

NOTICE OF PROJECT CHANGE

Multi-Purpose Machine Gun (MPMG) Range at the Known Distance (KD) Range

**Camp Edwards
Joint Base Cape Cod
Sandwich, Barnstable County, Massachusetts**

EOEEA #5834

Prepared For:

Massachusetts Army National Guard

Joint Force Headquarters

Hanscom Air Force Base, MA 01731



31 January 2020



**DEPARTMENTS OF THE ARMY AND THE AIR FORCE
JOINT FORCE HEADQUARTERS
MASSACHUSETTS NATIONAL GUARD
OFFICE OF THE ADJUTANT GENERAL
2 RANDOLPH ROAD
HANSCOM AFB, MA 01731-3001**

31 January 2020

Ms. Tori Kim, MEPA Director
Executive Office of Energy and Environmental Affairs
MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Notice of Project Change - EOEEA #5834
Multi-Purpose Machine Gun (MPMG) Range
Camp Edwards, Joint Base Cape Cod, Sandwich, Massachusetts

Dear Ms. Kim:

The Massachusetts Army National Guard (MAARNG) is pleased to present one original and one copy of a Notice of Project Change (NPC) for the Massachusetts Military Reservation Final Area-Wide Environmental Impact Report (EIR) of the Small Arms Range Improvement Project (SAR-IP). This NPC is being submitted for construction of the proposed Multi-Purpose Machine Gun (MPMG) Range which will allow the MAARNG to efficiently attain required training and weapons qualifications requirements within Massachusetts and provide Soldiers and units the necessary modernized training capabilities to be effective in contemporary and future operating environments. This NPC was prepared in accordance with the Secretary's Certificate dated 16 July 2001 which is included in the NPC. Certain projects and activities at Camp Edwards are subject to a Special Review Procedure (SRP) created and jointly executed by Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) and the MAARNG so that the process under MEPA could be used more efficiently for the long-term use of Camp Edwards.

Given the importance of the MPMG Range to the future operation and viability of the base, the MAARNG has taken its responsibilities under Massachusetts regulations extremely seriously. Therefore, the MAARNG has been working in close cooperation over the past two years with the Massachusetts Natural Heritage and Endangered Species Program (NHESP) to determine mitigation of rare species habitat impacts as a result of the MPMG Range project. In addition, MAARNG has been in communication with the Massachusetts Department of Environmental Protection (MassDEP), Environmental Management Commission (EMC), and United States Environmental Protection Agency (USEPA) relative to this project.

The MAARNG has established a mutually respectful relationships with these agencies and the four towns in which Camp Edwards resides (Bourne, Falmouth, Mashpee, Sandwich). The MAARNG meets regularly with the EMC and its two supporting councils, the Science Advisory Council (SAC) and the Community Advisory Council (CAC) including pre-application meetings, development of presentations, public meeting facilitation, outreach, and informal and formal consultations. Documentation of agency coordination and meetings is detailed in the NPC.

The MAARNG is proposing to construct and operate a MPMG Range (the Project) to be constructed at the existing 600-yard Known Distance (KD) Range that was previously used for training activities. The proposed Project change consists of design plans for the MPMG Range. This NPC is being submitted to satisfy the requirements of MEPA review to document a material change to a project. The MAARNG asserts that the MPMG Range project does not represent a significant change. As greater than 50 acres will be altered for this project, an Environmental Impact Report (EIR) will be required. We are requesting a Single EIR for this NPC.

Initial planning for improvements to the KD Range and the proposed MPMG Range can be traced back to the 1990s and the Project was included in the Massachusetts Military Reservation (MMR¹) Master Plan Final Report dated 8 September 1998 and has been included in subsequent MEPA filings; most recently in the Supplemental EIR for the SAR-IP in 2012. The MPMG Range has been consistently included in MEPA filings as Phase III of the SAR-IP.

A Greenhouse Gas (GHG) analysis has been prepared in accordance with the EOEEA GHG Policy and Protocol (last revised May 5, 2010) as over 50 acres is proposed to be altered for the construction of the MPMG Range. The GHG analysis includes calculations of the project baseline, estimation of emissions associated with the Preferred Alternative and two other alternatives as well as outlining and committing to a series of mitigation measures that will help to reduce GHG emissions from the Project.

The NPC will be filed with MEPA on 31 January 2020 in paper and electronic formats. The NPC will be made available for public review as well as mailed to an extensive circulation list including local stakeholders and agencies. The NPC will also be available on line on the MAARNG Environmental and Readiness Center (E&RC) publications page at <https://www.massnationalguard.org> and copies will be on file at the Bourne, Sandwich, Falmouth, and Mashpee public libraries. Additional copies of the NPC can be obtained by emailing Ms. Kathryn Barnicle of AECOM at Kathryn.barnicle@aecom.com or by calling Katie at 508-833-6953.

Sincerely,



Keith J. Driscoll
NEPA/MEPA Manager
Massachusetts Army National Guard
Keith.j.driscoll.nfg@mail.mil
339-202-3980

¹ The MMR was renamed the JBCC in 2013.

The information requested on this form must be

Notice of Project Change

completed to begin MEPA Review of a NPC in accordance with the provisions of the Massachusetts Environmental Policy Act and its implementing regulations (see 301 CMR 11.10(1)).

MEPA Analyst:

Phone: 617-626-

EEA #5834		
Project Name: Multi-Purpose Machine Gun (MPMG) Range		
Street Address: Joint Base Cape Cod (JBCC) Camp Edwards		
Municipality: Sandwich	Watershed: Cape Cod	
Universal Transverse Mercator Coordinates: 372318.60 4616331.66	Latitude: 41.688526	Longitude: -70.534237
Estimated commencement date: Spring 2020	Estimated completion date: Spring 2022	
Project Type: Military	Status of project design: 95 %complete	
Proponent: Massachusetts Army National Guard (MAARNG)		
Street Address: Joint Force Headquarters, 2 Randolph Road		
Municipality: Hanscom Air Force Base	State: MA	Zip Code: 01731
Name of Contact Person: Keith J. Driscoll		
Firm/Agency: MAARNG	Street Address: 2 Randolph Road	
Municipality: Hanscom Air Force Base	State: MA	Zip Code: 01731
Phone: 339-202-3980	Fax:	E-mail: keith.j.driscoll@mail.mil
With this Notice of Project Change, are you requesting: a Single EIR? (see 301 CMR 11.06(8)) ☒ Yes ☐ No a Special Review Procedure? (see 301 CMR 11.09) ☒ Yes ☐ No a Waiver of mandatory EIR? (see 301 CMR 11.11) ☐ Yes ☒ No a Phase I Waiver? (see 301 CMR 11.11) ☐ Yes ☒ No Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)? (1)(a)1. (Land) Direct alternation of 50 or more acres of land. (2)(b)2. (Rare Species) Greater than two acres of disturbance in designated priority habitat that results in a take of state-listed endangered or threatened species of species of special concern. Under Camp Edwards Environmental Performance Standards - New buildings that exceed 500 s.f. - Clearing of at least two acres of vegetation Which State Agency Permits will the project require? - Conservation and Management Permit from Massachusetts Natural Heritage and Endangered Species Program (NHESP) Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres: Proponent is an Agency of the Commonwealth.		

PROJECT INFORMATION

In 25 words or less, what is the project change? The project change involves . . .

The construction and operation of a Multi-Purpose Machine Gun (MPMG) Range required in order to meet qualification and pre-validation of deploying units.

See full project change description beginning on page 3.

Date of publication or availability of the ENF in the Environmental Monitor: (Date: January 1986)

Was an EIR required? ☒ Yes ☐ No; if yes,
was a Draft EIR filed? ☒ Yes (Date: December 1996) ☐ No
was a Final EIR filed? ☒ Yes (Date: June 2001) ☐ No
was a Single EIR filed? ☐ Yes (Date:) ☒ No

Have other NPCs been filed? ☒ Yes (Date(s):) ☐ No

15 February 2006, 15 September 2006, 9 July 2007, 23 December 2009, 6 April 2011, and 15 January 2013

If this is a NPC solely for lapse of time (see 301 CMR 11.10(2)) proceed directly to
ATTACHMENTS & SIGNATURES.

PERMITS / FINANCIAL ASSISTANCE / LAND TRANSFER

List or describe all new or modified state permits, financial assistance, or land transfers not previously reviewed: **dd w/ list of State Agency Actions (e.g., Agency Project, Financial Assistance, Land Transfer, List of Permits)**

Conservation and Management Permit from NHESP

Are you requesting a finding that this project change is insignificant? A change in a Project is ordinarily insignificant if it results solely in an increase in square footage, linear footage, height, depth or other relevant measures of the physical dimensions of the Project of less than 10% over estimates previously reviewed, provided the increase does not meet or exceed any review thresholds. A change in a Project is also ordinarily insignificant if it results solely in an increase in impacts of less than 25% of the level specified in any review threshold, provided that cumulative impacts of the Project do not meet or exceed any review thresholds that were not previously met or exceeded. (see 301 CMR 11.10(6)) ☐ Yes ☒ No; if yes, provide an explanation of this request in the Project Change Description below.

Project is subject to a Special Review Procedure.

FOR PROJECTS SUBJECT TO AN EIR

If the project requires the submission of an EIR, are you requesting that a Scope in a previously issued Certificate be rescinded?

☐ Yes ☒ No; if yes, provide an explanation of this request_____.

If the project requires the submission of an EIR, are you requesting a change to a Scope in a previously issued Certificate?

☐ Yes ☒ No; if yes, provide an explanation of this request_____.

SUMMARY OF PROJECT CHANGE PARAMETERS AND IMPACTS

Summary of Project Size & Environmental Impacts	Previously reviewed	Net Change	Currently Proposed
LAND			
Total site acreage	38.5	+160.5	209.0
Acres of land altered	38.5	+160.5	209.0
Acres of impervious area	0.9	-0.8	0.1
Square feet of bordering vegetated wetlands alteration	NA	NA	NA
Square feet of other wetland alteration	NA	NA	NA
Acres of non-water dependent use of tidelands or waterways	NA	NA	NA
STRUCTURES			
Gross square footage	585 s.f.	+3,010 s.f.	~3,595 s.f. total (six buildings)
Number of housing units	NA	NA	NA
Maximum height (in feet)	20' (existing Range Control Tower)	7'	27' (Range Control Tower)
TRANSPORTATION			
Vehicle trips per day	NA	NA	NA
Parking spaces	NA	NA	NA
WATER/WASTEWATER			
Gallons/day (GPD) of water use	NA	NA	NA
GPD water withdrawal	NA	NA	NA
GPD wastewater generation/ treatment	NA	NA	NA
Length of water/sewer mains (in miles)	NA	NA	NA

Does the project change involve any new or modified:

- conversion of public parkland or other Article 97 public natural resources to any purpose not in accordance with Article 97? ☐Yes ☒No
- release of any conservation restriction, preservation restriction, agricultural preservation restriction, or watershed preservation restriction? ☐Yes ☒No
- impacts on Rare Species? ☒Yes ☐No
- demolition of all or part of any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth?
☐Yes ☒No
- impact upon an Area of Critical Environmental Concern? ☐Yes ☒No

If you answered 'Yes' to any of these 5 questions, explain below:

Within the MPMG Range footprint, the work will result in the disturbance of approximately 170.5 acres of pine barrens habitat that include Pitch Pine Oak Forest (PPOF), Pitch Pine Scrub Oak (PPSO), and Scrub Oak Shrubland (SOS). NHESP has determined that, as a result of the construction and operation of the MPMG Range, there will be a "take" of several State-listed lepidopterans (moths and butterfly) species identified on the site, and that there could potentially be a "take" of Eastern Box Turtle (*Terrapene carolina*), Eastern Whip-poor-will (*Caprimulgus vociferus*), and sandplain grassland bird species.

PROJECT CHANGE DESCRIPTION (attach additional pages as necessary). The project change description should include:

- (a) a brief description of the project as most recently reviewed
- (b) a description of material changes to the project as previously reviewed,
- (c) if applicable, the significance of the proposed changes, with specific reference to the factors listed 301 CMR 11.10(6), and
- (d) measures that the project is taking to avoid damage to the environment or to minimize and mitigate unavoidable environmental impacts. If the change will involve modification of any previously issued Section 61 Finding, include a draft of the modified Section 61 Finding (or it will be required in a Supplemental EIR).

This document serves as the Notice of Project Change (NPC) under the Massachusetts Environmental Policy Act (MEPA) for the construction of a Multi-Purpose Machine Gun (MPMG) Range project at Camp Edwards, Joint Base Cape Cod (JBCC), Sandwich, Massachusetts (see **Figure 1.1**) proposed by the Massachusetts Army National Guard (MAARNG). Certain projects and activities at Camp Edwards are subject to a Special Review Procedure (SRP) created and jointly executed by Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) and the MAARNG so that the process under MEPA could be used more efficiently for the long-term use of Camp Edwards. Implementation of the MPMG Range project would allow the MAARNG to fulfill their mission by meeting their weapons qualifications standards and training requirements using in-State facilities, and to maintain their readiness posture. Specifically, it would train and test Soldiers on the skills necessary to zero, detect, identify, engage, and defeat targets. It would further permit Camp Edwards to fulfill its mission by providing mission-required training.

The MPMG Range is proposed to be constructed at the existing location of a Known Distance (KD) Range (38.5 acres) which is located within mapped rare species habitat (see **Figures 1.2 to 1.5**). The KD Range was previously used for past ranges and training including disturbed areas that due to inactivity of the range are comprised of grassland habitat and immature pitch pine. The existing KD Range is not presently used for live fire training but is used for other training operations like unmanned aerial systems (UAS) training.

The proposed Project change consists of design plans for the MPMG Range proposed at the KD Range. This NPC is being submitted to satisfy the requirements of MEPA review to document a material change to a project. The MAARNG asserts that the MPMG Range project does not represent a significant change. As greater than 50 acres will be altered for this project, an Environmental Impact Report (EIR) will be required. We are requesting a Single EIR for this NPC. In addition, a Greenhouse Gas (GHG) Analysis is included in the NPC.

Initial planning for improvements to the KD Range and the proposed MPMG Range can be traced back to the 1980s and the Project was included in the Massachusetts Military Reservation (MMR¹) Master Plan Final Report dated 8 September 1998 and has been included in subsequent MEPA filings; most recently in the Supplemental EIR for the Small Arms Range (SAR) Improvement Project (IP) in 2012. The MPMG Range has been consistently included in MEPA filings as Phase III of the SAR-IP.

The entire project site is located in mapped Priority Habitat as shown on **Figure 1.2**. The MAARNG has been working in close cooperation over the past two years with the Massachusetts Natural Heritage and Endangered Species Program (NHESP) to determine mitigation of rare species habitat impacts as a result of the MPMG Range project. In addition, MAARNG has been in communication regarding this Project with the Massachusetts

¹ The MMR was renamed the JBCC in 2013.

Department of Environmental Protection (MassDEP), the Environmental Management Commission (EMC), and the US Environmental Protection Agency (USEPA) as described within this NPC.

Other Permitting

The Project is regulated by other State and Federal agencies including the following: the EMC (see below), the MassDEP under the Massachusetts Contingency Plan (MCP), **the USEPA for consistency with the Administrative Orders under the Safe Drinking Water Act**, the US Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA), and by the NHESP under the Massachusetts Endangered Species Act (MESA). The MAARNG will coordinate with the Impact Area Groundwater Study Program (IAGWSP) to ensure the proposed MPMG Range construction and activities do not interfere with ongoing site investigations, restorations, and monitoring activities. Nonetheless, only one State permit is required; the Conservation and management Permit (CMP) from NHESP.

Environmental Management Commission

The EMC was created within the EOEEA by Chapter 47 of the Acts of 2002 and Executive Order (EO) 443. The purpose of the EMC is to provide permanent protection of the drinking water supply and wildlife habitat of the Upper Cape Water Supply Reserve (the Reserve), created as public conservation land by Chapter 47 of the Acts of 2002, by oversight, monitoring and evaluation of all military and other activities on the reserve to ensure they are consistent with this purpose. The Camp Edwards training ranges are co-located with and are within the Reserve.

The MAARNG has presented information regarding the proposed MPMG Range location and design to the EMC and its advisory councils, the Science Advisory Council (SAC) and the Community Advisory Council (CAC). The CAC assists the EMC by providing advice on issues related to the protection of the water supply and wildlife habitat on the reserve; and the SAC assists the EMC by providing scientific and technical advice relating to the protection of the drinking water supply and wildlife habitat on the Reserve. Finally, the EMC has participated in meetings with the MAARNG and MassWildlife to establish a mitigation bank and overall strategy to facilitate implementation of long-term planning efforts including modernization of the Camp Edwards range complex and infrastructure. EMC approval of the Project will be required.

Annual Reports

The MAARNG is required by MEPA to file annual “State of the Reservation” reports which presents information on special management and mitigation actions, total training utilization, coordination with other projects and programs including the IAGWSP, and the results of the environmental management programs compared against the standards listed in the EPS. These reports are made available to state environmental agencies, the EMC, SAC, and CAC and a notice of the availability is published in the Environmental Monitoring and posted on the MAARNG Environmental and Readiness Center (E&RC) website.

Project Description

The Project involves the construction of an eight lane MPMG Range with six lanes 800 meters long with a width of 25 meters at the firing line and a width of 100 meters at a distance of 800 meters. The two middle lanes (Lanes 5 and 6) will extend an additional 700 meters to a distance of 1,500 meters long to accommodate .50 caliber rifles. The proposed MPMG Range is depicted on **Figures 1.3 and 1.4**. Photographs are provided in **Figure 1.5**. The footprint of the Project would be 199 acres which includes improving the existing 600-yard KD Range comprised of approximately 38.5 acres and approximately 160.5 acres of additional ground disturbance and vegetation clearing. The range consists of three primary components: (1) the physical range footprint, consisting of the firing positions, targetry, (2) Range Operations Control Area (ROCA) support structures which includes a Range Control Tower, Ammunition Storage Building, Covered Bleachers, and other support features, and (3) the Surface Danger Zones (SDZs) and (4) firebreaks which are a critical component of the MPMG Range and are being developed as part of a Camp Edwards-wide firebreak and management plan.

Alternatives Analysis

The MAARNG developed and applied 13 criteria to screen and evaluate possible alternatives for the Project as

described in **Section 3.0**. The selection criteria were applied to available alternatives to determine which alternative(s) would fulfill the purpose and need for action including the No Action Alternative to assess any environmental consequences that may occur if the Project is not implemented. The alternatives analysis provides a description of the following alternatives

- Preferred Alternative (Project)
- Reduced-Scale Alternative
- Full Build Alternative
- No Action Alternative

The Preferred Alternative will be constructed in two phases. Phase 1 will be the Reduced-Scale Alternative, that is, eight lanes constructed at 800 meters in length. Phase 2 will add the extension of two lanes to a length of 1,500 meters to accommodate 0.50 caliber training. The acreages and estimated rare species impacts are provided below by phase. The Project is being phased to correspond with the MILCON (Military Construction) funding.

Impacts by Alternative

Alternative	800 meter lanes	1500 meter lanes	MPMG Range (acres)	Firebreak (acres)	Total Footprint (acres)	Tree clearing (acres)
Full Standard Build	10	4	294	12	306	267.5
Preferred Alternative	8	2	199	10	209	170.5
Reduced-Scale Alternative	8	0	128	10	138	99.5

** Without action, there will be an incremental loss of scrub oak shrubland habitat as described in **Section 4.6.1.3**.

Rare Species Impacts

Within the MPMG Range footprint, the work will result in the disturbance of approximately 170.5 acres of pine barrens habitat that include Pitch Pine Oak Forest (PPOF), Pitch Pine Scrub Oak (PPSO), and Scrub Oak Shrubland (SOS) natural communities as well as approximately 36 acres of existing Managed Grassland (MG) habitat within the KD Range footprint. NHESP has determined that, as a result of the construction and operation of the MPMG Range, there will be a “take” of several State-listed lepidopterans (moths and butterfly) species identified on the Site, and that there could potentially be a “take” of Eastern Box Turtle (*Terrapene carolina*), Eastern Whip-poor-will (*Caprimulgus vociferus*), and sandplain grassland bird species.

Accordingly, in order to provide a long-term net benefit to the impacted species for any MAARNG projects within Camp Edwards (including the MPMG Range project), the MAARNG proposes to use a combination of land transfers (i.e., “land protection”) and establishment of a mitigation bank comprised of approximately 3,400 acres for pine barrens habitat, approximately 1,180 acres for forest cover retention, and approximately 250 acres for potential sandplain grassland creation. Mitigation specific to the MPMG Range includes the land transfer of 133 acres, the preservation of 177 acres of land within Camp Edwards, management of habitat within Camp Edwards, monitoring and research of rare species and associated habitat, and funding as described in **Section 6.7** and the draft CMP Application included as **Appendix B**.

Conservation and Management Plan

The MAARNG is preparing the CMP Application for submittal to NHESP for the MPMG Range. The CMP will also include the framework for future mitigation of other MAARNG projects at Camp Edwards in addition to the MPMG Range project. A part of the CMP Application is the Conservation and Management Plan (Plan) which outlines how impacts from the MPMG Range project will be mitigated with the actions described above. A copy of the draft CMP Application is provided as **Appendix B**.

