-1392 or me at (617) 918-1210.

Sincerely,


Lynne A. Jennings
MMR Team Leader

cc: Kim Harriz/NGB
Heather Sullivan/ACOE
Len Pinaud/MassDEP
Ron Fein/EPA
Tim Conway/EPA
Jane Dolan/EPA
Carol Keating/EPA
Bob Lim/EPA
Desiree Moyer/EPA

Attachment C

Responsiveness Summary

(To be provided after Public Comment Period)

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