ATTACHMENTS & SIGNATURES

Attachments:

1. Secretary's most recent Certificate on this project (see **Appendix A**)
2. Plan showing most recent previously-reviewed proposed build condition (see **Figure 1.3**)
3. Plan showing currently proposed build condition (see **Figure 1.4**)
4. Original U.S.G.S. map or good quality color copy (8-1/2 x 11 inches or larger) indicating the project location and boundaries (see **Figure 1.1**)
5. List of all agencies and persons to whom the proponent circulated the NPC, in accordance with 301 CMR 11.10(7) (see **Section 10.0**)

Signatures:

1-31-20			
Date	Signature of Responsible Officer or Proponent	Date	Signature of person preparing NPC (if different from above)
<u>Keith J. Driscoll</u>		<u>Kathryn S. Barnicle, PWS</u>	
Name (print or type)		Name (print or type)	
<u>MAARNG</u>		<u>AECOM</u>	
Firm/Agency		Firm/Agency	
<u>Joint Force Headquarters</u>		<u>9 Jonathan Bourne Drive</u>	
Street		Street	
<u>Hanscom Air Force Base, MA 01731</u>		<u>Pocasset, MA 02559</u>	
Municipality/State/Zip		Municipality/State/Zip	
<u>339-202-3980</u>		<u>508-833-6953</u>	
Phone		Phone	

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Acronyms

AFCEC	Air Force Civil Engineer Center	EPS	Environmental Performance Standards
ANG	Air National Guard	ESA	Federal Endangered Species Act
ANGB.....	Air National Guard Base	FCRA.....	Forest Canopy Reserve Areas
AO	Administrative Order	FFA.....	Federal Facility Agreement
APE	Area of Potential Effect	FPPA	Farmland Protection Policy Act
AQCR.....	Air Quality Control Region	FY	Fiscal Year
ARF	Automatic Record Fire	GHG	Greenhouse Gas
ARNG.....	Army National Guard	GW	Groundwater
ARRM	Army Range Requirement Model	IAGWSP.....	Impact Area Groundwater Study Program
ASP.....	Ammunition Supply Point	ICRMP.....	Integrated Cultural Resources Management Plan
AT/FP	Antiterrorism and Force Protection	IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
BOMARC.....	Boeing and Michigan Aeronautical Research Center	INRMP	Integrated Natural Resources Management Plan
BRAC	Base Realignment and Closure	ITAM.....	Integrated Training Area Management
CAA.....	Clean Air Act	IWFMP.....	Integrated Wildland Fire Management Plan
CAC.....	Community Advisory Council	JBCC	Joint Base Cape Cod
CACI	Clean Air Construction Initiative	KD	Known Distance
Camp Edwards	Camp Edwards Training Area	LSD	Low sulfur diesel
CEQ.....	Council on Environmental Quality	LUZ	Land Use Zone
CERCLA	Comprehensive Environmental Response, Compensation and Liability	MA ANG	Massachusetts Air National Guard
CFR	Code of Federal Regulations	MAARNG	Massachusetts Army National Guard
CMP.....	Conservation and Management Permit	MassDEP	Massachusetts Department of Environmental Protection
CMR	Code of Massachusetts Regulations	MassWildlife ..	Massachusetts Division of Fisheries and Wildlife
CO	Carbon monoxide	MA UASTC....	Massachusetts Unmanned Aircraft Systems Test Center
CWG.....	Citizens Working Group	MCP.....	Massachusetts Contingency Plan
MassDCR	Department of Conservation and Recreation	MEC	Munitions and Explosives of Concern
DoD	Department of Defense	MEPA.....	Massachusetts Environmental Policy Act
DPF.....	Diesel particulate filters	MFR.....	Memorandum For Record
E.....	Endangered	MG.....	Managed Grassland
E&RC	Environmental & Readiness Center	MGL	Massachusetts General Laws
EA.....	Environmental Assessment	MHC	Massachusetts Historical Commission
ECOP.....	Environmental Condition of Property	MILCON	Military Construction
EOEEA.....	Executive Office of Energy and Environmental Affairs	MMR	Massachusetts Military Reservation
EIR.....	Environmental Impact Report	MOA.....	Memorandum of Agreement
EIS.....	Environmental Impact Statement		
EMC	Environmental Management Commission		
EO.....	Executive Order		

MOU.....	Memorandum of Understanding	SIP.....	State Implementation Plan
MPMG.....	Multi-Purpose Machine Gun	SMRC.....	Special Military Reservation Commission
MRF.....	Modified Record Fire	SONMP.....	Statewide Operational Noise Management Plan
MSL.....	Mean Sea Level	SOP.....	Standard Operating Procedures
NAAQS.....	National Ambient Air Quality Standards	SOS.....	Scrub Oak Shrubland
NEPA.....	National Environmental Policy Act	SOW.....	Statement of Work
NGB.....	National Guard Bureau	SPCC.....	Spill Prevention Control and Countermeasure Plan
NGVD.....	National Geodetic Vertical Datum	SR/ES.....	Source Registration Emissions Statement
NHESP.....	Natural Heritage and Endangered Species Program	SRA.....	Sustainable Range Awareness
NHPA.....	National Historic Preservation Act	SRP.....	Special Review Procedure
NLEB.....	Northern Long-Eared Bat	STEP.....	Status Tools for Environmental Program
NPC.....	Notice of Project Change	SVL.....	Solider Validation Lane
OANGB.....	Otis Air National Guard Base	SDWA.....	Safe Water Drinking Act
OHM.....	Oil and Hazardous Material	T.....	Threatened
OMMP.....	Operations, Maintenance, and Monitoring Plan	TAG.....	The Adjutant General
OTR.....	Ozone Transport Region	TBD.....	To Be Determined
PAL.....	Public Archaeological Lab	The Reserve....	Upper Cape Water Supply Reserve
PCA.....	Pre-Construction Assessment	TRI.....	Training Requirements Integration
PM.....	Particulate Matter	TY.....	Training Year
PNF.....	Project Notification Form	UAS.....	Unmanned Aircraft Systems
PPOF.....	Pitch Pine Oak Forest	USAF.....	US Air Force
PPSO.....	Pitch Pine Scrub Oak	USAPHC.....	US Army Public Health Center
ROCA.....	Range Operations Control Area	USC.....	US Code
ROI.....	Region of Influence	USCG.....	US Coast Guard
RRA.....	Rapid Response Action	USEPA.....	US. Environmental Protection Agency
RTLA.....	Range and Training Land Assessment	USFWS.....	US. Fish and Wildlife Service
RTN.....	Reporting Tracking Number	UTES.....	Unit Training Equipment Site
SAAQS.....	State Ambient Air Quality Standards	UXO.....	Unexploded Ordnance
SAC.....	Science Advisory Council	VA.....	Veterans Administration
SAIA.....	Sikes Act Improvement Act	WL.....	Watch List
SAR.....	Small Arms Range	XCTC.....	eXportable Combat Training Capability
SAR-IP.....	Small Arms Range-Improvement Plan		
SARNAM.....	Small Arms Range Noise Assessment Model		
SC.....	Special Concern		
SDZs.....	Surface Danger Zones		
SHPO.....	State Historical Preservation Office		

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Summary Table and Definitions

Terms	Acres	Description
Joint Base Cape Cod (JBCC)	20,554	Full scale, joint-use base home to five military commands training for missions at home and overseas, conducting airborne search and rescue missions, and intelligence command and control.
Camp Edwards	15,000	Camp Edwards makes up the majority of JBCC and includes multiple training areas most of which is located within the Upper Cape Water Supply Reserve.
Camp Edwards Northern Training Area	14,410	Major training area for National Guard Soldiers in the northeast where they practice maneuvering exercises, bivouacking, and use the small arms ranges.
Upper Cape Water Supply Reserve	13,352	Established by Chapter 47 of the Acts of 2002 as public conservation land dedicated to: water supply and wildlife habitat protection; the development and construction of public water supply systems, and, use and training of military forces of the Commonwealth; provided that, military use and training is compatible with natural resource purposes of water supply and wildlife habitat protection..
Cantonment Area	5,000	The southern developed area of the JBCC with roads, utilities, office and classroom buildings, training support areas, and housing. Numerous Federal, State, and county entities are located here as well as the airfield.
Impact Area	2,200	Formal off-limits designation due to unexploded ordnance safety regulations. Area surrounds the Central Impact Area (below). An additional 1,600 acres are off-limits due to ordnance hazard, but not officially designated Impact Area.
Central Impact Area	330	This areas is located within the Impact Area and was the primary target area for artillery, mortar, and other firing activities from the early 1900s to 1997.
KD Range	38.5	Existing inactive range where the MPMG Range is proposed comprised of 36.0 acres of Managed Grasslands (previous mitigation for rare species impacts from another project) and 2.5 acres of ROCA.
MPMG Range Footprint	199.0	MPMG Range including 800 meter and 1,500 meter lanes and the ROCA.
MPMG Range-Specific Firebreak Footprint	10.0	Firebreaks to be constructed associated with the MPMG Range; including new roads and expansion of existing roads.
Project Footprint	209.0	MPMG Range Footprint plus MPMG Range-Specific Firebreak Footprint
Range Operations Control Area (ROCA)	2.5	Contains the Range Control Tower, Ammunition Storage Building, Covered Bleachers, and other support features (included in MPMG Range Footprint).
MPMG Range Rare Species Take Footprint	206.5	Project Footprint minus the ROCA acreage • 36.0 acres (existing) Managed Grassland at KD Range • 170.5 acres of Pine Barrens to be cleared (includes firebreaks)
Acres of Trees to be Cleared	170.5	Includes pine barrens and firebreaks.

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1.0 Project Summary

1.1 Project Information

Project Name: Multi-Purpose Machine Gun Range

EOEEA File No. 5834

Project Location: Existing KD Range, Camp Edwards, Joint Base Cape Cod, Sandwich, Massachusetts

Project Proponent: Massachusetts Army National Guard

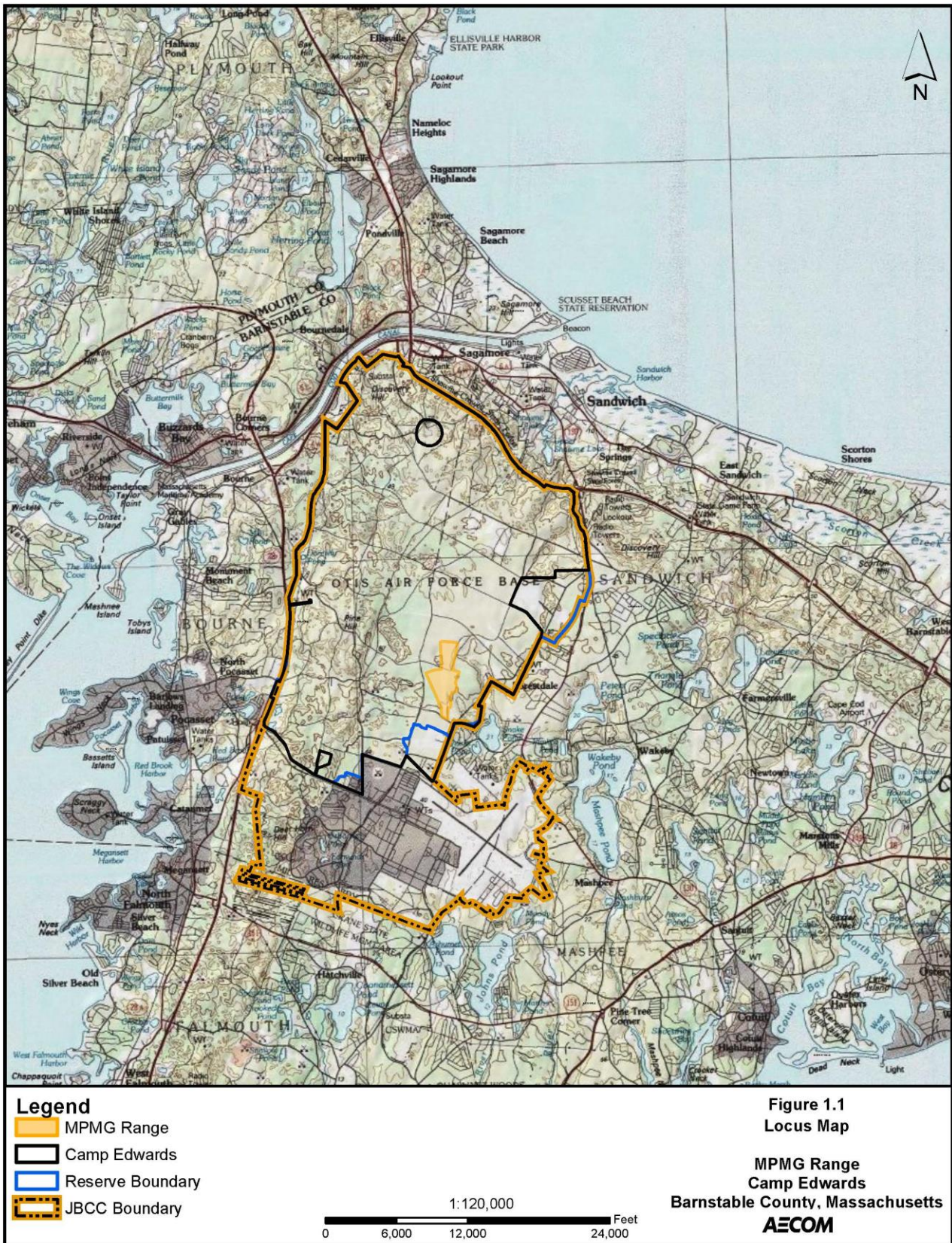
This document serves as the Notice of Project Change (NPC) under the Massachusetts Environmental Policy Act (MEPA) for the construction of a Multi-Purpose Machine Gun (MPMG) Range Project at Camp Edwards, Joint Base Cape Cod (JBCC), Sandwich, Massachusetts (see **Figure 1.1**) proposed by the Massachusetts Army National Guard (MAARNG). Certain projects and activities at Camp Edwards are subject to a Special Review Procedure (SRP) created and jointly executed by Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) and the MAARNG so that the process under MEPA could be used more efficiently for the long-term use of Camp Edwards.

The MAARNG is proposing to construct and operate a MPMG Range (the Project) to be constructed at the existing 600-yard Known Distance (KD) Range that was previously used for training activities. The proposed Project change consists of design plans for the MPMG Range. This NPC is being submitted to satisfy the requirements of MEPA review to document a material change to a project. The MAARNG asserts that the MPMG Range Project does not represent a significant change. Since greater than 50 acres will be altered for this Project, an Environmental Impact Report (EIR) will be required. We are requesting a Single EIR for this NPC. In addition, a Greenhouse Gas (GHG) Analysis has been completed and is included in this NPC.

Initial planning for improvements to the KD Range and the proposed MPMG Range can be traced back to the 1980s and the Project was included in the Massachusetts Military Reservation (MMR¹) Master Plan Final Report dated 8 September 1998 and has been included in subsequent MEPA filings; most recently in the Supplemental EIR for the SAR Improvement Plan (SAR-IP) in 2012. The MPMG Range has been consistently included in MEPA filings as Phase III of the SAR-IP.

Given the importance of the MPMG Range to the future operation and viability of the base, the MAARNG has taken its responsibilities under Massachusetts regulations extremely seriously. Therefore, the MAARNG has been working in close cooperation over the past two years with the Massachusetts Natural Heritage and Endangered Species Program (NHESP) to determine mitigation of rare species habitat impacts as a result of the MPMG Range Project. Camp Edwards is home the largest continuous pine barrens ecosystem outside of the New Jersey pine barrens and as such is home to numerous rare species and habitats.

¹ The MMR was renamed the JBCC in 2013.



In addition, MAARNG has been in communication with the Massachusetts Department of Environmental Protection (MassDEP), Environmental Management Commission (EMC), and U.S. Environmental Protection Agency (USEPA) relative to this Project.

The MAARNG has established a mutually respectful relationships with these agencies and the four towns in which Camp Edwards resides (Bourne, Falmouth, Mashpee, Sandwich). The MAARNG meets regularly with the EMC and its two supporting councils, the Science Advisory Council (SAC) and the Community Advisory Council (CAC) including pre-application meetings, development of presentations, public meeting facilitation, outreach, and informal and formal consultations. Documentation of agency coordination and meetings is detailed in **Section 1.3.7**.

1.2 Project Overview

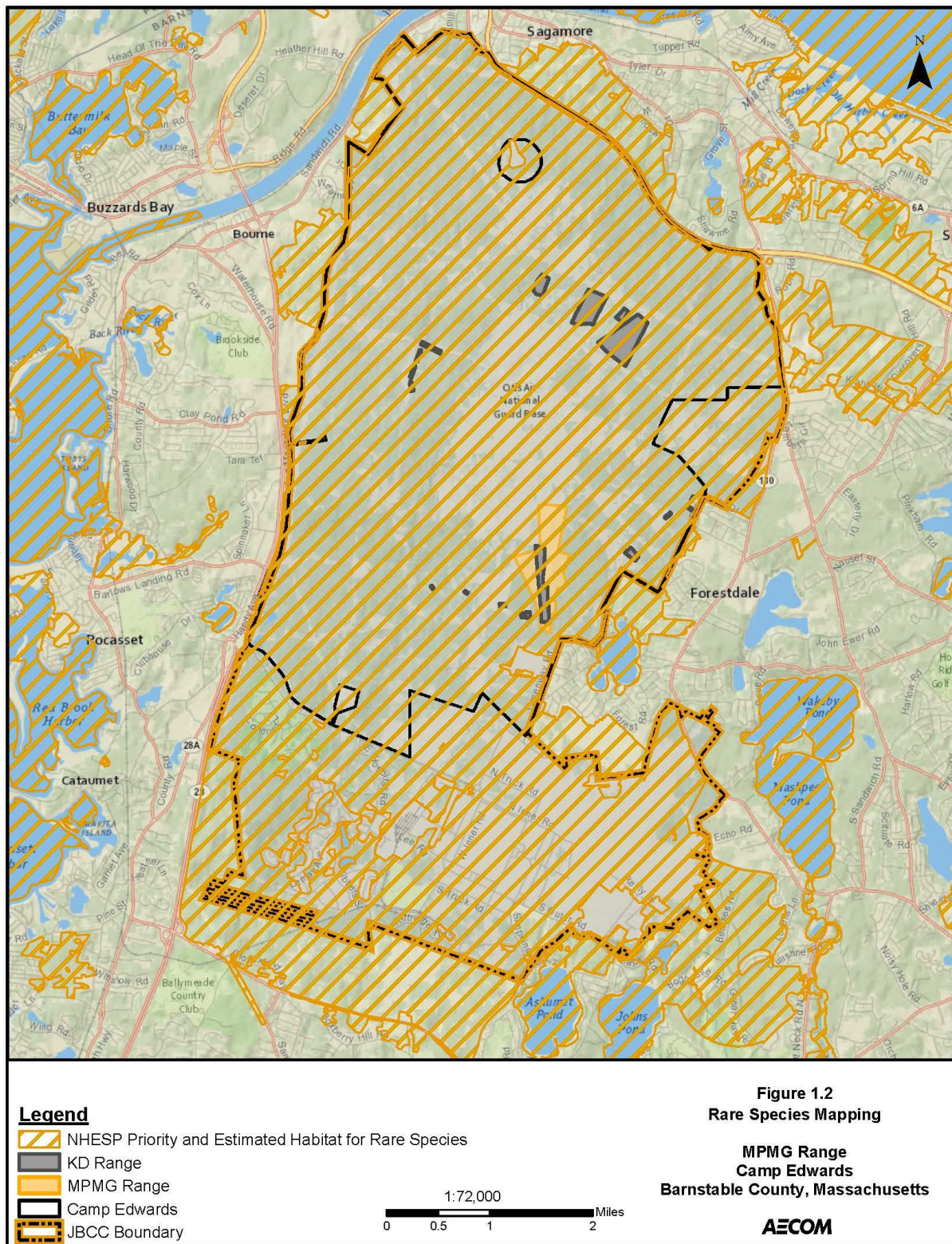
The MAARNG is proposing to construct and operate a MPMG Range (the Project) to be constructed at the existing 600-yard Known Distance (KD) Range that was previously used for training activities. The KD Range was used between 1966 until 1997 when live (lead) ammunition and training activities at Camp Edwards were suspended by USEPA due to potential groundwater contamination concerns. Since 2006, the MAARNG has been actively planning and redeveloping various ranges at Camp Edwards for live-fire training exercises through the Small Arms Range Improvement Plan (SAR-IP) which incorporates Best Management Practices (BMPs) into any range development for pollution prevention and environmental protection. The existing KD Range is not presently used for live-fire training but is used for other training operations such as unmanned aircraft systems (UAS).

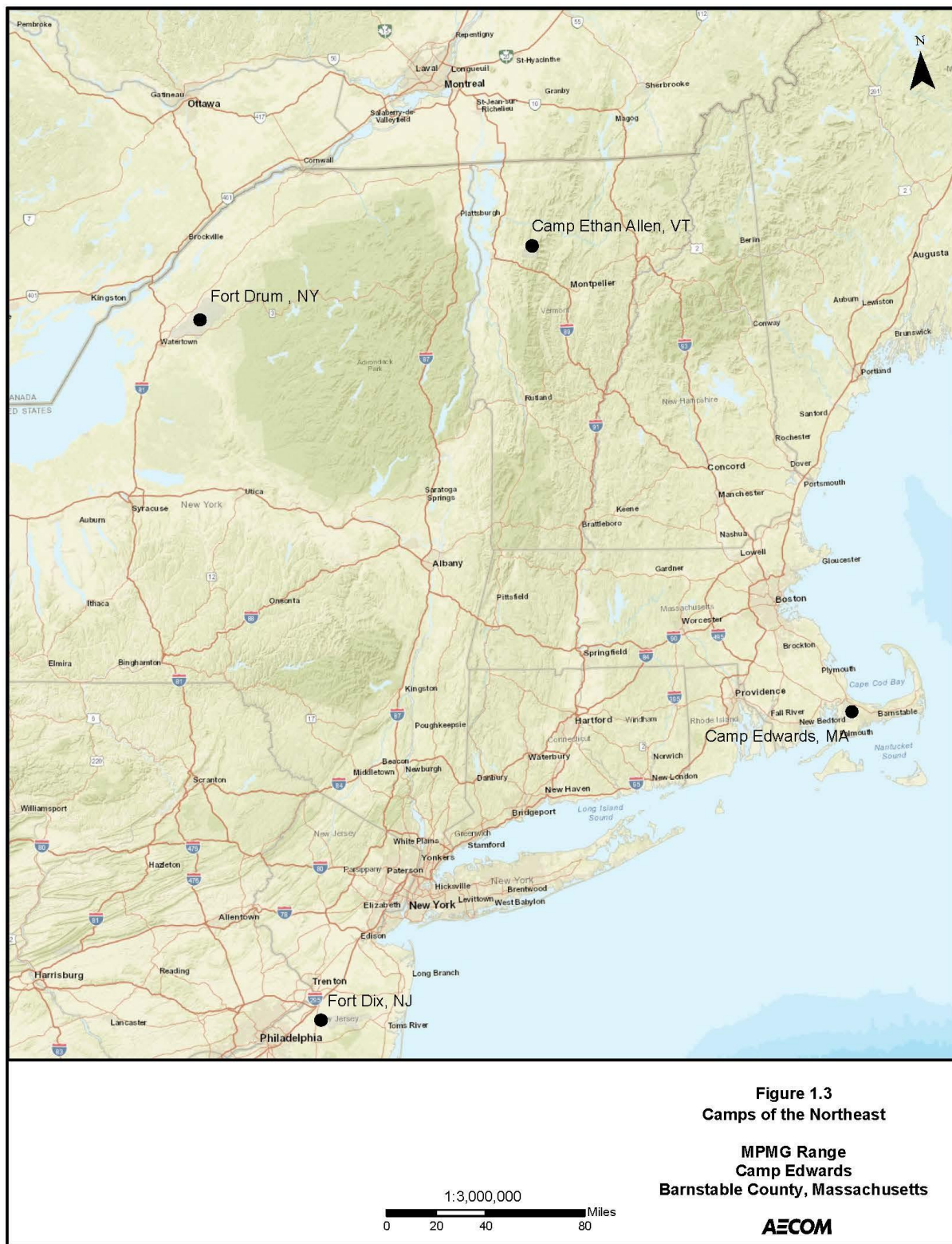
The entire Project Site is located in mapped Priority Habitat as shown on **Figure 1.2**. The MAARNG has been working in close cooperation over the past two years with NHESP to determine mitigation of rare species habitat impacts as a result of the MPMG Range Project. NHESP has determined that, as a result of the construction and operation of the MPMG Range, there will be a take of several State-listed lepidopterans (moths and butterfly) species identified on the Site, and that there could potentially be a take of Eastern Box Turtle (*Terrapene carolina*), Eastern Whip-poor-will (*Caprimulgus vociferus*), and sandplain grassland bird species.

1.3 Purpose and Need

The purpose of the Project is to provide the MAARNG with a mission required MPMG Range to allow the MAARNG to efficiently attain required training and weapons qualifications requirements within Massachusetts. The MPMG Range will provide Soldiers and units the necessary modernized training capabilities to be effective in contemporary and future operating environments. A priority for the MAARNG at Camp Edwards is the continued use and development of live-fire ranges to meet the requirement that all Soldiers qualify with their primary weapon systems annually.

The three closest MPMG ranges include Camp Ethan Allen in Jericho, Vermont located over 270 miles away, Fort Dix in Ocean County, New Jersey located over 300 miles away, and Fort Drum located in Jefferson County, New York located over 370 miles away (see **Figure 1.3**).





The Project is needed to address shortfalls, based on force structure, in required small arms training facilities and capabilities within Massachusetts for units to train in-State and to meet mission training objectives in accordance with Federal laws, regulations, policies, and training guidelines. The Project is needed to allow multiple units to attain required weapons qualification levels simultaneously and efficiently. The Project would ensure the MAARNG provides a complete, sustainable, and viable training facility for its Soldiers to attain and maintain a full readiness posture. Implementation of the Project would support higher quality, mission-essential training activities at Camp Edwards, while limiting the need for travel to out-of-state training sites that cause the loss of critical training time and resources.

Camp Edwards encompasses approximately 15,000 acres of the approximately 20,554-acre Joint Base Cape Cod (JBCC) (see **Figure 1.1**) formerly called the Massachusetts Military Reservation or MMR. Within the JBCC are five military commands including: the MAARNG at Camp Edwards; the Massachusetts Air National Guard (MA ANG) at Otis Air National Guard Base; the U.S. Air Force (USAF) at Cape Cod Air Force Station; and the U.S. Coast Guard (USCG) at Air Station Cape Cod. Although the JBCC is situated within four towns, Bourne, Sandwich, Falmouth, and Mashpee, Camp Edwards lies only within the boundaries of Bourne and Sandwich.

The land that currently comprises Camp Edwards is owned by the Commonwealth of Massachusetts and is in custody of Massachusetts Department of Fish and Game, Division of Fisheries and Wildlife, which has leased the property to the Department of the Army. In turn, the Army licensed the land to the MAARNG for training. The current lease held by the Army expires in the year 2051. The proposed MPMG Range will be constructed on State-owned land leased to the Federal government.

JBCC is divided into two major sections. The southern section is comprised of approximately 5,000 acres of Cantonment Area, which is the industrialized portion of the JBCC where administrative buildings, barracks, vehicle and equipment maintenance shops, housing, and runways are located. The northern training area encompasses approximately 14,410 acres and is a largely wooded area with rolling topography, trails, and paved roads and includes training areas and ranges where small arms firing and maneuver training occur. The Impact Area is a 2,200-acre area that has a formal off-limits designation due to unexploded ordnance (UXO) safety regulations. It includes the 330-acre Central Impact Area which was the primary target area for artillery, mortar, and other firing activities from the early 1900s to 1997. In the northern portion of the Camp Edwards Training Area, 13,352 acres has been identified as the Upper Cape Water Supply Reserve (the Reserve) created by Chapter 47, Acts of 2002. Chapter 47 also transferred the care, custody, and control of the Reserve from the Special Military Reservation Commission (SMRC) to the Division of Fisheries and Wildlife.

1.4 Statutory and Regulatory Standards and Requirements

This section describes the various State and Federal environmental requirements including Camp Edwards-specific requirements and a history of MEPA reviews and actions at Camp Edwards.

1.4.1 Massachusetts Environmental Policy Act

The Project exceeds the following MEPA thresholds:

- 301 CMR 11.03(1)(a)1. (Land) Direct alteration of 50 or more acres of land.
- 301 CMR 11.03(2)(b)2. (Rare Species) Greater than two acres of disturbance in designated priority habitat that results in a take of State-listed Endangered or Threatened species or Species of Special Concern.
- 301 CMR 11.01(2)(a)2. The MAARNG is an Agency of the Commonwealth. As such, MEPA jurisdiction is broad as the Project will be undertaken by an Agency of the Commonwealth in accordance with 301 CMR 11.01(2)(a)1. In addition, Camp Edwards is located on State-owned land leased to the Federal government and licensed back to the MAARNG.

One State permit is required for the Project: Conservation and Management Permit (CMP) from NHESP

1.4.1.1 MEPA Special Review Procedure

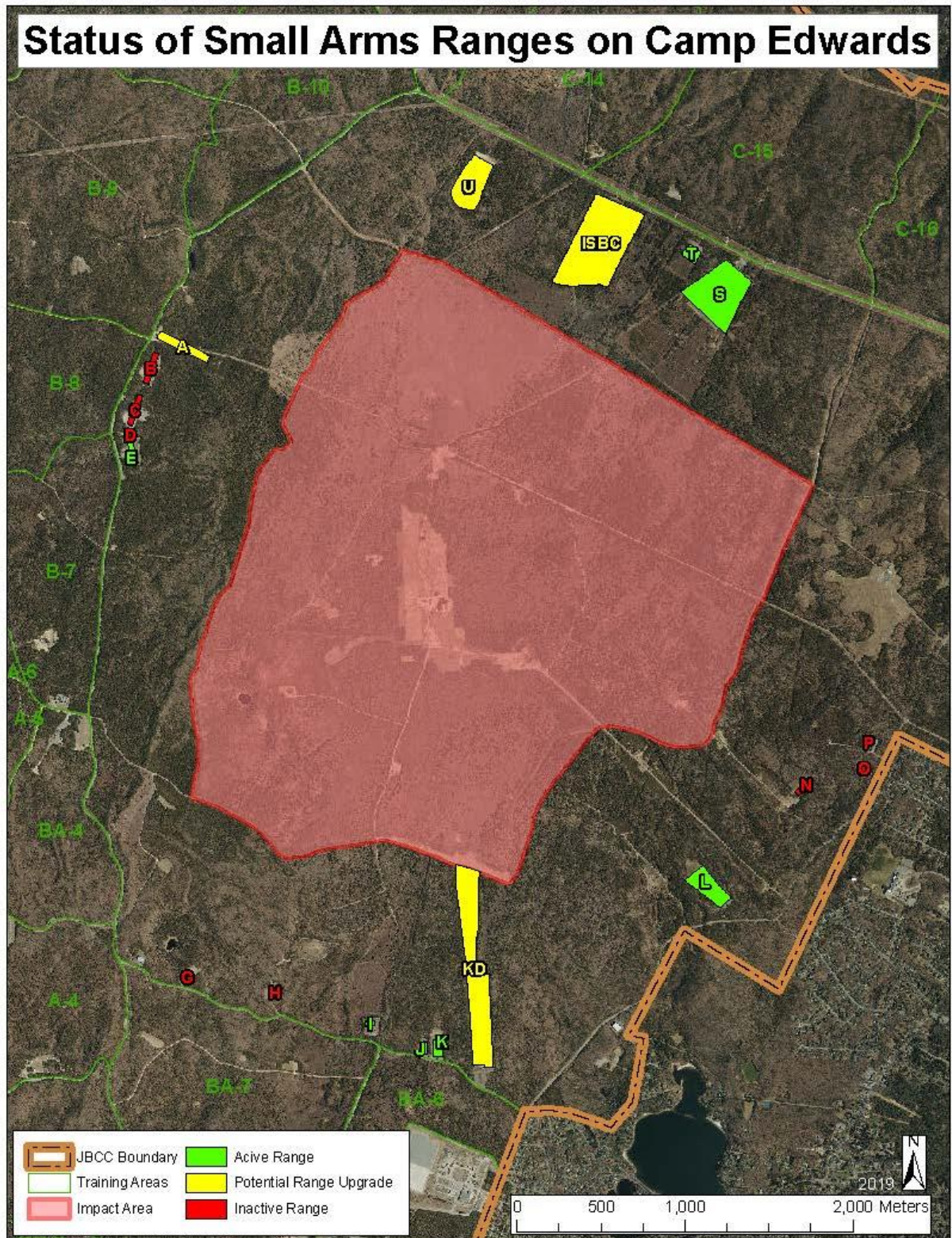
Certain project and activities at Camp Edwards are subject to a SRP created and jointly executed by EOEEA and MAARNG so that the process under MEPA could be used more efficiently for the long-term use of Camp Edwards. This NPC is being submitted in accordance with the requirements of the Certificate on the Final Area-Wide Environmental Impact Report (EIR) for the MMR Master Plan issued by MEPA on 16 July 2001 (see **Appendix A**).

As part of the MMR Master Plan, Camp Edwards was set aside for permanent protection of water supplies, wildlife habitat, and open space, while allowing compatible military training. The MMR Master Plan was submitted to MEPA as a NPC in 1997 and subsequently work at MMR was designated as a “major and complicated” project. The SRP was further detailed in the Certificate on the NPC and the Major and Complicated Procedure issued on 10 July 1997 (See **Appendix A**) and in other Certificates as noted below.

For MAARNG projects at Camp Edwards, the SRP includes “lowered thresholds” for MEPA reviews (in addition to the stand-alone MEPA thresholds at 301 CMR 11.03) including impervious areas (more than 0.5 acres), vegetative clearing (more than two acres), and any new building or structure (more than 500 s.f.) The Project, as proposed, does not exceed the lowered threshold for impervious area as approximately 0.9 acres of impervious areas presently exists at the KD Range and the proposed MPMG Range will have approximately 0.8 acres of impervious areas, a reduction of 0.1 acres. The Project, as proposed, does exceed the lowered threshold for vegetative clearing (approximately 170.5 acres of clearing is proposed), and new buildings and structures of more than 500 s.f. (six structures are proposed, five of which are greater than 500 s.f., totaling approximately 3,595 s.f. of new construction). In addition to the lowered thresholds, the SRP allows proposed actions to be reviewed using NPCs to be submitted under EOEEA #5834 and also provides expedited time frames.

1.4.1.2 MEPA Review History

Initial planning for improvements to the KD Range and the construction of the proposed MPMG Range can be traced back to the 1990s as it was included in the November 1996 Draft Environmental Impact Statement (EIS) and EIR for the MMR Facilities Upgrade. Master Planning submitted through MEPA extends as far back as 1986. The Project was included in the MMR Master Plan Final Report dated 8 September 1998 and has been mentioned in subsequent MEPA filings; most recently in the Supplemental EIR for the SAR-IP in 2012. See **Figure 1.4** for location of the small arms ranges at Camp Edwards.



Through the SRP, EOEAA required the creation of the Community Working Group (CWG) with members to include representatives from each town where JBCC resides (Falmouth, Mashpee, Sandwich, and Bourne), the Cape Cod Commission, various branches of the military stationed at the then MMR, and at-large members representing the Cape Cod public, who were tasked with developing a land use plan for the then MMR. After a lengthy, comprehensive, and open public process, in September 1998, the CWG issued and adopted its MMR Master Plan Final Report which divided the MMR into two primary land use zones: the Upper Cape Water Supply Reserve and the Cantonment Area. The Upper Cape Water Supply Reserve (or Reserve) composes the northern portion of the JBCC with a land area of 13,352 acres. The Cantonment Area composes the southern 5,000 acres of the JBCC.

The Final Area-Wide EIR for the MMR Master Plan Final Report proposed a set of Environmental Performance Standards (EPS) that included a prohibition on the use of lead-bullet ammunition at all Camp Edwards training areas. The Certificate on this Final EIR (issued on 16 July 2001) required MEPA review for future projects within the Camp Edwards Training Area that exceeded the stand-alone MEPA thresholds and the “lowered thresholds” specific for Camp Edwards for activities involving any new impervious area, vegetative clearing or other land alteration as detailed in the Informational Supplement to the Final EIR, submitted to MEPA on 15 August 2001. A copy of the 16 July 2001 MEPA Certificate (see **Attachment A**) outlines the SRP. The following is a description of the various NPCs submitted under this Certificate to date:

- On 15 February 2006, the MAARNG submitted a NPC to MEPA proposing upgrades at Bravo, Echo and Sierra Ranges (B, E, and S Ranges). On 24 March 2006, MEPA issued a Certificate indicating that the NPC would not require an EIR.
- On 15 September 2006, the MAARNG submitted a NPC to MEPA that described the SAR-IP designed to resume small arms weapons training at Camp Edwards using lead-bullet ammunition (which required the modification of one of the EPS), proposed bullet capture and containment systems, and proposed BMPs in a three-phased approach by range: I) Tango and Echo Ranges; II) SE/SW Range and A, J, and K Ranges; and III) KD Range and ISBC Range. On 9 November 2006, MEPA issued a Certificate allowing State permitting to proceed for the Tango and Echo Ranges and required the MAARNG prepare a Supplemental EIR to provide additional information on baseline conditions, pollution prevention plans, on-site remedial investigations of specific small arm ranges and an analysis of ammunition alternatives. The Supplemental EIR was filed on 15 August 2012 (as described below).
- On 9 July 2007, the MAARNG submitted a NPC to MEPA proposing a change of sequencing for range upgrades including upgrades to J and K Ranges under the SAP-IP. This work included installing bullet containment systems along with the resumption of firing lead-bullet ammunition. On 10 August 2007, MEPA issued a Certificate allowing State permitting to proceed for the J and K Range upgrades prior to the completion of the Supplemental EIR. The Supplemental EIR was filed on 15 August 2012 (as described below).
- On 23 December 2009, the MAARNG submitted a NPC to MEPA proposing a temporary installation of an eXportable Combat Training Capability (XCTC) System which consisted of installation of ten areas to simulate realistic conditions with 10,400 s.f. of structures. On 22 January 2010, MEPA issued a Certificate indicating that the NPC would not require the preparation of a Supplemental EIR.
- On 6 April 2011, the MAARNG submitted a NPC to MEPA proposing Solider Validation Lane

(SVL) training activities which included the placement of portable containers totaling 60,000 s.f. which would be modified to set up mock villages for realistic training. On 6 May 2011, MEPA issued a Certificate indicating that the NPC would not require preparation of a Supplemental EIR.

- On 15 August 2012, the MAARNG submitted the Supplemental EIR to MEPA that provided a detailed description of the MAARNG's proposed three-phase small arms range development program, and included a Pollution Prevention Plan (P2 Plan), range design plans, range rehabilitation/reuse plans, range management plans, and an overall environmental management strategy for the use of small arms ranges at Camp Edwards including the MPMG Range. The P2 Plan also included a selection of the most appropriate BMPs and an Operations, Maintenance and Monitoring (OMMP) Plan for individual small arms ranges for firing lead core ammunition. The Supplemental EIR provided the results of the MAARNG's lead fate and transport study, remedial investigations of SAR ranges, and an analysis of ammunition alternatives. On 29 September 2012, MEPA issued a Certificate which determined the Supplemental EIR to be adequate.
- On 15 January 2013, a NPC was filed by MAARNG for a change of site for the construction of a Unit Training Equipment Site (UTES) from the 3600 Area to the western portion of the BOMARC (Boeing and Michigan Aeronautical Research Center) site. On 22 February 2013, MEPA issued a Certificate indicating the NPC would not require the preparation of an EIR.

1.4.2 Massachusetts Endangered Species Act

State-listed rare species are protected under the Massachusetts Endangered Species Act (MESA) (MGL c. 131A) and implementing regulations (321 Code of Massachusetts Regulations [CMR] 10.00) which prevents a loss or take of State-listed rare species. The NHESP manages the State-listed species and implements the MESA regulations. As approximately 98% of Camp Edwards is located within mapped Priority Habitat (see **Figure 1.2**), all Projects need to be coordinated with the NHESP to ensure that there will be no take of any State-listed species. A CMP is being applied for pursuant to MESA and addresses mitigation for State-listed rare species as a result of possible impacts on pine barrens habitat and other future MAARNG projects. A copy of the Draft CMP Application is included as **Appendix B**.

The MAARNG is presently working with NHESP on developing a mitigation plan specifically for the MPMG Range Project through the pending submittal of the CMP Application. MAARNG has committed to a system of mitigation actions and strategies as outlined in **Section 6.7** which includes land preservation, management of rare species habitat, monitoring and research, and fire management. The mitigation strategies outlined in the CMP Application are not only for the MPMG Range but intended also as framework for mitigation to be used for other projects within Camp Edwards so as to manage the entirety of Camp Edwards for the net benefit of rare species.

1.4.3 Camp Edwards Regulations

As a result of the significance of Camp Edwards and the Reserve relative to groundwater protection, land area, rare species, military use, and soil and groundwater contamination, there are multi-layers of regulations specific to Camp Edwards. In addition to State regulations, projects and activities at Camp Edwards are subject to orders, acts, agreements, and Federal regulations including, but not limited to, the following described in greater detail in the sections below:

- Executive Orders (EO), Acts, Memorandums of Agreement (MOA)
- Camp Edwards Range Regulations and Standard Operating Procedures (SOPs)
- Oversight by EMC
- Camp Edwards Environmental Performance Standards (EPS)
- JBCC Groundwater Protection Policy
- National Environmental Policy Act (NEPA)
- Other Federal guidelines

1.4.3.1 Executive Orders, Acts, and Memorandums of Agreement

The following EO, Acts, and MOAs have been promulgated relative to the JBCC:

- EO 414 was approved by the Governor of Massachusetts in October 1999 which established the Upper Cape Water Supply Reserve within the northern 15,000 acres of the then MMR.
- Chapter 352 of the Acts of 2000 approved by the Commonwealth of Massachusetts created the Upper Cape Regional Water Supply Cooperative for the four towns to establish a supplementary supply of water from sources within the then MMR.
- Memorandum of Agreement (MOA) was signed on 4 October 2001 between the Commonwealth of Massachusetts and the U.S. Army and National Guard Bureau and established a long-term management structure for the northern 15,000 acres in order to ensure the “permanent protection of the drinking water supply and the wildlife habitat, and to ensure that military and other activities are compatible with protection of the drinking water supply and the wildlife habitat.” This MOA also established the EMC and is included in **Appendix A**.
- EO 433 was approved by the Governor of Massachusetts in 5 October 2001 and further established the EMC.
- Chapter 47 of the Acts of 2002 created the Upper Cape Water Supply Reserve area as a public conservation land dedicated to the natural resource purposes of water supply and wildlife habitat protection and the development and construction of public water supply systems, and the use and training of the military forces of the Commonwealth; provided that, such military use and training is compatible with the natural resource purposes of water supply and wildlife habitat protection. This Act formally approved the EPS provided in the 2001 Final Area-Wide EIR.

1.4.3.2 Camp Edwards Range Regulations and Standard Operating Procedures

Range regulations provide guidance for the MAARNG for combat readiness training and establish uniform policies and procedures for facilities and training areas including, but not limited to, the following:

- Range Regulation 350-1 (Training and Training Support)
- Range Regulation 385-1 (Range Safety)
- Camp Edwards Training Site 210-5 Range Control SOP (range operations and training activities)
- Camp Edwards Range Regulation 350-2 (Camp Edwards Operations and Training Requirements)

1.4.3.3 Environmental Management Commission

The EMC was created within the EOEEA by EO 443 and Chapter 47 of the Acts of 2002. The purpose of the EMC is to provide permanent protection of the drinking water supply and wildlife habitat of the Upper Cape Water Supply Reserve, created as public conservation land, by oversight, monitoring and evaluation

of all military and other activities on the Reserve. The Camp Edwards training ranges are co-located with and are within the Reserve.

The MAARNG has presented information regarding the proposed MPMG Range location and design to the EMC and its advisory councils, the Science Advisory Council (SAC) and the Community Advisory Council (CAC). The CAC assists the EMC by providing advice on issues related to the protection of the water supply and wildlife habitat on the reserve; and the SAC assists the EMC by providing scientific and technical advice relating to the protection of the drinking water supply and wildlife habitat on the Reserve. The EMC has participated in meetings with the MAARNG and MassWildlife to establish a mitigation bank for rare species and overall strategy to facilitate implementation of long-term planning efforts including modernization of the Camp Edwards range complex and infrastructure. EMC approval of the MPMG Range Project will be required.

The EMC consists of three members including the Commissioner of the Massachusetts Department of Fish and Game (DFG), the Commissioner of the Massachusetts Department of Conservation and Recreation (DCR); and the Commissioner of the MassDEP. The CAC and SAC hold public meetings and report to the EMC with their review of proposed projects.

The CAC assists the EMC on issues related to protection of the water supply and wildlife habitat in the Reserve. The 15-member CAC consists of one representative from each of the surrounding towns (Bourne, Falmouth, Mashpee, and Sandwich), one resident of base housing, two representatives from the military, one representative from the Cape Cod Commission, one representative from the Upper Cape Regional Water Supply Cooperative², one representative from the Wampanoag Tribe, and five other members appointed by the Governor. Meetings are held two times per year or as needed.

The SAC assists the EMC by providing scientific and technical assistance to the EMC as it relates to protection of natural resources of the Reserve. The SAC, appointed by the Governor, consists of scientists and engineers recognized for their expertise in the areas of public health, water protection, wildlife habitat management, and land use management. Meetings are held two to three times per year.

1.4.3.4 Camp Edwards Environmental Performance Standards

The EPS are standards for performance, that guide both military and civilian users (all users) in the protection of Camp Edwards' natural and cultural resources and the groundwater beneath the Reserve during compatible military training and civilian use activities, such as hunting. These standards apply to MAARNG properties at JBCC. The EPS were established in 2001 under EO 443 and Chapter 47, Acts of 2002. The 19 EPSs that, under the oversight of the EMC, regulate and guide training in the Reserve, include the following. Detailed analysis of the EPS relative to the Project is provided in **Section 7.3**.

1. Groundwater
2. Wetlands and Surface Water
3. Rare Species
4. Soil Conservation

² The Upper Cape Regional Drinking Water Supply Cooperative consists of three groundwater supply wells located in Sandwich on the Massachusetts Military Reservation. A Board of Managers representing four-member public water supply systems manages the Cooperative. <http://www.falmouthmass.us/DocumentCenter/View/1237/2015-Upper-Cape-Cooperative-Water-Supply-PDF?bidId>

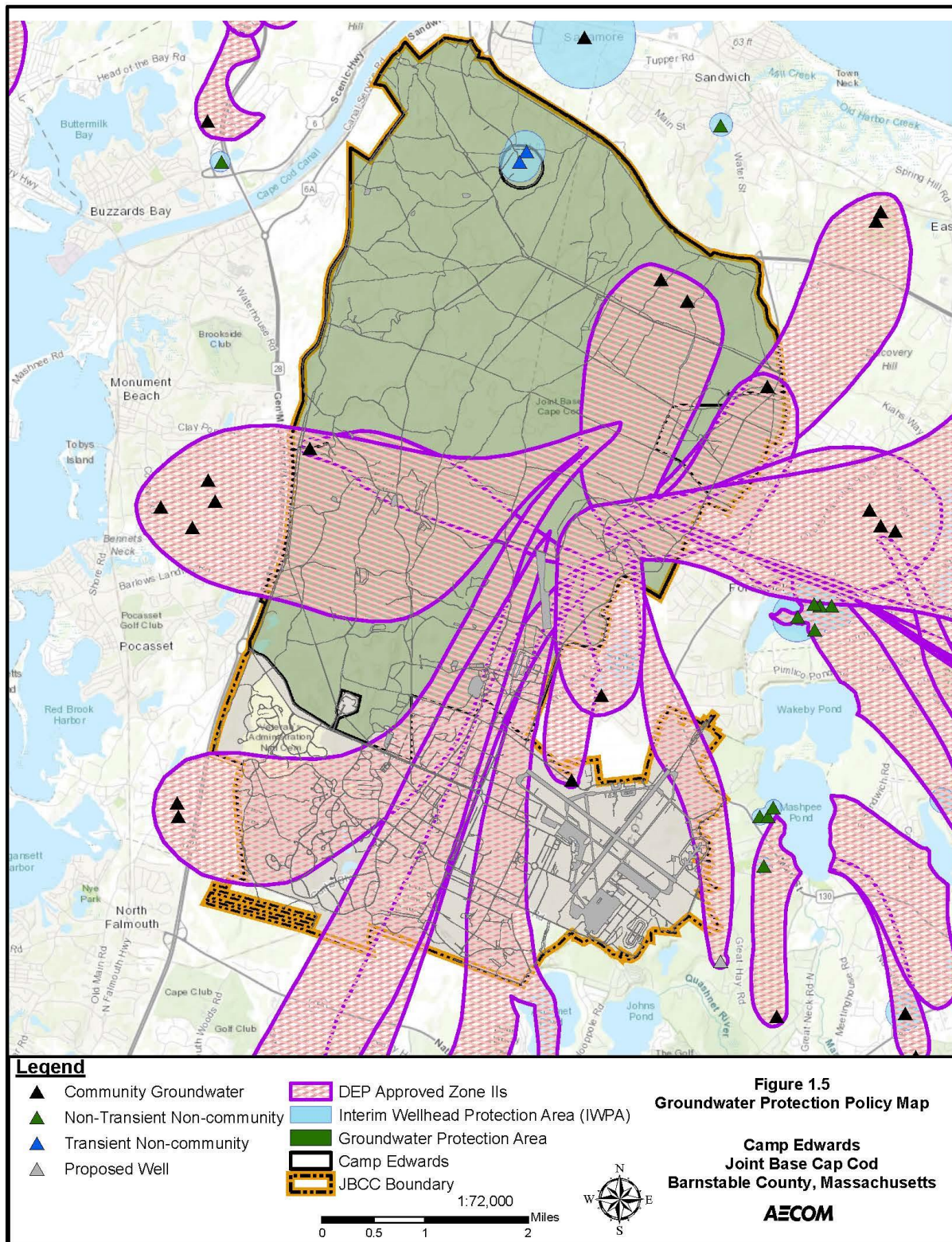
5. Vegetation Management
6. Habitat Management
7. Wildlife Management
8. Air Quality
9. Noise Management
10. Pest Management
11. Fire Management
12. Stormwater Management
13. Wastewater
14. Solid Waste
15. Oil and Hazardous Material
16. Hazardous Waste
17. Vehicle
18. General Use and Access
19. Range Performance Standards

1.4.3.5 JBCC Groundwater Protection Policy

The JBCC Groundwater Protection Policy was approved in January 2015 through a MOA between the MAARNG, MA ANG, USAF, and USCG to protect future and existing water supplies, control land use within Groundwater Protection Areas (i.e., Zone IIs and Interim Wellhead Protection Areas), to preserve the ecological integrity of water resources interconnected with groundwater beneath the JBCC, and to prevent temporary and permanent contamination of the subsurface environment. All users of the Camp Edwards Training Area must comply with the provisions of the Groundwater Protection Policy and any future amendments or revisions to the restrictions and requirements. These will apply to all uses and activities within the overlays relative to Wellhead Protection, Zone II's within the Cantonment Area, and the Camp Edwards Training Areas (see **Figure 1.5**).

1.4.4 National Environmental Policy Act

MAARNG has developed an Environmental Assessment (EA) prepared under the provisions of, and in accordance with the National Environmental Policy Act of 1969 (NEPA; 42 United States Code [USC] 4321 et seq.), the Council on Environmental Quality (CEQ) Regulations Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and 32 CFR 651 (Environmental Analysis of Army Actions, Final Rule, 29 March 2002). This EA will facilitate the decision-making process regarding the Project and its alternatives considered by the MAARNG through input from Federal agencies and the National Guard Bureau. This includes consultations with the U.S. Fish and Wildlife Service (USFWS) for Federally-listed species.



1.4.5 Sikes Act Improvement Act

The Sikes Act Improvement Act (SAIA) of 1997, 16 USC §670a *et seq.*, as amended, requires Federal military installations and State-owned National Guard facilities with adequate wildlife habitat to develop a long-range Integrated Natural Resource Management Plan (INRMP) and implement cooperative agreements with other agencies. The INRMP is the primary guidance document and tool for managing natural resources at Camp Edwards. This INRMP integrates all aspects of natural resources management with the rest of MAARNG's mission, and therefore becomes the primary tool for managing the ecosystems and habitats at Camp Edwards while ensuring the successful accomplishment of the military mission at the highest possible levels of efficiency. The INRMP is presently being updated.

1.4.6 Other Federal Guidelines

Project and activities at Camp Edwards are subject to Federal laws, regulations, executive orders, policies, and guidance including, but not limited to, the following:

Table 1-1: Federal Laws, Regulations, and Guidance

EO 12372 (Intergovernmental Review of Federal Programs) EO 13175 (Consultations and Coordination with Indian Tribal Governments) 10 USC 10501 16 USC 1452 32 CFR 190 – Appendix-Integrated Natural Resources Management 32 CFR 651 – Environmental Effects of Army Actions 40 CFR 1500.2a 40 CFR 1501 40 CFR 1502.14 42 USC 4331 (NEPA) AR 200-1 – Environmental Protection and Enhancement AR 210-9 – Use of Off-Road Vehicles on Army Lands AR 315-19 – The Army Sustainable Range Program AR 385-63 - Range Safety AR 405-80 – Granting Use of Real Estate AR 415-15 – Army Military Construction	AR 420-40 – Fire and Emergency Services AR 420-40 – Historic Preservation DA PAM 200-4 – Cultural Resources Management DA PAM 350-38 – Standards in Training Commission, STRAC DA PAM 385-63 – Range Safety DA PAM 415-12 – Army National Guard Facilities DoD 5105.77 DoDI 4710.02 – DoD Interactions with Federally Recognized Tribes DoDI 4715.03 – Environmental Conservation Program DoDI 6055.6 – DoD Fire and Emergency Service Program NGR 385-63 (Range Safety) NGR 5-3 – Management of Army National Guard Training Centers TC 25-1 (Training Land) TC 25-8 (Training Ranges) UFC 4-010-01 – DoD Minimum Antiterrorism Standards for Buildings
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The Project is regulated by other State and Federal agencies including the following: the EMC (see below), the MassDEP under the Massachusetts Contingency Plan (on call MCP), the US Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA), and by the NHESP under the Massachusetts Endangered Species Act (MESA). The MAARNG will coordinate with the Impact Area Groundwater Study Program (IAGWSP) to ensure the proposed MPMG Range construction and activities do not interfere with ongoing site investigations, restorations, and monitoring activities. The IAGWSP began in 1997 following an Administrative Order from the USEPA to cleanup groundwater contamination at Camp Edwards including the removal of potential contamination sources and UXO.

1.4.7 Agency Coordination

The following is a tabulation of the agency coordination that has occurred within the past few years regarding the MPMG Range. This is not an exhaustive list and there are likely additional meetings and correspondence not captured here. This list highlights show the extensive efforts and thorough pre-planning the MAARNG has had with local, State, and Federal agencies and with community groups. This pre-planning has been in addition to the long-term planning that has occurred for the MPMG Range dating back to the 1980s within the MEPA process. Communication and coordination between MAARNG and these State agencies continues regarding the MPMG Range Project. The MAARNG has established mutually respectful relationships with these agencies and the four towns in which Camp Edwards resides (Bourne, Falmouth, Mashpee, Sandwich). The MAARNG meets regularly with the EMC, the SAC and the CAC including pre-application meetings, development of presentations, public meeting facilitation, outreach, and informal and formal consultations as described below. This list provides a summary of the type of reporting, discussions, or actions that involved the MPMG Range. MEPA documents involving the MPMG Range are listed in **Section 1.4.1**.

Annual State of the Reservation Reports

In accordance with the provisions of the final MEPA certificate issued on 16 July 2001, the Camp Edwards Environmental & Readiness Center (E&RC) publishes an Annual State of the Reservation Report for each training year. As required by Chapter 47, Acts of 2002, copies of the report have been provided to the EMC, SAC, and CAC. Copies are made available at the town libraries in Bourne, Sandwich, Mashpee, and Falmouth. A notice of availability is published in the Environmental Monitor annually.

Community Advisory Council (CAC)

The 15-member CAC consists of one representative from each of the surrounding towns (Bourne, Falmouth, Mashpee, and Sandwich), one resident of base housing, two representatives from the military, one representative from the Cape Cod Commission, one representative from the Upper Cape Regional Water Supply Cooperative, one representative from the Wampanoag Tribe, and five other members appointed by the Governor.

- Minutes of Meeting 2 May 2018
- Minutes of Meeting 4 October 2018

Science Advisory Council (SAC)

The SAC assists the EMC by providing scientific and technical assistance to the EMC as it relates to protection of natural resources of the Reserve. The SAC, appointed by the Governor, consists of scientists and engineers recognized for their expertise in the areas of public health, water protection, wildlife habitat management, and land use management.

- Minutes of Meeting 2012 September
- Minutes of Meeting 18 May 2017
- Minutes of Meeting 10 May 2018
- Minutes of Meeting 20 September 2018

Environmental Management Commission (EMC)

The EMC was created within the EOEEA by EO 443 and Chapter 47 of the Acts of 2002. The purpose of the EMC is to provide permanent protection of the drinking water supply and wildlife habitat of the Upper Cape Water Supply Reserve, created as public conservation land, by oversight, monitoring and evaluation of all military and other activities on the Reserve. EMC has reviewed the MPMG Range plans at the 20%, 30%, and 65% design stages.

- Minutes of Meeting 8 June 2016
- Minutes of Meeting 25 October 2018
- Minutes of Meeting 23 May 2019

NHESP

The NHESP implements MESA and has been working closely with the MAARNG to develop a comprehensive rare species mitigation plan for the MPMG Range for the net benefit of the species at Camp Edwards.

- Conference Call 26 February 2019
- Updated Species List 16 August 2019
- Conference Call 17 December 2019
- Upcoming Meeting 5 February 2020

Massachusetts Historical Commission (MHC)

A Project Notification Form (PNF) was submitted to MHC for comment on 23 October 2019. No comments were received and a Memorandum For Record (MFR) is included in **Appendix E** documenting this correspondence.

State Agency Site Visit

Recently, on 8 August 2019, the MAARNG hosted a site visit for State agencies to view the proposed MPMG Range site and rare species mitigation areas within Camp Edwards. In attendance were representatives from the EMC, MEPA, and NHESP.

- MEPA, EMC, NHESP 8 August 2019

Neighborhood Mailings

Camp Edwards conducted a test fire at KD Range in August 2015, to simulate noise from the proposed MPMG range in the Southern Location Alternative. A mailing was sent to neighbors identifying the time and date that the noise test was to take place and requested comments regarding the test any noises heard.

- Noise Test mailing to 700 neighbors (14 responses) 2015

Interagency and Intergovernmental Coordination for Environmental Planning (IICEP)

IICEP is required as part of the Federal NEPA process in order to request information from local, State, and Federal Agencies, and other interested parties for input in the preparation of the EA. Letters were sent on 7 August 2019 to the following agencies. Only three comment letters were received from the EMC, USEPA, and the MassDCR. The comment letters received were used to assist in the preparation of this NPC. Comment letters are provided in **Appendix E**. Response to the comment letters is provided in **Section 8.0**.

- Cape Cod Commission
- Cape Cod Conservation District
- EMC
- EOEEA
- MassDCR
- MassDEP
- MHC
- NHESP
- Town of Bourne
- Town of Falmouth
- Town of Mashpee
- Town of Sandwich
- University of Massachusetts Amherst
- U.S. Army Corps of Engineers
- U.S. Department of Agriculture
- USEPA
- USFWS

Native American Consultation (NAC)

A separate but similar process to the IICEP occurred under the Native American Consultation (NAC). Letters were sent on 7 August 2019. No comment letters have been received.

- Mashpee Wampanoag Tribe
- Wampanoag Tribe of Gay Head (Aquinnah)
- Stockbridge-Munsee Community, Band of Mohican Indians of Wisconsin

Special Military Reservation Commission (SMRC)

The MMR (now JBCC) was established by the Massachusetts legislature in Chapter 196 of the Acts of 1935, which created the Special Military Reservation Commission and authorized it to acquire certain lands in the towns of Sandwich, Bourne, Falmouth and Mashpee for military purposes.

- Meeting 10 April 2019
 - The SMRC voted on this date to transfer SMRC Tracts 1-4 (128 acres) to the Massachusetts Department of Fish and Wildlife. The transfer of these parcels along with the previously transferred Parcel 5 (135 acres) is an integral part of the mitigation strategy for the MPMG.

Impact Area Groundwater Study Program (IAGWSP)

The MAARNG is coordinating with the IAGWSP regarding any UXO removal and to ensure the proposed MPMG Range construction and activities do not interfere with ongoing site investigations, restorations, and monitoring activities.

1.5 Summary of Alternatives Analysis

The MAARNG developed and applied 13 criteria to screen and evaluate possible alternatives for the Project as described in **Section 3.0**. The selection criteria were applied to available alternatives to determine which alternative(s) would fulfill the purpose and need for action including the No Action Alternative to assess any environmental consequences that may occur if the Project is not implemented. The alternatives analysis provides a description of the following alternatives

- Preferred Alternative (Project)
- Reduced-Scale Alternative
- Full Build Alternative
- No Action Alternative

The Preferred Alternative will be constructed in two phases. Phase 1 will be the Reduced-Scale Alternative, that is, eight lanes constructed at 800 meters in length. Phase 2 will add the extension of two lanes to a length of 1,500 meters to accommodate 0.50 caliber training. The acreages and estimated rare species impacts are provided below by phase. The Project is being phased to correspond with the MILCON (Military Construction) funding.

Table 1-2: MPMG Range Phased Construction

Phase	Alternative	800 Meter Lanes	1,500 Meter Lanes	Total Acreage *	Rare Species Impacts
Phase 1	Reduced-Scale Alternative	8	0	133.0	94.5
Phase 2	Construction of 1,500 Meter Lanes	0	2	76.0	76.0
TOTAL	Preferred Alternative (Project)	8	2	209.0	170.5

* With approximately 5.0 acres of firebreaks included in each phase

1.6 Summary of Mitigation Measures

Mitigation measures proposed for the MPMG Range construction and operation fall into the following categories as described in **Section 6.0**. The following bullets refer to those environmental resources where mitigation is proposed.

- Greenhouse Gas
- Noise
- Biological Resources
- Endangered, Threatened, and Rare Species

- Oil and Hazardous Materials
- Construction Phasing
- Best Management Practices

The mitigation proposed for the rare species is identified below and is presently being discussed with NHESP. These measures will also provide mitigation for other impacts areas including GHG emissions.

- Approximately 133 acres within the 15,000-acres Camp Edwards will be preserved in perpetuity as open space through the transfer of land to MassWildlife. The land is identified as the 133-acre Tract 5 located within the towns of Falmouth, Bourne, and Sandwich along the JBCC and abuts the Crane Wildlife Management Area.
- Approximately 177 acres of land has been identified by MAARNG to set aside for land preservation with management of vegetation for rare species. This land is identified as a Forest Canopy Reserve Area.
- Approximately 36 acres of has been identified for grassland management for rare species. This land is identified as a Grassland Mitigation Focal Area.
- The proponent will monitor the MPMG Range construction area prior to, and during construction, to remove Eastern Box Turtles from the construction areas.
- MAARNG will provide construction staff with information and materials about the likely presence of State-listed species and appropriate responses to any sightings
- MAARNG will implement a Turtle Protection Plan during the construction phase of the project Eastern Box Turtles.
- MAARNG will restore grassland habitat in an acreage to be determined in the CMP in order to optimize conditions for grassland species.
- MAARNG will monitor Eastern Box Turtles and other species to be determined for a period to be determined after the construction of the project to assess the effectiveness of mitigation measures.
- MAARNG will implement a long term monitoring and management plan to maintain habitat quality within the pine barrens.
- The schedule for implementing mitigation efforts began in 2019 and will continue through to 2025 and beyond.
- The cost of the mitigation is more fully detailed in the draft CMP Application. Financial resources are budgeted for the proposed actions through Federal (Army, National Guard Bureau) funding.
- Mitigation funding for range MILCON projects is through the environmental budget of Army National Guard (ARNG) while facilities projects are through a combination of environmental (e.g., staff) and installation funding. Environmental funding is entered through the Status Tool for Environmental Programs (STEP) and is maintained with a seven-year budget.
- The MAARNG will be funding the various habitat management actions proposed as described in the plan.
- Monitoring and research funding is also detailed more fully in the CMP Application which identifies actions and associated costs through to 2025.

2.0 Project Description

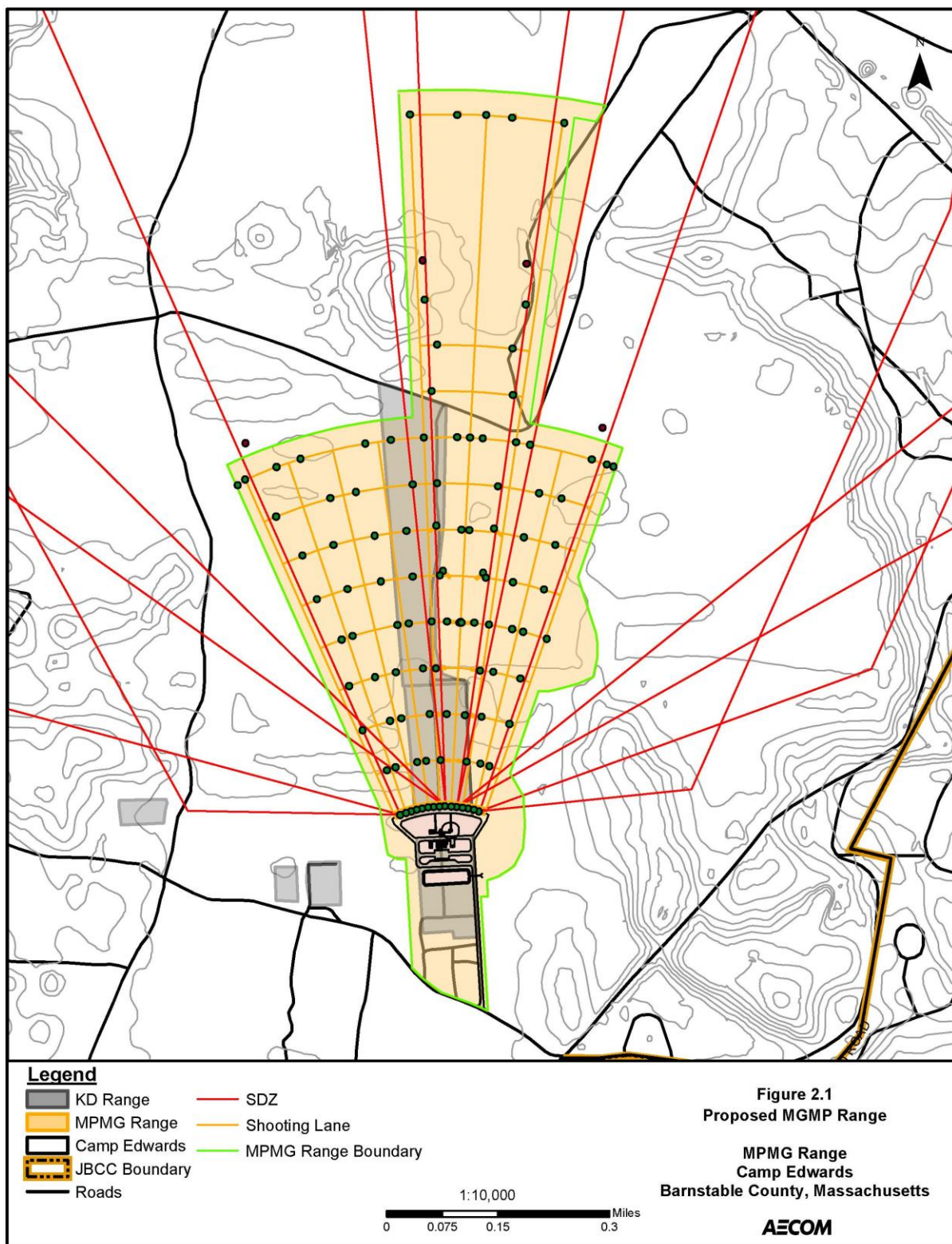
The Project involves the construction of an eight lane MPMG Range with six lanes 800 meters long with a width of 25 meters at the firing line and a width of 100 meters at a distance of 800 meters. The two middle lanes (Lanes 5 and 6) will extend an additional 700 meters to a distance of 1,500 meters long to accommodate .50 caliber rifles. The proposed MPMG Range is depicted on **Figure 2-1**. The footprint of the Project is 199.0 acres which includes improving the existing 600-yard KD Range comprised of approximately 38.5 acres (36.0 acres managed grasslands, 2.5 acres existing range control area) and approximately 170.5 acres of vegetation clearing for range construction and firebreaks. The range consists of four primary components: (1) the physical range footprint, consisting of the firing positions, targetry (see **Section 2.1**), (2) Range Operations Control Area (ROCA) support structures (i.e., as specified in TC 25-8); which includes a Range Control Tower, Ammunition Storage Building, Covered Bleachers, and other support features (see **Section 2.2**), (3) the Surface Danger Zones (SDZs) (see **Section 2.3**), and (4) firebreaks (see **Section 2.4**).

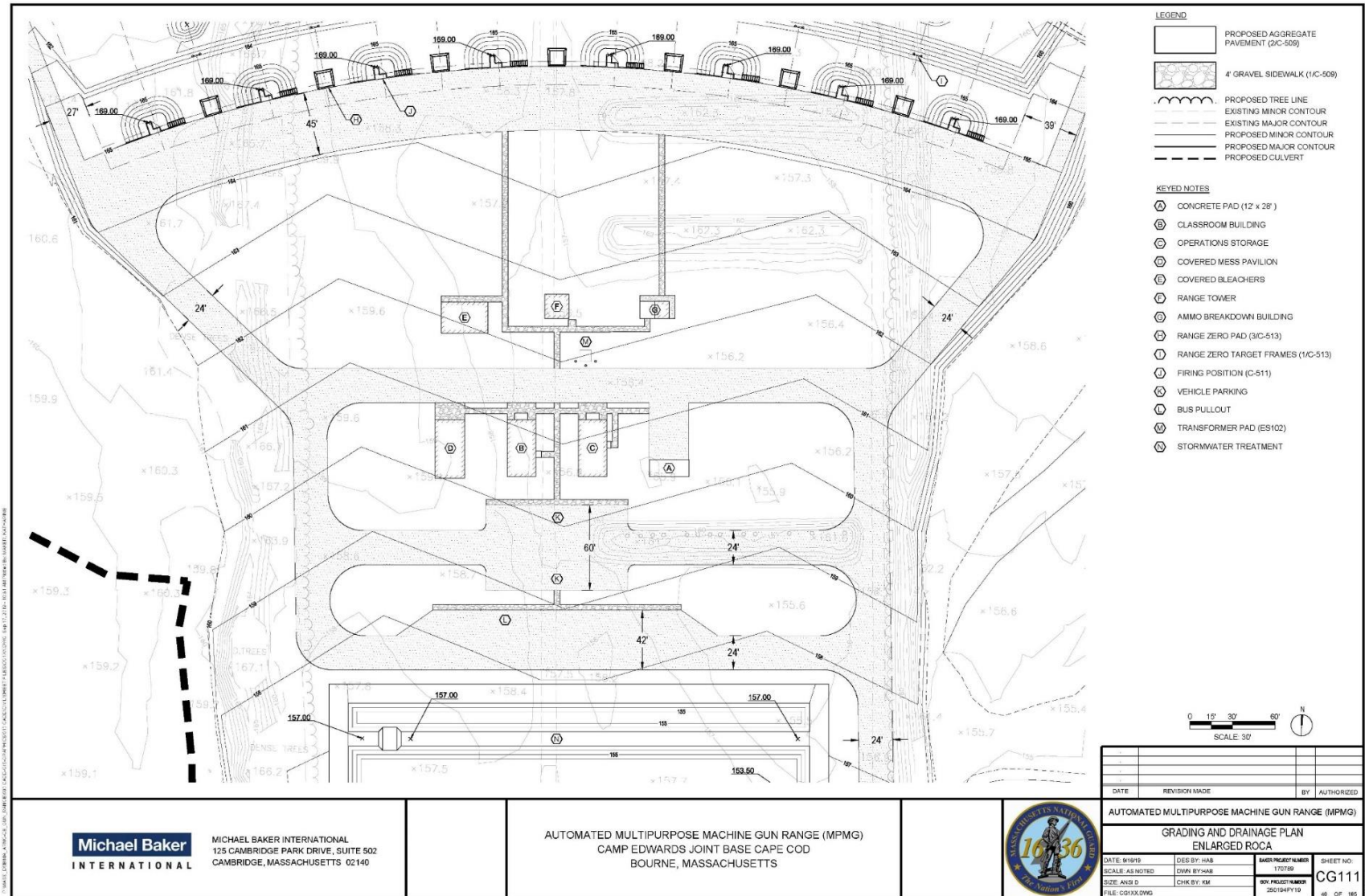
Implementation of the Project would allow the MAARNG to fulfill their mission by meeting their weapons qualifications standards and training requirements using in-State facilities, and to maintain their readiness posture. Specifically, it would train and test Soldiers on the skills necessary to zero, detect, identify, engage, and defeat targets. Range Area

The firing line of the proposed Project has been designed approximately 100 meters north of the existing firing line. Stationary Infantry Targets (SITs) would be emplaced at approximately 100-meter intervals from the firing position at 100, 200, and 300 meters from the firing line. Moving Infantry Targets (MITs) would be emplaced in the center lanes between 100 and 600 meters. Widened Stationary Infantry Targets (WSITs) and Double Target Arms (DTAs) would be emplaced at between 400 and 800 meters. Individual Movement Techniques (IMTs) would be emplaced between 800 and 900 meters. Stationary Armor Targets (SATs) would be emplaced between 1,000 and 1,500 meters from the firing line within the two extended lanes. This range configuration is shown on **Figure 2.1**. Design plans are provided in **Appendix C**.

2.1 Range Operations and Control Areas

The ROCA is the center for overall control and operation of the range, training exercises, administrative services, and support facilities. The ROCA includes the area for target control, range safety, and training evaluation, generally the Range Control Tower. There is an area for range maintenance, centered at the Operations and Storage Facility. There is an area for pre- and post-training instruction, centered at the Classroom or After-Action Review (AAR) and the Bleacher Enclosure. Ranges also have areas for non-training support including the Covered Mess Shelter. ROCA facilities that directly support the live-fire function of the range include the Ammunition Breakdown Building, the unit staging area, and the vehicle instrumentation doc. The ROCA at the proposed MPMG Range will be comprised of the following primary facilities and associated square footages (s.f.), as shown on **Figure 2.2**:





- Range Control Tower (657 s.f.)
- Range Operations and Storage Facility (800 s.f.)
- Ammunition Breakdown Building (185 s.f.)
- Bleacher Enclosure (726 s.f.)
- Range Classroom Building (800 s.f.)
- Covered Mess Shelter (800 s.f.)

In addition to the main design features as described above, these additional features and components would be constructed:

- Antiterrorism and force protection (AT/FP) measures in accordance with the Department of Defense (DoD) minimum.
- Range signage will be provided.
- Fire detection and alarm systems would be provided in all buildings.

2.1.1 Utilities

Electricity is supplied to Camp Edwards by Eversource. In order to accommodate the MPMG Range, an aboveground power line (5 kV or 15 kV) with electrical and communication feeds will be connected from the closest power source which is located at the H Range located on the Forestdale-Pocasset Road and run east approximately half-mile to the MPMG Range. Tree clearing is not anticipated as the line would keep to the existing roadways when possible.

The MPMG Range would require utility extensions for electricity and data out to all of the targets from the ROCA throughout. Data service would also be provided at every automated range. Phone service would also be provided. Buried electrical wire would be placed in conduit running the entire length of the range. The use of an above ground liquid propane gas is proposed for heating ROCA structures.

Portable toilet facilities will be provided as latrines are not allowed in accordance with EPS Standards 1.2. Wastewater and sewage from MAARNG training activities at Camp Edwards is pumped from portable toilet facilities and hauled off-base for disposal at licensed disposal facilities.

2.1.2 Storm Drainage Site Improvements

Stormwater (water from precipitation events) is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade surface waters. Proper stormwater flow management, which can be intensified by high proportions of impervious surfaces associated with buildings, roads, and parking lots, is important to the management of surface water quality and natural flow characteristics. Stormwater management systems are typically designed to contain runoff on-site during construction, and to maintain predevelopment stormwater flow characteristics following development through either the application of infiltration or retention practices. These roads would be designed to meet site-specific engineering requirements as part of the formal range design process. The Proposed Project will reduce impervious surface from 0.9 acres to 0.8 acres. Stormwater management would be provided for runoff from the impervious surfaces. Stormwater is presently not managed at the KD Range due to the flat topography and sandy soils. The proposed MPMG Range will have an onsite stormwater management area to the south of the ROCA as shown in **Figure 2.2** and on the plans provided

in **Appendix C**. Although there are no wetlands or surface water resources within or near to the Project footprint, all stormwater measures will be designed to meet Massachusetts Stormwater Standards.

2.1.3 Lighting

Temporary and permanent lighting proposed for the Project would be designed and installed so as not to interfere with State-listed species, specifically moths. This range would be available for limited night fire operations in accordance with existing Camp Edwards Range Regulations. Lighting would be designed to minimize the potential for lighting adjacent off-range areas and contained within the confines of the MPMG Range by directing light onto the range and minimize uplighting. Sodium lights or lights within the yellow/red range (3000 Kelvin) are proposed as moths are more attracted to lights in the blue range (i.e., mercury vapor lights) which will be avoided. Additional light impact reduction will be based on behavior controls in range use SOPs (e.g., lights off when range not in use). Control of the flood lighting would be via manual switching which is typically located at the control building and would not be used during live-fire exercises. Flood lighting would be used for pre- and post- live firing operations to assist with set up and breakdown activities. In addition to the flood lighting, the site will also require red night lighting that is used to provide low level lighting for night live-fire exercises when the Soldiers are using night vision equipment.

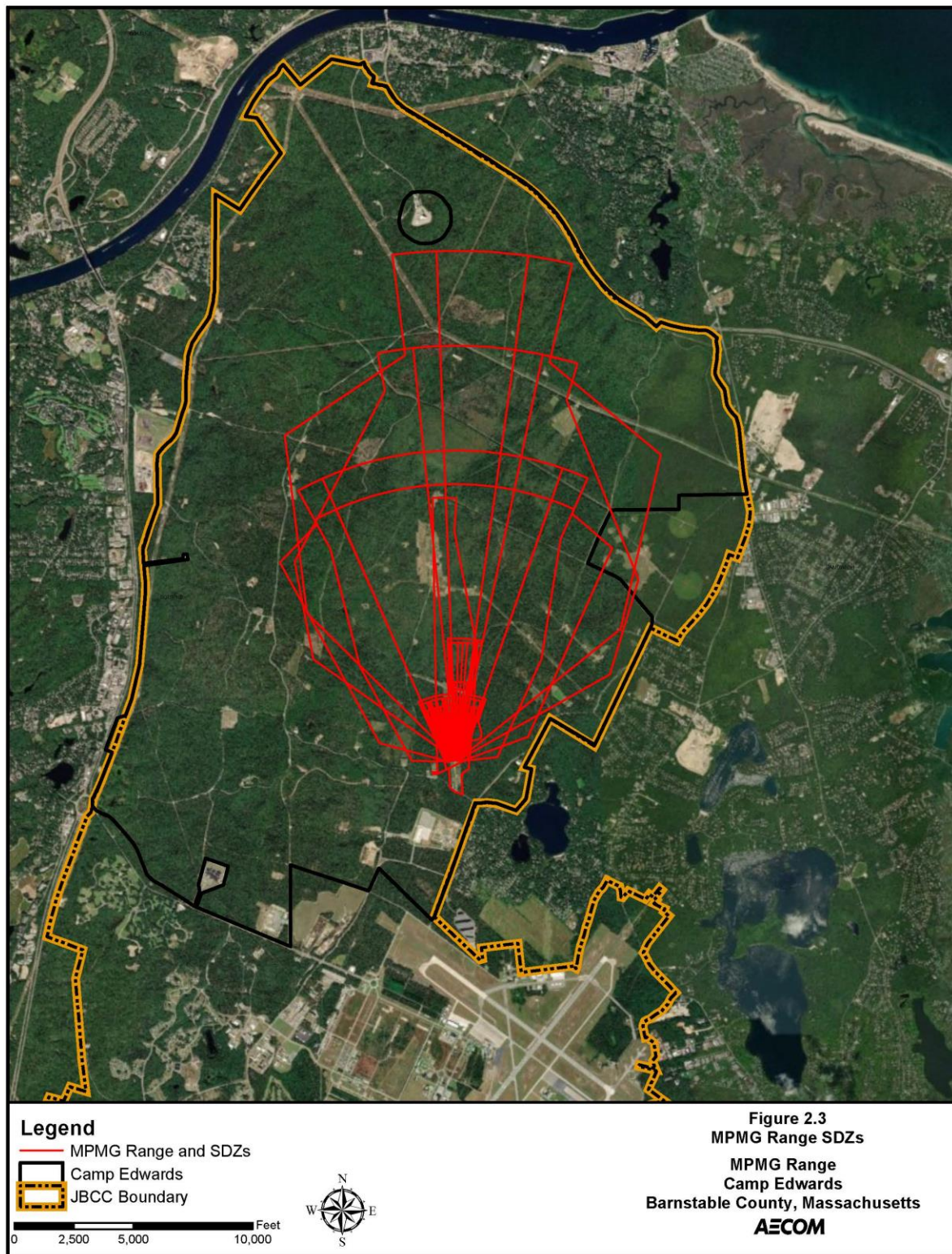
2.1.4 Access and Maintenance Roads

Access to the existing KD Range is provided through the existing paved Pocasset-Forestdale Road. The existing KD Range has paved parking, and dirt access and maintenance roads. The Project within the ROCA will result in reconfigured access and parking areas to be surfaced with aggregate pavement. Sidewalks would be constructed of gravel and would connect the Covered Bleachers, Range Tower, and Ammunition Breakdown Building. Within the Range, compacted gravel access roads will be constructed every 100 meters and along the eastern and western exteriors of the limit of construction as shown on **Figure 2.1** to access target emplacements and for installation and maintenance operations. Firebreaks are described in **Section 2.4**.

2.2 Surface Danger Zones

A SDZ is a mathematically-predicted area that a projectile will impact upon return to earth, either by direct fire or ricochet. The SDZ is the area extending from a firing point to a distance downrange based on the projectiles fired and weapon system used. The SDZ has specific dimensions for the expected caliber or the weapon being fired, so that all projectile fragments are contained in this area. The SDZ for a range must be contained within the controlled boundaries of a training site for the range to be considered buildable and usable without a special waiver from regulations. The MAARNG proposes to configure ranges to allow common SDZs as much as possible without causing training conflicts (i.e., to allow all proposed ranges to be used simultaneously, to the maximum extent possible).

The SDZs would collectively require 5,197 acres for the MPMG Range. SDZs are defined by the DA PAM 385-63 (Range Safety), as “that portion of the earth and the air above in which personnel and/or equipment may be endangered by ground weapon firing or demolition activities.” The existing KD Range is not presently used for live-fire training but is used for other training operations like UAS. The proposed MPMG Range SDZs for the Project are illustrated in **Figure 2-1** and **Figure 2-3**. No land alterations or disturbance is proposed within the range SDZs other than firebreak construction and maintenance.



2.3 Firebreaks

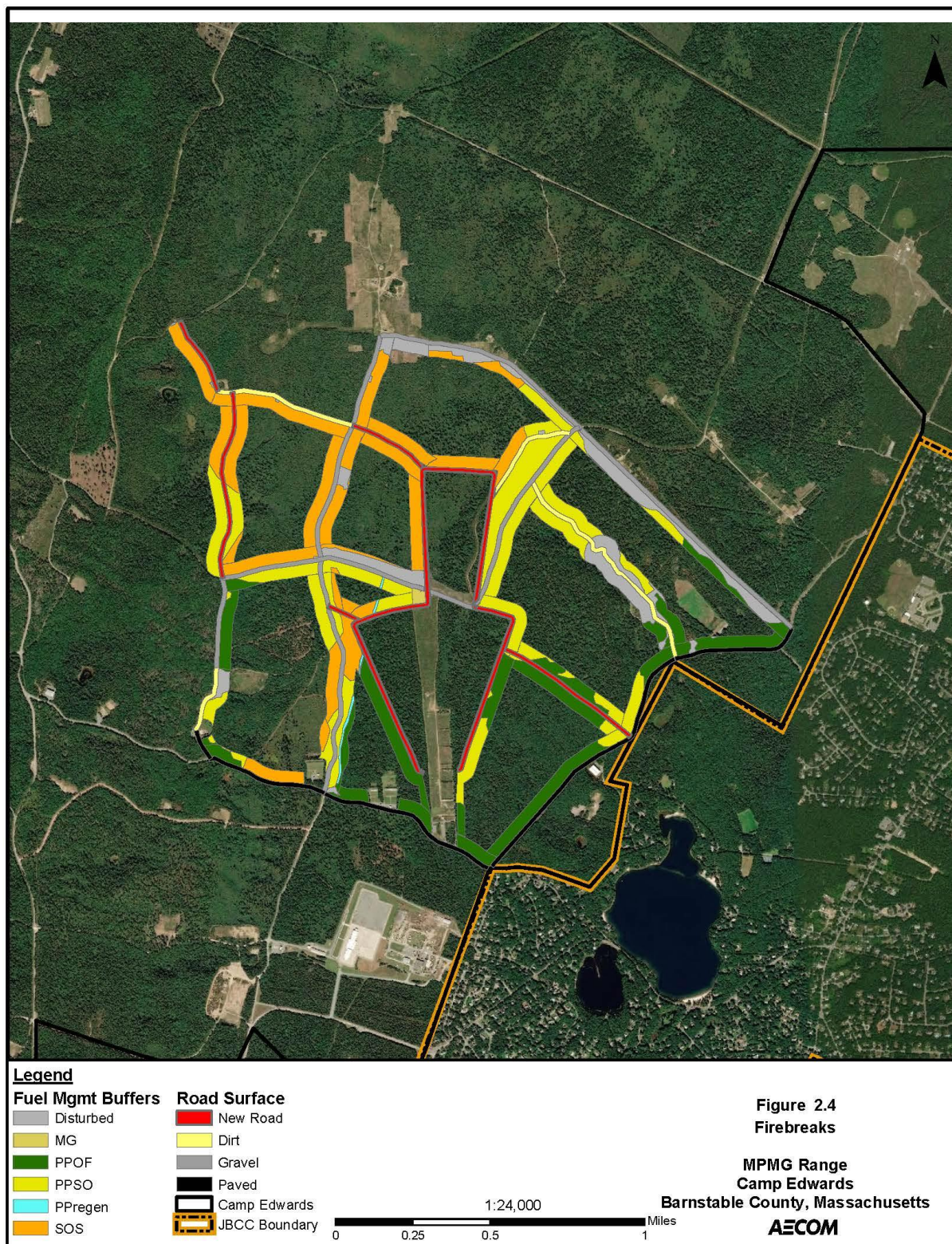
Strategic firebreaks are proposed to be constructed along the exterior of the MPMG Range pursuant to the Camp Edwards INRMP and IWFMP (see **Figure 2.4**). Approximately 10.0 acres of land will be cleared for this effort. This work will be performed as part of the firebreak project involving the construction and maintenance of firebreaks throughout Camp Edwards to reduce the risk of a large wildfire and assist in managing the fighting of fires. Firebreak and fuels management involves the alteration of fuels to reduce the likelihood of a fire starting or to reduce its effects if one does start. These techniques may improve access for fire apparatus, increase water resources available on-site, adjust target placement, and provide buffer or safety zones. Range use at Camp Edwards introduces significant wildfire hazard into unmanaged and high risk fuels conditions through the use of tracers and ammunition. Tracers are forms of ammunition that include a small pyrotechnic charge which makes the trajectory of the ammunition visible in the day time and night time. Natural communities within the Camp Edwards, such as pitch pine and scrub oak communities, are fire-dependent systems shaped over thousands of years. With Euro-American influence, the natural fire regime has mostly been suppressed and replaced with infrequent human induced catastrophic fires creating a severe wildland urban interface. It is imperative that the MAARNG and the surrounding communities address and plan for wildland fire.

Firebreaks will be located along existing roads where feasible. The firebreak planning standard is a 15-foot gravel road with 30-feet of winter mowed grass/forb/low shrub on each side and a 200-foot fuel management buffer beyond that on each side with understory mowing (initial) and mechanical tree thinning to 20-40 foot spacing. Firebreak work associated with the MPMG Range is proposed to involve 10.0 acres of new road (roughly 4.5 miles of new road) and 77.0 acres of mowed firebreak edge (overall habitat benefit from mowing). Most or all species anticipated to benefit from combination of direct habitat management (e.g., fuel management buffers, prescribed fire) and the indirect habitat management made possible through range development, fire management support (e.g., new or improved firebreaks), and ordnance remediation. Locations of the firebreaks and associated roadways are presently being analyzed. The firebreak work associated with the MPMG Range (10.0 acres) will be considered a take by NHESP. The mowed firebreak edges and prescribed burns are not considered to take any rare species and in fact are being proposed for habitat improvement in addition to fire management.

2.4 Projected Site Use

The MPMG Range would be available for all MAARNG units as well as other DoD organizations as scheduling permits. Over the last two decades, the MAARNG and Camp Edwards have worked diligently to transform and modernize its operations, facilities, and training venues to provide the best possible training for the MAARNG, other ARNG and DoD units, emergency responders, and law enforcement and is an important training facility for the DoD and the USCG (Department of Homeland Security).

A total of 103,864 man-days of training occurred at Camp Edwards for military personnel in TY (Training Year) 2018. The MAARNG has approximately 5,880 Soldiers who train on average one weekend per month and one two-week cycle during a training year. The KD Range is not presently used for training exercises other than for UAS. The overall training days/events at Camp Edwards will increase by 173 days/events or an approximately 20% increase of existing training days/events with the construction of the MPMG Range. The Annual Training Cycle at Camp Edwards is March through November with peak usage during May through June. The MPMG Range will not impact this training cycle.



2.5 Impacts and Mitigation

The impacts from the proposed MPMG Range include 170.5 acres of tree clearing which is considered impact on rare species to be constructed in two phases.

Table 2-1: MPMG Range Impacts

Phase	Alternative	800 Meter Lanes	1,500 Meter Lanes	Total Acreage *	Rare Species Impacts
Phase 1	Reduced-Scale Alternative	8	0	133.0	94.5
Phase 2	Construction of 1,500 Meter Lanes	0	2	76.0	76.0
TOTAL	Preferred Alternative (Project)	8	2	209.0	170.5

* With approximately 5.0 acres of firebreaks included in each phase

Mitigation proposed includes a comprehensive and robust rare species mitigation plan which is explained in greater detail in the attached draft CMP Application in **Appendix B** and summarized in **Section 6.7**. This combination of mitigation strategies will allow MAARNG to establish a robust mitigation bank and overall strategy for success to facilitate implementation of long-term planning efforts including modernization of the range complex and infrastructure, thereby maximizing positive impacts. The schedule for implementing mitigation efforts for the MPMG Range began in 2019 and will continue through to 2025 and beyond.

In addition, mitigation measures will be implemented during the construction phase and during the MPMG Range operation phase once constructed including the following with a reference to the mitigation sections in this documents where additional information can be found.

- Air Quality (**Section 6.3**)
- Greenhouse Gas (**Section 6.4**)
- Noise (**Section 6.5**)
- Biological Resources (**Section 6.6**)
- Endangered, Threatened, and Rare Species (**Section 6.7**)
- Oil and Hazardous Materials (**Section 6.12**)
- Construction Phase Mitigation (**Section 6.13**)
- Best Management Practices (**Section 6.14**)

2.6 Construction Schedule

Table 2-2 provides an estimated timeline for construction of the MPMG Range and associated mitigation actions. Details of these actions are described in **Section 6.7**.

2.7 Construction Cost

The estimated cost of construction of the MPMG Range is approximately \$7 Million.

Table 2-2: MPMG Range Construction and Mitigation Schedule

Action Proposed	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Construction Phase										
Clear and construct primary range area (0-800 meters; ROCA)	x									
Clear UXO and mechanical removal of trees as needed	x	x	x	x	x	x				
Create shaded fuel breaks with mechanical forestry and UXO clearing			x	x	x					
Construct two lanes north from 800 to 1,500 meters			x	x	x	x				
Introduce fire into MPMG Zone				x						
Mitigation Phase										
Parcel H – Unit K Grassland improvement	x	x	x	x	x	x	x	x		
Frequent prescribed burns in MPMG Zone (2-3 year return interval)			x	x	x	x	x			
Maintenance burns on 3-year interval in MPMG Zone								x	x	x

UXO = unexploded ordinance

3.0 Alternatives Analysis

MEPA requires a description and review of feasible alternatives to the Project in light of the objectives of the Proponent and the mission of any participating agency, including relevant statutes, regulations, EOs and other policy directives, and any applicable state, Federal, municipal, or regional plan formally adopted by any State, Federal, municipal, or regional governmental entity. In addition, the No-Build Alternative shall be reviewed for the purpose of establishing a future baseline in relation to which the Project and its alternatives can be described and analyzed and its potential environmental impacts and mitigation measures can be assessed. A brief discussion of alternatives no longer under consideration including the reasons for no longer considering these alternatives is also provided. The baseline data has been previously submitted to MEPA, most recently in the 15 August 2012 Supplemental EIR for the SAR-IP.

The MAARNG developed and applied 13 criteria to screen and evaluate possible alternatives for the Project. The selection criteria were applied to available alternatives to determine which alternative(s) would fulfill the purpose and need for action including the No Action Alternative to assess any environmental consequences that may occur if the Project is not implemented. The alternatives analysis provides a description of the following alternatives

- Preferred Alternative (Project)
- Reduced-Scale Alternative
- Full Build Alternative
- No Action Alternative

Alternatives were screened first for different locations and then when the KD Range was chosen, different layouts were analyzed.

The purpose of the Project is to provide the MAARNG with a mission required, MPMG Range to allow the MAARNG to efficiently attain required training and weapons qualifications requirements within Massachusetts. The MPMG Range will provide Soldiers and units the necessary modernized training capabilities to be effective in contemporary and future operating environments. A priority for the MAARNG at Camp Edwards is the continued use and development of live-fire ranges to meet the requirement that all Soldiers qualify with their primary weapon systems annually.

The three closest MPMG ranges include Camp Ethan Allen in Jericho, Vermont located over 270 miles away, Fort Dix in Ocean County, New Jersey located over 300 miles away, and Fort Drum located in Jefferson County, New York located over 370 miles away (see **Figure 1.3**). Implementation of the Project would support higher quality, mission-essential training activities at Camp Edwards, while limiting the need for travel to other training sites that cause the loss of critical training time and resources.

3.1 Alternatives Development (Screening Criteria)

The MAARNG developed and applied the following 13 criteria to screen and evaluate possible alternatives for the Project. The MAARNG identified that a suitable site would meet the following requirements:

1. **Sufficient Land Area:** The proposed range should be located within a MAARNG-controlled training area in Massachusetts of sufficient size to accommodate the proposed range and its associated SDZs.
2. **Reduce Travel:** The proposed range should avoid excessive travel times and costs for MAARNG units by minimizing travel in and out of state to meet mission and training requirements.
3. **Minimize Conflicts with Other Existing Ranges and Training Areas:** The proposed range should be sited so as to minimize conflicts with other, existing ranges and other training uses, thereby allowing multiple training ranges and facilities to be utilized concurrently and maximizing training efficiency.
4. **Maximize Co-Location with Existing Impact Areas:** The proposed range should be sited in a way that maximizes the use of existing impact areas. Such a layout would avoid the creation of new impact areas, avoid consuming additional training land, and reduce the area of potential hazard across Camp Edwards.
5. **Proximity to Existing Utilities:** The proposed range should be sited in close proximity to existing utility services (i.e., electric, telecommunications) in order to minimize construction costs and the need for new or extended utilities.
6. **Proximity to Existing Roads:** The proposed range should be sited in close proximity to existing access roads in order to minimize construction costs and the need for new roads.
7. **Minimize Environmental Concerns:** The proposed range should be sited in an area and layout that would minimize potential effects to existing onsite environmental concerns, including cultural resources and special status species.
8. **Minimize Need for New Ground Disturbance:** The proposed range should be sited in previously disturbed areas to minimize the need for new ground disturbance. This would minimize the potential for new and additional impacts to onsite soils, water, biological, and cultural resources.
9. **Central Location to Minimize Offsite Impacts:** The proposed range should be sited in a central location within a MAARNG-controlled training area in order to minimize potential impacts (i.e., dust, noise, lighting) to off-site areas, including residents and sensitive receptors.
10. **Meet Training Requirements:** The proposed range should allow the MAARNG units to meet all required training provided by a MPMG Range.
11. **Meet Army Range Requirement Model (ARRM) Requirements:** The proposed range should meet current ARRM data requirements regarding the number and types of ranges needed to meet MAARNG training requirements.
12. **Compliance with Regulatory and Planning Requirements:** The proposed range should be in compliance with applicable regulations and planning documents developed.
13. **No Net Loss of Training Capacity:** The proposed range should be constructed to ensure no net loss in the capacity of the MAARNG or Camp Edwards to support the military missions and conduct training operations.

Through application of the first two screening criteria and the evaluation process provided in this section, it became readily apparent to the MAARNG that locating the MPMG Range at Camp Edwards was the only alternative capable of meeting these screening criteria. Therefore, the subsequent 11 screening criteria were used to identify the Project location within Camp Edwards. For the location within Camp Edwards, where possible, similar training facilities were co-located or grouped to increase usage of common areas and infrastructure components and to further reduce overall development needs and costs. Numerous range and facility layouts and sites within Camp Edwards were investigated and eliminated from further consideration due to conflicts with other training uses, location of existing utilities, lack of overall land area, existing environmental constraints, surrounding residential areas, or other limiting factors. Finally, when the KD

Range was determined to be the best alternative location (as described below), alternative layout designs were analyzed.

3.2 Evaluated Alternatives

The selection standards described above were applied to available alternatives to determine which alternative(s) would fulfill the purpose and need for action including the No Action Alternative to assess any environmental consequences that may occur if the Project is not implemented. The No Action Alternative also provides a baseline against which the Project can be compared. The following discussion provides a description of the Preferred Alternative (Project), the Reduced-Scale Alternative, the Full Build Alternative, and the No Action Alternative. The footprints of these alternatives are shown in **Figure 3.1**. Alternatives eliminated from further consideration are described in **Section 3.3**.

Table 3-1: Impacts by Alternative

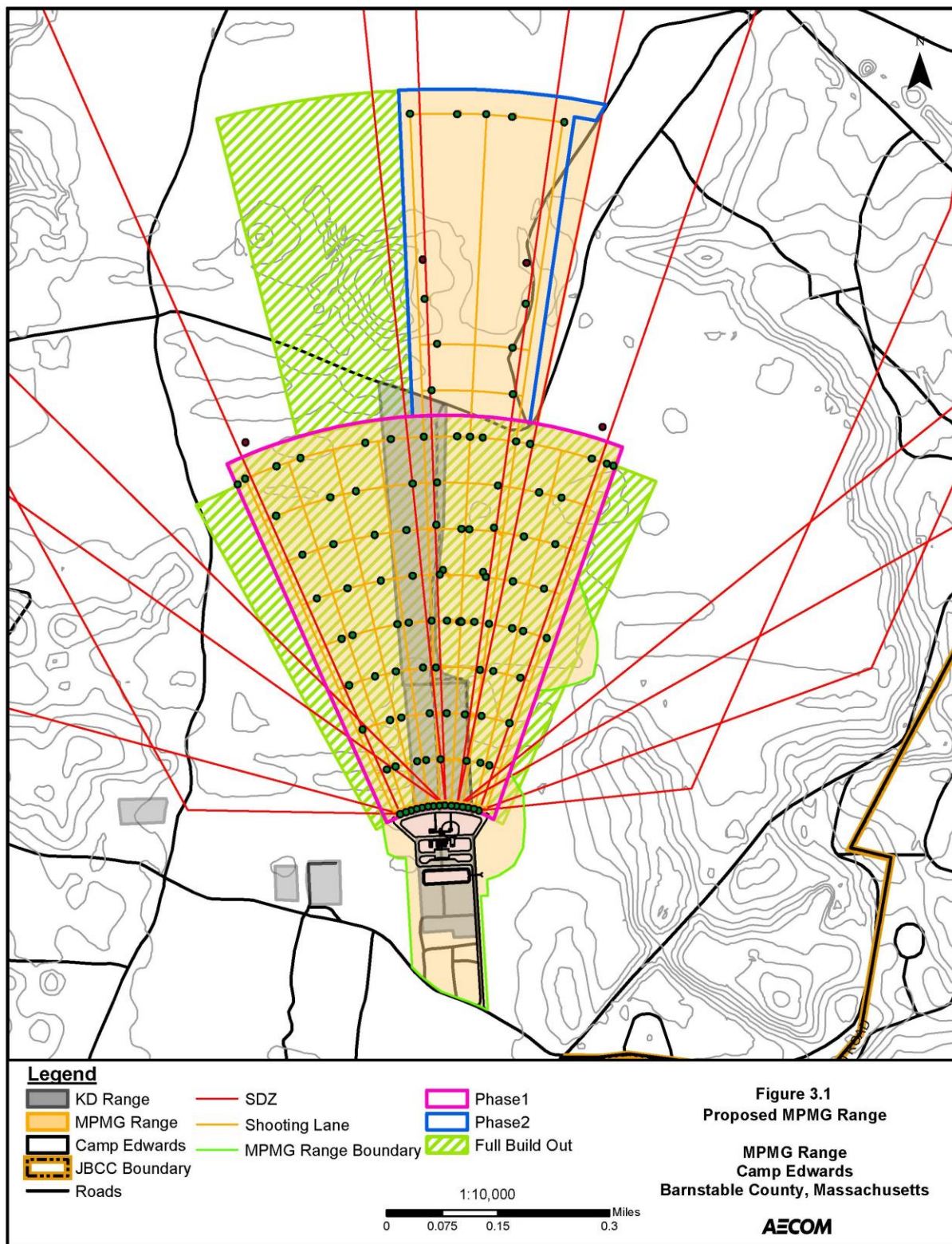
Alternative	800 meter lanes	1500 meter lanes	MPMG Range (acres)	Firebreak (acres)	Total Footprint (acres)	Tree clearing (acres)
Full Standard Build	10	4	294	12	306	267.5
Preferred Alternative	8	2	199	10	209	170.5
Reduced-Scale Alternative	8	0	128	10	138	99.5

** Without action, there will be an incremental loss of scrub oak shrubland habitat as described in **Section 4.6.1.3**.

3.2.1 Preferred Alternative

Under the Preferred Alternative (Project), the MPMG Range would be constructed and operated as described in **Section 2.0** by constructing the MPMG Range at the KD Range with the construction of an eight lane MPMG Range with six lanes 800 meters long with a width of 25 meters at the firing line and a width of 100 meters at a distance of 800 meters. The two middle lanes (Lanes 5 and 6) will extend an additional 700 meters to a distance of 1,500 meters long to accommodate .50 caliber rifles. The construction of the Project will fulfill the assigned mission and training requirements to have a machine gun range available within Massachusetts. The firing line would be located approximately 200 meters north of the existing firing line.

This design already represents minimization from the standard MPMG Range design guide which calls for ten 800 meter lanes and four 1,500 meter extended lanes (Full Build Alternative). The Preferred Alternative has eight 800 meter lanes and two 1,500 meter lanes which is approximately 97 acres less in footprint than the Full-Build Alternative design. Due to the presence of the Impact Area which is not accessible for habitat management and fire management, the scrub oak shrublands (SOS) have become overgrown. The primary driver behind declines in some of the State-listed moths at Camp Edwards is a lack of fire in SOS and the dramatic incursion of pitch pines into shrublands and frost bottoms after the secession of artillery fires in the Impact Area. The extension of the two 1,500 meter lanes into this habitat will allow for management and enhancement of the SOS which is a globally rare habitat.



The Preferred Alternative would increase training days/events at Camp Edwards by 173 days/events or an approximately 20% increase of existing training days/events at Camp Edwards. This is a reduction of over 90% of the mileage (or 277,390 miles) travelled under existing conditions to other ARNG sites as shown in **Figure 1.3**. Units will no longer have to travel long distances to train at an out-of-state MPMG Range. Allowing units to train at Camp Edwards on the proposed MPMG Range also eliminates the travel time spent going to other sites; a reduction of approximately 144 hours less travel. This transportation information is part of the GHG Analysis summarized in **Section 4.4**.

This is the MAARNG's Preferred Alternative because it best meets the screening criteria set forth in **Section 3.1**. It effectively provides the best combination of land and resources to sustain quality military training and to maintain and improve MAARNG's readiness posture. This alternative provides many advantages:

- Located within an existing MAARNG facility, and therefore, no land acquisition costs.
- Eliminates the need for MAARNG units to travel out of state to meet mission and training requirements.
- Provides ample space/acreage for the required facilities.
- Located on previously disturbed land.
- Located near existing infrastructure and available utility connections.
- Places noise-producing facilities further away from noise-sensitive areas within and adjacent to Camp Edwards.

It was determined that the mission (Project purpose and need) would be completed with the Preferred Alternative with less impact on the environment from the Full Build Alternative or other alternatives dismissed as described in Section 3.3.

3.2.2 Reduced-Scale Alternative

The Reduced-Scale Alternative would implement the Project without the two extended .50 caliber use middle lanes. All lanes would be constructed to a distance of 800 meters. This alternative would allow for the same usage as the Preferred Alternative with the exception of the M2 machine gun and the M82 sniper rifle which utilize .50 caliber ammunition, thus reducing training capabilities of this range. This alternative would have a footprint of about 138.0 acres reducing the amount tree clearing by 71.0 acres compared to the Preferred Alternative. Nonetheless, this alternative would not allow the management of the SOS frost bottom located north of the KD Range maintaining the dramatic incursion of the pitch pines into this significant habitat. This alternative would have the same transportation and time impacts (or benefits) as described for the Preferred Alternative above. The Reduced-Scale Alternative represents Phase 1 of the MPMG Range Project. Phase II would include the extension of two lanes, both phases combined to be the Preferred Alternative.

3.2.3 Full Build Alternative

Construct and operate a standard ten-lane MPMG Range with four extended 1,500 meter lanes in accordance with TC 25-8. Given the existing site and environmental conditions, a reduced-size MPMG Range with only eight lanes is proposed as approved for funding by MILCON. Under the Full Build alternative, additional impacts to rare species habitat would be unavoidable. In addition, a larger range would increase noise impacts on adjacent sensitive receptors. This alternative would have an increased footprint by 97 acres to approximately 306 acres compared to the Preferred Alternative. The SDZs for this

alternative would reach a wider area and would be located partially off-base. This alternative does not meet Screening Criteria #1, #3, #7, #8, and #12.

3.2.4 No Action Alternative

Under this alternative, the Project would not be implemented and the existing training activities and operations would continue at Camp Edwards. Units would travel out-of-state to either New York, New Jersey, or Vermont to qualify on the nearest MPMG Range. This alternative would limit the capability of the MAARNG to carry out its assigned mission to provide adequate training facilities, and would not meet the purpose of or need for the Project. This alternative was retained to provide a comparative baseline analysis as required by MEPA. The No Action Alternative reflects the status quo and serves as a benchmark against which the effects of the Project (i.e., Preferred Alternative) can be evaluated.

Under the No Action Alternative, Camp Edwards full training potential would continue to be limited and the facilities necessary to accommodate the MAARNG's mission and training requirements would continue to be unavailable in the state. Required training would continue to be conducted by the MAARNG at out-of-state installations where the necessary ranges and training facilities are available. This would continue to cause MAARNG units to risk not meeting readiness requirements, and to use excessive training time for travel, potentially resulting in a decreased ability to meet training proficiency standards.

3.3 Alternatives Eliminated from Further Consideration

Alternatives that were eliminated from detailed study are identified along with a brief discussion of the reasons for eliminating them. For purposes of analysis, an alternative was considered "unreasonable" if it would not enable the MAARNG to meet the purpose of and need for the Project. The MAARNG considered the following alternatives:

- Southern Location Alternative
- New Training Site Alternative
- New Undisturbed Range Site Alternative
- Different Existing Range Alternative

These alternatives were eliminated from further consideration because they did not meet one or more of the screening criteria included in **Section 3.1**.

3.3.1 Southern Location Alternative

Implement the Project at a more southerly location which would shift the entire MPMG Range south approximately 100 meters. The firing line of this alternative would be located approximately 100 meters north of the existing firing line at the KD Range. The construction would fulfill the assigned missions but would result in greater impacts, specifically with noise as described in **Section 4.5**. This alternative does not meet Screening Criteria #7, #9, and #10.

3.3.2 New Training Site Alternative

Acquire a completely new training site for the construction and operation of the proposed MPMG Range, off-site of Camp Edwards. This alternative was examined but eliminated due to the fact that, as a primary

component of Base Realignment and Closure (BRAC), the DoD is eliminating and/or consolidating many installations throughout the U.S. and other sufficient land area is not available. As sufficient land area is available at Camp Edwards to accommodate the required range and training facilities, the MAARNG determined that, in accordance with DoD directives and vision, establishment of a new training site in-state but off-site of Camp Edwards was neither feasible nor necessary. This alternative does not meet Screening Criteria #7 and #8.

3.3.3 New Undisturbed Range Alternative

Construct and operate the proposed MPMG Range on a previously undisturbed portion of Camp Edwards. This alternative was examined but eliminated due to the fact that it would likely impact more rare species habitat resulting in more fragmentation of the rare habitats present at Camp Edwards than siting the range at the already cleared KD Range. This alternative does not meet Screening Criteria #3, #4, #7, and #8.

3.3.4 Different Existing Range Alternative

Construct and operate the proposed MPMG Range on either the A (Alpha) Range or the existing S (Sierra) Range (or a different range at Camp Edwards). During the range siting process, additional range configurations were evaluated, but were eliminated due to various land constraints and existing usage at other ranges. Given the large amount of land this range requires (including the configuration of the SDZs) and the available land at Camp Edwards that was already altered but did not have existing uses, siting options were limited for this range. Alpha Range was previously a .50 caliber machine gun range but guns were required to have a restraint bar to prevent the barrel from moving too far to the side. Substantial funding was spent upgrading Sierra Range in 2011-2012 to a Modified Record Fire (MRF) Range. In order for this alternative to work, the MRF range would have to be dismantled and constructed elsewhere on the base resulting in additional substantial costs. This alternative does not meet Screening Criteria #3, #7, and #12.

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4.0 Existing Environment

This section provides a description and analysis of the physical, biological, chemical, economic, and social conditions of the Project site, its immediate surroundings, and the region in sufficient detail to provide a baseline in relation to which the Project and its alternatives can be described and analyzed and its potential environmental impacts and mitigation measures can be assessed.

4.1 Topography, Geology, and Soils

The following is a summary of topography, geology, and soils at the MPMG Range and within Camp Edwards.

4.1.1 Topography

Elevations on Camp Edwards range from 250 feet above mean seal level (MSL) at the northern end of the installation to 50 feet above MSL at its southern end. The surface topography of Camp Edwards varies greatly between northern and western portion and the southern portion of the training area. Large glacial deposits dominate this area with high topographic relief of rolling hills and deep kettle holes. The eastern portion of Camp Edwards at the proposed MPMG Range is relatively flat and level outwash plain with slopes of 0-2%. Approximately 20 kettle-holes within the area have steeper slopes. One kettle hole is located to the north of the proposed range within the Impact Area and is referred to as the frost pocket or frost bottom. The KD Range and the proposed location of the MPMG Range is located in a relatively flat area of Camp Edwards at an elevation of about 160 feet above sea level (NGVD 29 datum).

4.1.2 Geology

The geology of Camp Edwards and its environs is composed primarily of Pleistocene Age sandstones, with sandstone deposits of Holocene age present along major drainage channels overlying Proterozoic-age schist, gneiss, and granite bedrock. Surficial glacial sediments deposited during the retreat of the Wisconsin glaciation underlie western Cape Cod. These deposits are estimated to be approximately 15,000 years old. In the Camp Edwards region, there are three large sedimentary units: the Buzzards Bay Moraine, the Sandwich Moraine, and the Mashpee Pitted Plain. The Buzzards Bay and Sandwich Moraines are mounds or ridges of unstratified glacial till along the western and northern edges of the installation, respectively. Both are composed of ablation till, unsorted material ranging from clay to boulders and deposited at the leading edge of Wisconsin glaciations.

4.1.3 Soils

In general, the soil of Camp Edward is well-drained sand or sandy loam with a high susceptibility to erosion. The primary soils present at the Project and in the vicinity include the Merrimac sandy loam, with slopes of 0 to 3%. Where the two lanes would be extended, soils present include Enfield silt loam, with slopes of 0 to 3%³ The soil underlying the Site are well-drained and has a low frequency of flooding and ponding. Soils underlying the KD Range have been contaminated by past releases of hazardous substances. Further

³ NRCS 2018 <https://websoilsurvey.sc.egov.usda.gov>

information on environmental contamination including hazardous materials at the KD Range is provided in **Section 4.12**.

The majority of the MPMG Range is identified as containing Prime Farmlands and Farmland of Statewide Importance as identified under the Farmland Protection Policy Act (FPPA) (7 USC 4208[b]) was adopted in 1981 is intended to minimize the impact that any Federal programs would have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. Farmland subject to FPPA requirements does not have to be currently used for cropland and can be forest land, pastureland, cropland, or other land. Camp Edwards may be exempt from the FPPA in accordance with Section 1547(b) of this Act which exempts acquisition or use of farmland for national defense purposes. The Project Site has been used for training purposed since at least the 1930s and may extend as far back as 1908 when training first started in this area. Due to the many years of the Site being used for military training, it is highly unlikely that this area would ever be used as farmland.

4.2 Water Resources (Groundwater)

Water resources evaluated in this section include groundwater as there are no wetlands, surface waters, or floodplains in or near to the Project Site. The predominant source of groundwater in the Camp Edwards area is the Sagamore lens of the Cape Cod aquifer, designated as a sole-source aquifer under the SDWA. The groundwater beneath the Camp Edwards is also known as the Upper Cape Water Supply Reserve and provides up to three million gallons of clean drinking water daily to Camp Edwards and the towns of Sandwich, Bourne, Falmouth, and Mashpee.

The water table is encountered an elevation of approximately 65 to 67 feet above sea level (NGVD 29 datum) which equates to an average depth of 100 feet below ground surface in and around the proposed MPMG Range. Groundwater at Camp Edwards has been classified as GW-1 and GW-3, in accordance with the Massachusetts Contingency Plan (MCP) (310 CMR 40.0932). Groundwater classified as GW-1 is water that might contribute to a Current Drinking Water Source Area or a Potential Drinking Water Source Area, while water classified GW-3 are groundwater resources that are considered a potential source of discharge to surface waters. In addition, portions of Camp Edwards, including the proposed MPMG Range, lie within multiple Zone II areas. According to 310 CMR 40.0006, Zone II is defined as the area of an aquifer that contributes water to a well under severe pumping and recharge conditions (see **Figure 1.5**).

Otis Air National Guard Base (ANGB) was placed on the Superfund program's National Priorities List (NPL) in 1989. A Federal Facility Agreement (FFA) was signed in 1991 (and subsequently amended in March 2000) governing the Superfund cleanup. Signatories to the FFA include the National Guard Bureau (NGB), the USAF, and the USEPA. Working under the authority of SOWA AO and separate from the Superfund work, the DA is managing long-term groundwater and any remaining source area cleanups as the Impact Area Groundwater Study Program (IAGWSP). Currently, there are seven groundwater plumes undergoing extraction and treatment with a combined system rate of 4.1 million gallons per day. The DA also manages a land use control program so that there are no public exposures to contaminated groundwater undergoing treatment. Long-term groundwater monitoring and operation and maintenance of treatment systems will continue until groundwater cleanup levels are met.

To date, no response actions have been needed to address groundwater due to contamination from the KD Range. A Human Health Risk Screening was conducted to identify any analytes that warranted further

evaluation, and no analytes were found that exceeded screening criteria.⁴ According to IAGWSP data, no contaminated groundwater plumes are located beneath the KD Range or the proposed MPMG Range.

4.3 Air Quality

The following is a summary of Federal and State air quality regulations as they may relate to the proposed MPMG Range.

4.3.1 Federal Air Quality Regulations

The ambient air quality in an area can be characterized in terms of whether it complies with the primary and secondary National Ambient Air Quality Standards (NAAQS). The CAA, as amended, requires the USEPA to set NAAQS for pollutants considered harmful to public health and the environment. NAAQS are provided for six principal pollutants, called “criteria pollutants” as listed under Section 108 of the CAA: carbon monoxide (CO); lead (Pb); nitrogen oxides (NO_x); ozone (O₃); particulate matter (PM), divided into two size classes of (1) aerodynamic size less than or equal to 10 micrometers (PM₁₀), and (2) aerodynamic size less than or equal to 2.5 micrometers (PM_{2.5}); and sulfur dioxide (SO₂). The General Conformity Rule (40 CFR Part 51, Subpart W) requires Federal agencies to prepare written Conformity Determinations for Federal actions in or affecting NAAQS in nonattainment and maintenance areas, except when the action is covered under the Transportation Conformity Rule or when the action is exempted because the total increase in emissions is insignificant, or de minimus. NAAQS promulgated by the USEPA are defined as the maximum acceptable concentrations, both annual and short-term standards that may be reached. The short-term standards may not be exceeded. The allowable times per year a short-term standard may not be exceeded varies depending on the pollutant and averaging period of standard. Most NAAQS cannot be exceeded more than once per year.

According to the USEPA, air quality within Barnstable County and the Region of Influence (ROI) is in “attainment” for all NAAQS⁵, though the area is treated as moderate non-attainment for ozone given the location within the Ozone Transport Region (OTR) designated by Section 176A of the CAA, with 1990 amendments, which subjects 12 northeast States, including Massachusetts. However, for General Conformity purposes, nonattainment designations due solely to being part of the OTR are not applicable. Therefore, the procedural requirements of the General Conformity Provision of the CAA does not apply to the Project and no Conformity Determination is required.

4.3.2 State Air Quality Regulations

The CAA gives the authority to States to establish air quality rules and regulations. The Commonwealth of Massachusetts has adopted the NAAQS and promulgated additional State Ambient Air Quality Standards (SAAQS) for criteria pollutants. The primary regulatory authority for air quality in Massachusetts is the MassDEP – Air and Climate Division. Massachusetts has also developed a State Implementation Plan (SIP) to enforce the CAA in the State. The Massachusetts Air Pollution Control Regulations (310 CMR 6.00-7.00) outline emission limits necessary to attain ambient air quality standards for fugitive emissions, dust and particulates.

⁴ USEPA Training Area Operable Unit Decision Document 2019

⁵ USEPA Greenbook. https://www3.epa.gov/airquality/greenbook/anayo_ma.html

Camp Edwards, located within Barnstable County, is part of the Metropolitan Providence Intrastate Air Quality Control Region (AQCR 120) which was designated a serious non-attainment area for the 1-hour ozone and 8-hour ozone (1997) standards but those standards have since been revoked by USEPA. With the exception of CO, for which several areas of Massachusetts are unclassified, Massachusetts is in attainment for SO₂, PM_{2.5}, PM₁₀, NO₂, and Pb. The Metropolitan Providence Intrastate AQCR 120 is classified as attainment for all criteria pollutants except for the one-hour ozone standard which has been revoked as previously noted.

Potential air emissions from stationary sources at Camp Edwards are below the established Federal and State thresholds for the designated primary air pollutants (carbon monoxide, nitrogen oxide, particulate matter, sulfur dioxide, and volatile organic compounds). The only MAARNG stationary source emissions in the Camp Edwards Training Area are located at Range Control and the Ammunition Supply Point.

Thus, Camp Edwards does not require an air quality control permit for stationary source emissions under the provisions of the CAA, nor is Camp Edwards required to measure and report actual emissions from its stationary sources. However, the prescribed burn program requires an air quality control permit. The MassDEP Southeast Regional Office renewed the Camp Edwards smoke management and prescribed burn permit (#4F02008) on August 20, 2018. Because of the number of facilities at Camp Edwards, the MAARNG is required to submit a Source Registration/Emissions Statement (SR/ES) report for Camp Edwards to MassDEP.

4.3.3 Air Quality - Existing Conditions

The muzzle blast from small arms fire releases air emissions and residual energetic materials, primarily nitroglycerin/nitrocellulose, from the propellant. Lead air emissions are produced from a single source the primer (lead styphanate).

Potential receptors from air borne emissions are limited to onsite personnel training on or maintaining the SAR. Emissions released from the muzzle blast and entrained in the air are expected to be a minor source of inhalation exposure limited to range users.

Current air emissions from Camp Edwards result from mobile and stationary sources include, but are not limited to, vehicles, equipment, and personally owned vehicles. Air pollution from fugitive dust may result from vehicles traveling on unpaved roads, construction projects, and troop training activities. These mobile sources are regulated in Massachusetts in accordance with the vehicle emissions regulations at 310 CMR 60.000. In addition, any construction or demolition of a building requires notification to the MassDEP before start of work in accordance with 310 CMR 7.09 designed to protect public health and the environment by ensuring that the release of dust or other potentially hazardous air pollutants to the ambient air will be prevented.

4.4 Greenhouse Gas Emissions

EOEEA issued the MEPA Greenhouse Gas Emissions (GHG) Policy and Protocol in 2007. Projects under the review of MEPA are required to quantify GHG impacts as a result of the proposed Project and identify measures to avoid, minimize, or mitigate any such emissions. As MEPA has full scope jurisdiction over the MPMG Range Project, a GHG analyses is required. We anticipate providing the final GHG assessment in the EIR to be filed following the issuance of the NPC Certificate. The GHG assessment is anticipated to calculate impacts for the demolition, construction, and operation of the Project including the removal of

170.5 acres of trees being converted to managed grasslands as part of the active range. In addition, the purpose of this Project is to eliminate long trips out of state for MAARNG units to train at other MPMG ranges. There are no stationary sources at the MPMG Range which would have emissions once the range is in operation as the range will be used sporadically.

Federal agencies are required to implement sustainable practices and technologies, increase energy efficiency, and reduce greenhouse gas emissions. Travel associated with personal and government-owned vehicles would slightly decrease under the Preferred Alternative because the need to travel to out-of-State facilities to meet weapons qualifications standards and training requirements would be reduced, resulting in a slight decrease in greenhouse gas emissions overall. Further, the MAARNG anticipates Camp Edwards site usage to increase by 77% annually over current conditions as a result of implementing the Preferred Alternative. Therefore, overall greenhouse gas emissions locally are anticipated to increase slightly in Camp Edwards, while overall regional emissions may experience a slight decrease due to reduced travel requirements.

A GHG Analysis has been completed and is included in **Appendix H. Table 4-1** provides a summary of all GHG emissions generated as a result of this Project compared to the baseline information and the three alternatives. Emissions are calculated by transportation, construction, land clearing, and range operations. Construction related emissions will be temporary and may produce short-term localized impacts limited to the construction period. Emissions from land clearing are also temporary but have the most impact on CO₂ emissions. Transportation related CO₂ emissions will be greatly reduced (by 82%) over existing baseline conditions. Long-term emissions would be generated from the training activities, specifically the firing of ammunition and the ROCA structures which are only estimated at 3 US Tons.

Table 4-1: CO₂ Emissions Summary by Alternative (US Tons)

Activity	Baseline	Preferred Alternative	Reduced Build	Full Build
Transportation	724	60	60	60
Out-of-State Training	724	0	0	0
Travel of Work Crews	0	1	1	1
Within Camp Edwards after Range Construction	0	59	59	59
Construction	0	897	549	1,157
Land Clearing	0	734	430	935
Range Construction	0	129	85	189
ROCA Demolition and Construction	0	34	34	34
Land Clearing (Biomass Removal)	0	39,649	23,295	61,992
Range Operations	0.3	1.3	1.3	1.3
Firing of Weapons	0.3	0.3	0.3	0.3
ROCA Structures	0	1	1	1
CO₂ Emission Totals	724.3	40,607.3	23,904.3	63,210.3
CO₂ Emissions without Land Clearing	726	960	611	1,220

4.5 Noise

The MAARNG manages noise in accordance with State and Federal regulations and other Federal guidelines for training areas. The Army and MAARNG use a system that partitions noise into three zones (I, II, and III), each representing an area of increasing noise as shown in **Table 4-2**. The United States Army Public Health Center (USAPHC) performed a Noise Assessment for the proposed MPMG Range in 2015 and again in May of 2019 in accordance with EPS 9.1 (Noise management activities shall conform to the Army's Environmental Noise Management Program policies for evaluation, assessment, monitoring, and response procedures). Copies of the final Noise Assessment (1 May 2019) is provided in **Appendix D**.

Table 4-2: Land Use Planning Guidelines

Noise Zone	Noise Limits Small Arms Peak (dB)	Noise-Sensitive Land Use
Land Use Planning Zone (LUPZ)	n/a	Generally Compatible
Zone I	< 87	Generally Compatible
Zone II	87 – 104	Generally Not Compatible
Zone III	> 104	Not Compatible

Source: AR 200-1

dB = decibel

As a result of the Noise Assessment, the location of the MPMG Range has been shifted to the north to reduce the Zone II (where small arms range decibels reach 87-104 dB) location within the adjacent residential areas. Therefore, the noise impacts are being mitigated partly through the design. In addition, the .50 caliber round training (which has greater noise impacts) will only utilize the center extended lanes approximately 30 days per year.

The USAPHC provided the recommendation to provide public notification of upcoming training events, particularly the .50 caliber activity as mitigation. Additional testing may be performed once the range is built in order to determine the actual Zone II locations which can then be used to determine if other mitigation measures such as constructing noise barriers to lower noise levels may be recommended. The noise model assumed no vegetation between the range and the sensitive receptors, therefore the model looks at the worst case scenario.

4.5.1 State Noise Regulations

The MassDEP has established a Noise Level Policy for implementing the Massachusetts Noise Control Regulations defined in 310 CMR 7.10. The policy specifies that a new noise source proposed in an area that is not likely to be developed for residential use because of development constraints, or proposed in a commercial or industrial area with no sensitive receptor might not be required to mitigate its noise impact. The regulation states that even if the projected noise levels at the facility's property line exceed the ambient background by more than 10 dBA, mitigation might not be required. However, a new noise source proposed in an area with current or proposed noise-sensitive receptors could be required to mitigate its noise impact in these areas. In accordance with 310 CMR 7.10(3), public safety agencies (i.e., fire and police) and civil and national defense activities are exempt from these State regulations. Nonetheless, MassDEP may become involved if the noise became a nuisance condition.

The MAARNG published a Statewide Operational Noise Management Plan (SONMP) in December 2007 that provides a strategy for noise management at MAARNG facilities, including Camp Edwards. The plan includes a description of noise environments, including levels from small arms and aircraft training activities. Elements of the plan include education, complaint management, possible noise and vibration mitigation, noise abatement procedures, and land use management. Specific procedures are provided for noise complaints and protocols are provided for providing public notification for demolition of UXO in place and for other unusual noise events.

4.5.2 Noise – Existing Conditions

The ambient noise environment around JBCC is affected mainly by small arms training, helicopter and aircraft activity, and automobile traffic. Typical activities that produce noise from Camp Edwards and the JBCC include existing helicopter traffic and jet traffic and other aircraft operations. Other sources of noise include truck traffic, convoys, and use of heavy equipment. The existing noise environment is characteristic of an active military installation, dominated by live-fire small arms training ranges and helicopter traffic.

The Zone II for other small arms ranges at Camp Edwards (primarily J, K, and L Ranges) are located partially within the residential area located off-base based on information provided in the Final Environmental Assessment for Small Arms Ranges at Camp Edwards⁶ and confirmed in the 2019 Noise Assessment. These noise levels would affect a greater area with implementation of the Preferred Alternative as described in **Section 5.5**. Noise impacts are anticipated during the operational life of the proposed ranges.

4.6 Biological Resources

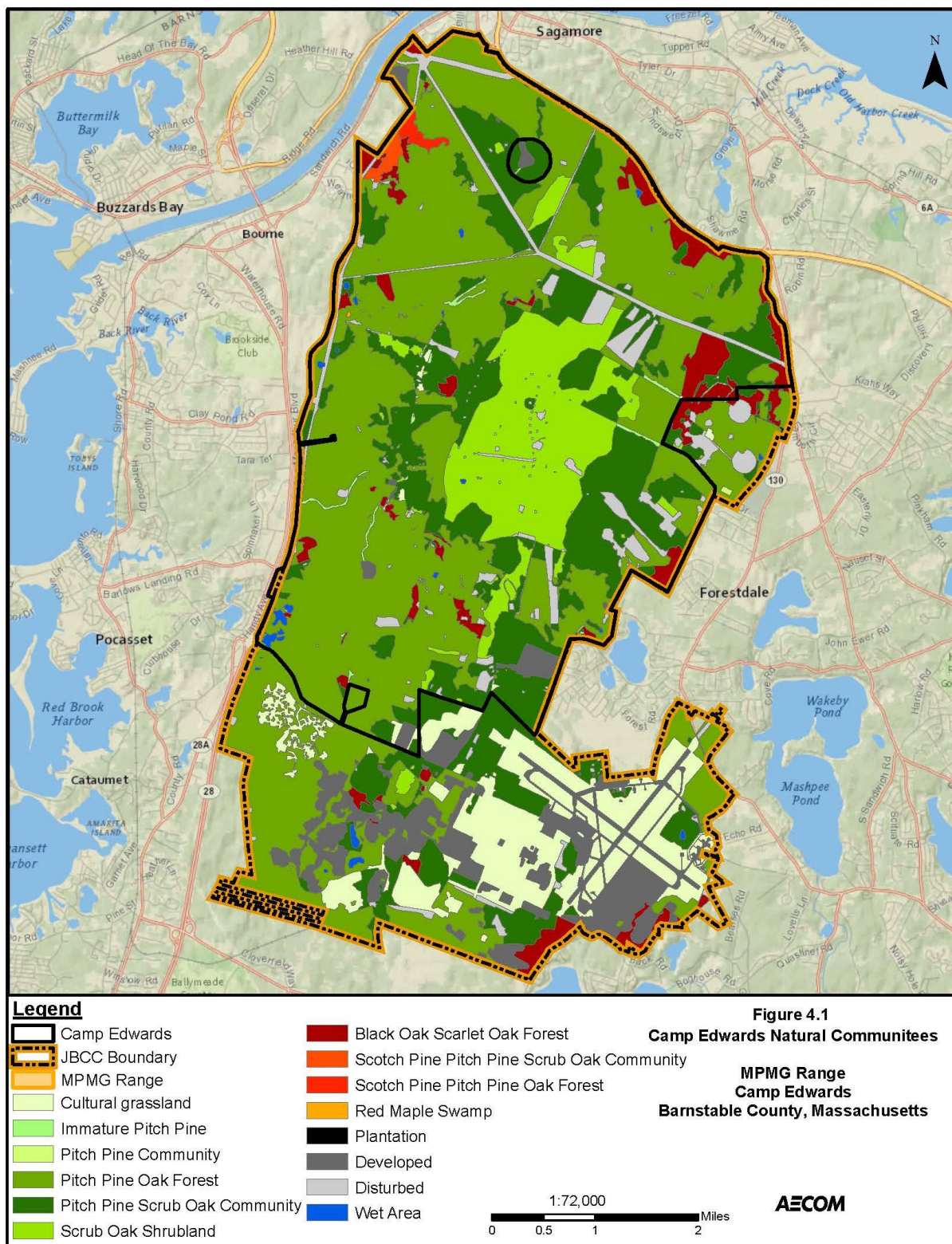
This section describes the existing vegetation and general wildlife at Camp Edwards and the proposed MPMG Range. Rare species are described in **Section 4.7**.

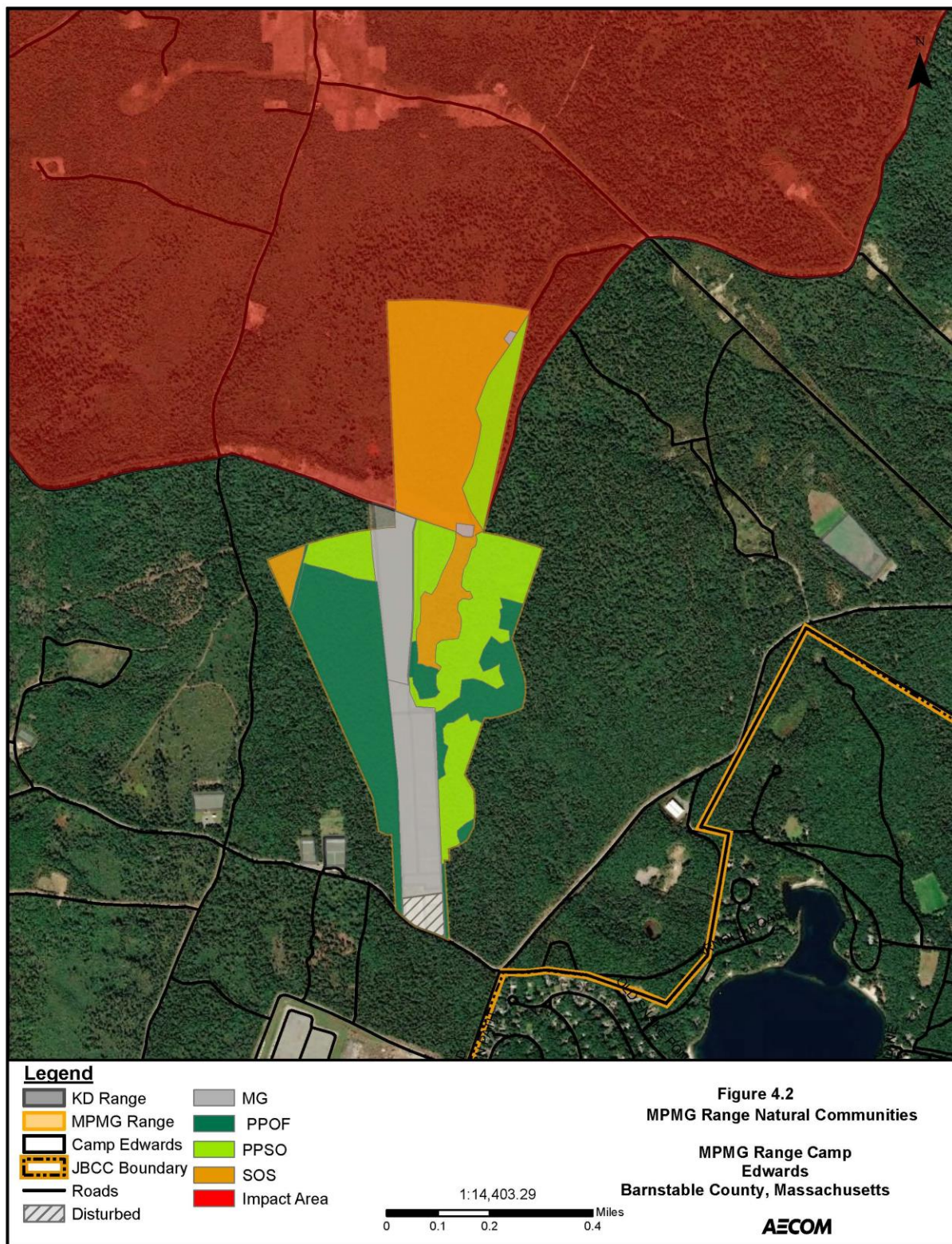
4.6.1 Vegetation

Much of Camp Edwards consists of Pitch Pine-Scrub Oak Barrens and is one of the largest remaining habitats of this type in northeastern U.S. (see **Figure 4.1**). There are a few small wetlands and ponds within this otherwise dry habitat that provide an important source of water for wildlife. Camp Edwards is the largest intact area of relatively unfragmented forest remaining on Cape Cod and serves as an important refuge for wildlife which require large ranges of interior forest habitat. Vegetation associated with the MPMG Range is provided in **Figure 4.2**.

The plant communities of Camp Edwards are dominated by cover types generally classified as mid to late successional forest with occasional early successional disturbed areas. Many of the plant communities at Camp Edwards have been influenced by several different disturbance types, including fire, ice storms, frost, drought, insect outbreaks, hurricanes, tropical storms, historic logging and grazing, and history of military use. A total of 13 natural communities and two altered land types are found at Camp Edwards as shown on **Figure 4.1**. Plant community types include Black Oak-Scarlet Oak Forest; Pitch Pine-Scrub Oak Community, Cultural Grassland, Plantation, Red Maple Swamp, Scotch Pine-Pitch Pine-Oak Forest, Immature Pitch Pine, Scotch Pine-Pitch Pine-Scrub Oak, Non-Mapped Vegetation Community, Scrub Oak Shrubland, Pitch Pine Community, Wetlands, and Pitch Pine-Oak Forest.

⁶ URS Corporation. Final Environmental Assessment for the SAR-IP, Camp Edwards, Massachusetts 19 June 2007





Two of these natural communities are ranked as S2 or “Imperiled in Massachusetts” by NHESP including the Pitch Pine-Scrub Oak Community and the Scrub Oak Shrubland. The Black Oak-Scarlet Oak Forest is ranked by NHESP as S3/S4 or “Vulnerable in Massachusetts/Apparently Secure in Massachusetts” which indicated a wide range of uncertainty regarding this community.

The proposed MPMG Range footprint is primarily comprised of disturbed land, managed grasslands, immature pitch pine, scrub oak shrubland, pitch pine oak forest, pitch pine scrub oak. Rare species associated with the pine and scrub oak barrens and the large unfragmented sections of forest may be found within the area of the Project.

The following are descriptions of the natural communities of Camp Edwards as per the Classification of Natural Communities (Swain and Kearsely 2001) that are located in and adjacent to the MPMG Range and at the other projects locations

- Pitch Pine-Oak Forest/Woodland (PPOF)
- Pitch Pine-Scrub Oak Community (PPSO)
- Scrub Oak Shrubland/Frost Bottoms (SOS)
- Cultural or Managed Grasslands (MG)
- Wetlands

4.6.1.1 Pitch Pine-Oak Forest/Woodland (PPOF)

The pitch pine-oak forest woodland (PPOF) of Camp Edwards varies with degree of maturity. The structure of the forest ranges from a low canopy with a dense shrub layer to a taller canopy with a sparser shrub layer. In general, the plant community is in a mid-successional state where trees and shrubs are increasing in number, while forbs and grasses are becoming less abundant. The woodlands in the northern area of Camp Edwards tend to have a higher and denser canopy than the other forest communities. This may be due to less historic disturbance, resulting in a more mature forest.

The pitch pine-oak forest woodland of Camp Edwards has a low canopy of pitch pine (*Pinus rigida*) and tree oaks (black oak (*Quercus velutina*), scarlet oak (*Q. coccinea*), and white oak (*Q. alba*) and a moderately continuous shrub layer of blueberry (*Vaccinium* spp.), black huckleberry (*Gaylussacia baccata*), sheep laurel (*Kalmia angustifolia*), and scrub oak (*Q. ilicifolia*). The sparse forb layer consists of bracken fern (*Pteridium aquilinum*), wintergreen (*Gaultheria procumbens*), and Pennsylvania sedge (*Carex pensylvanica*). The low forest canopy, about 10-15 m tall, indicates a relatively young forest of no more than 100 years old and site-wide forest assessments in 1997 and 2003 indicate nearly all of this community dates to the mid-1950s or newer, which is consistent with historic photos and aerial imagery. PPOF near the MPMG Range and other project sites has a high percentage of scrub oak in the understory and is functionally lumped in with PPSO.

4.6.1.2 Pitch Pine-Scrub Oak Community (PPSO)

In areas of significant past disturbance and/or much of the moraine, the overstory community is almost entirely pitch pine with an understory of sometimes very dense scrub oak which creates the pitch pine-scrub oak (PPSO) community. Other tree species that are present but not common to the community are scotch pine (*Pinus sylvestris*), white oak, and black/scarlet oak. Scotch pine was likely introduced to Camp Edwards in the late 1920s and the early 1930s as plantations in Shawme-Crowell State Forest. The prevalent shrub species of this community are black huckleberry (*Gaylussacia baccata*) and blueberry which are

commonly interspersed among the more dominant scrub oak. The structure of the pitch pine-scrub oak communities varies greatly with age. Younger stands are short, dense thickets of immature pitch pine associated with significant recent disturbance. White oak is increasing significantly in understory where fire has been excluded and threatens to convert the community.

A smaller portion of the PPSO community is comprised of immature pitch pine, is relatively low in plant diversity, and often occurs along roads, old firebreaks, or other previously disturbed areas. As the pitch pine matures, the forest has a more closed canopy, which ultimately out competes scrub oak and nearly all other species for sunlight. However, in areas where pitch pine has been cleared, scrub oak often grows in extremely dense patches. In the pitch pine-scrub oak community trees, and shrubs in general, are growing at a rate greater than in any other plant community, indicating a somewhat young, but rapidly maturing forest. The diversity of the pitch pine-scrub oak community, 51 plant species, is about average for the plant communities of Camp Edwards. However, pitch pine and scrub oak are the dominant and most productive species in the community. This is an extremely fire prone plant community and present an extreme wildlife hazard as it matures and scrub oak meets canopy.

4.6.1.3 Scrub Oak Shrubland (SOS)

Much of Upper Cape Cod has been dominated by pitch pine and scrub oak shrublands or barrens (SOS) since the period of colonial settlement. The area has been maintained in an early successional state as a result of intensive timber harvesting and successive catastrophic fires. Fire and frost effects typically suppress the growth of pitch pine and other tree species while promoting the growth of scrub oak creating frost bottoms. Fire scarring causes scrub oak acorns to germinate more readily and terminal buds to die, resulting in the growth of lateral branches. Frequent late spring frosts result in chronic dieback of developing leaves, slow growth rates, and reduced stem height which promotes shrub growth. Eventually, large herds of sheep were grazed throughout the Upper Cape, which limited tree growth and promoted the establishment of the scrub oak barren habitats.

The SOS covers 2,107 acres, or 15% of Camp Edwards, mostly within the Impact Area. This plant community represents one of the earliest states of vegetative succession on Camp Edwards and consists primarily of scrub oak with essentially no pitch pine. Other common plants in the scrub oak barrens include black huckleberry, blueberry, cat brier (*Smilax glauca*), and wintergreen. The majority of SOS at Camp Edwards is at significant risk of loss due to forest (pitch pine) encroachment due to lack of fire from artillery and historic sources. Efforts to provide this habitat outside the Impact Area are underway.

4.6.1.4 Cultural or Managed Grasslands (MG)

Cultural or Managed Grasslands (MG) are human created and maintained open communities dominated by grasses. Mowing is the typical maintenance, however on Camp Edwards; fire has played and is playing a more important role. Only 175 acres of MG are located on Camp Edwards in portions of the Cantonment Area. The remainder of the grasslands of the JBCC are managed by other military services. MG were historically cleared for use as parade grounds, barracks areas, and airfield during World War II. The existing MG and management area is shown in **Figure 4.1**.

The cultural grasslands are one of the least diverse plant communities on Camp Edwards, with only 37 identified species during a floristic inventory. The community is dominated by grass species including little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), hairgrass (*Deschampsia flexuosa*), redbow (*Agrostis gigantea*), poverty grass (*Danthonia*

spiccata), and Pennsylvania sedge (*Carex pensylvanica*). The only common tree species is immature pitch pine and red cedar. Sweetfern (*Comptonia peregrina*) was found in dense thickets less than a meter in height, whereas bayberry (*Myrica pensylvanica*), blueberry, and scrub oak were present, but less common. Many nonnative species such as honeysuckle (*Lonicera* spp.), Asiatic bittersweet (*Celastrus orbiculata*), autumn olive (*Elaeagnus umbellata*), and spotted knapweed (*Centaurea maculosa*) occur in the cultural grasslands of Camp Edwards and the JBCC. However, intensive management effort is focused on increasing plant diversity and reducing invasive plants. Best effect has been found in concentrating a combination of herbicide, fire, and mowing within an individual unit as opposed to broader treatments with a single method.

4.6.1.5 Wetlands

The ponds and wetlands at Camp Edwards, which comprise only 55 acres, or less than 1%, are the most diverse plant community on the installation. A total of 67 plant species were documented in the wetlands. There are six different types of wetlands based on the “Classification of Natural Communities in Massachusetts”. They are Ponds, Coastal Plain Pond Shore, Kettlehole Level Bogs, Red Maple Swamps, Highbush Blueberry Thickets, and Woodland Vernal Pools. In addition, there are other types of bogs which are unique and not found in large acreages such as a Sphagnum Moss (*Sphagnum* spp.) Bogs comprised primarily of sphagnum moss and cranberry (*Vaccinium macrocarpon*) and Woodland Vernal Pools, and Highbush Blueberry Thickets that lack standing water for much of the year.

The MPMG Range and the majority of the other proposed projects do not include any wetlands within the project footprint. Additional details on these wetland resource area can be found in the 2009 INRMP. Range and other project designs will specifically avoid impacting wetlands and will comply with the Massachusetts Wetlands Protection Act and town bylaws.

4.6.1.6 Invasive Species

Although not a cover type, invasive species deserve a mention as they may impact mitigation efforts. As mentioned above, many nonnative and invasive species such as honeysuckle (*Lonicera* spp.), Asiatic bittersweet (*Celastrus orbiculata*), barberry (*Berberis thunbergii*), autumn olive, and spotted knapweed occur in the grassland area. There are ongoing management efforts to remove these exotic, invasive plant species. Some exotic and invasive plant species benefit from disturbance which tend to out-compete native species and proliferate in disturbed systems. One example of such a proliferation is that of knapweed (*Centaurea maculosa*) in the Cantonment Area which quickly establishes and out-competes native species in disturbed areas. It should be noted however, that the knapweed is slowly displaced by native bluestem grasses over a period of several years. Areas surrounding the existing KD Range, especially adjacent to parking and firing lines have particular abundance of some nonnative invasive plants including barberry, honeysuckle, and bittersweet.

4.6.2 Guilds

In addition to the vegetative communities described above, “guilds” have been identified at Camp Edwards to use for mitigation efforts. A guild is a grouping of species that may utilize similar natural resources such as vegetation cover types. For Camp Edwards, there are four vegetative guilds and three guilds based on a specific State-listed species (i.e., Eastern Box Turtle, Eastern Whip-poor-will, and Northern Harrier). In order to determine the mitigation ratios for Projects impacts (as described in **Section 1.4**), we assigned the

highest level of protection for species within that natural community or guild as shown in **Table 4-3** according to those species known to exist within these communities at Camp Edwards.

Table 4-3: Natural Communities and Guilds at Camp Edwards

Guild Associations	Natural Communities	Mitigation Level
Pine Barrens Guild	PPOF, PPSO, SOS	Threatened (2:1)
Grassland Bird Guild	MG	Threatened (3:1)
Frost Bottom Plant Guild	SOS Frost Bottoms	Endangered (3:1)
Wetlands	Wetlands	Endangered (3:1)
Eastern Whip-poor-will	PPOF, PPSO, SOS	Species of Special Concern (1.5:1)
Eastern Box Turtle	PPOF, PPSO, SOS	Species of Special Concern (1.5:1)
Northern Harrier	MG	Threatened (2:1)
Bats	PPOF, PPSO, SOS	Endangered (3:1)

4.6.3 Wildlife

Extensive surveys have been conducted to inventory the fauna of Camp Edwards. The MAARNG Range and Training Land Assessment (RTLTA) program inventories and monitors natural resource conditions and manages and analyzes natural resource information. Results are pertinent to management of training and testing lands from training area to installation scales and provides input to decisions that promote sustained and multiple uses on military lands. Annual RTLTA surveys have monitored the long-term trends in bird and small mammal populations since 1993 while other projects have surveyed faunal populations for one to eight years. According to the 2009 INRMP, in total, 28 species of mammals, 105 species of birds, 11 species of amphibians, 12 species of reptiles, 528 species of macrolepidoptera (butterflies, insects), and 46 species of odonates (dragonflies) have been documented at Camp Edwards. The INRMP is presently being updated and these lists are constantly being updated based on recent surveys.

4.7 Endangered Threatened, and Rare Species

MESA (MGL c. 131A) and its implementing regulations (321 CMR 10.00) protects State-listed rare species. MESA prevents a loss or take of State-listed rare species. The NHESP manages the State-listed species and the MESA regulations. **Table 4-4** includes a summary of all State-listed species identified at Camp Edwards by rank. An updated list of State-listed wildlife species is provided in **Table 4-5** and plants are provided in **Table 4-6**. The Federal Endangered Species Act (ESA) requires that all Federal agencies shall seek to conserve threatened and endangered species and shall utilize their authorities in furtherance of the purposes of the ESA (Section 2(c)). MAARNG is presently working with both NHESP and USFWS regarding the survey, monitoring, and habitat management of listed species at Camp Edwards.

Based on surveys and observations made at Camp Edwards, earlier successional habitats (e.g., frost bottoms, SOS, sandplain grassland) are being lost to forest encroachment – especially within the Impact Area and other UXO hazard areas where the MAARNG is unable to implement management projects. The primary driver behind declines in some of the State-listed moths at Camp Edwards is a lack of fire in SOS

and the dramatic incursion of pitch pines into shrublands and frost bottoms after the secession of artillery fires in the Impact Area.

Table 4-4: Summary of State-Listed Rare Species Documented at Camp Edwards

Taxon	Special Concern	Threatened	Endangered	Total
Birds	1	3	1	5
Reptiles/amphibians	1	1	0	2
Odonates	0	1	0	1
Moths and Butterflies	12	6	0	18
Beetles	1	0	0	1
Crustacea	0	0	1	1
Mammals		0	4	0
Subtotal	15	11	6	32
Plants	0	1	6	7
Total	15	12	12	39

Table 4-4 includes the State-listed plants that have been identified at Camp Edwards.

Table 4-5: State-Listed Plant Species at or Near Camp Edwards

Scientific Name	Common Name	State Status	Federal Status	Habitat
<i>Eleocharis ovata</i>	Ovate Spike-sedge	E	-	Wetlands
<i>Juncus debilis</i>	Weak Rush	E	-	Wetlands
<i>Malaxis bayardii</i>	Bayard's Green Adder's Mouth	E	-	PPSO, MG
<i>Ophioglossum pusillum</i>	Adder's Tongue Fern	T	-	Wetlands
<i>Rhynchospora torreyana</i>	Torrey's Beak Sedge	E	-	SOS Frost Bottoms
<i>Scleria pauciflora</i>	Papillose Nut Sedge	E	-	PPSO, MG, Powerlines
<i>Triosteum perfoliatum</i>	Broad Tinker's Weed	E	-	SOS Frost Bottoms

Source: NHESP letter dated 16 August 2019

E = Endangered, T = Threatened, SC = Special Concern

Table 4-6: State-Listed Rare Species at Camp Edwards

Scientific Name	Common Name	State Status	Federal Status
Birds			
<i>Ammodramus savannarum</i>	Grasshopper sparrow	T	-
<i>Bartramia longicauda</i>	Upland sandpiper	E	-
<i>Caprimulgus vociferus</i>	Eastern Whip-poor-will	SC	
<i>Circus cyaneus</i>	Northern harrier	T	-
<i>Pooecetes gramineus</i>	Vesper sparrow	T	-
Reptiles and Amphibians			
<i>Scaphiopus holbrookii</i>	Eastern spadefoot	T	-
<i>Terrapene carolina</i>	Eastern box turtle	SC	-
Odonates			
<i>Enallagma recurvatum</i>	Pine Barrens bluet	T	-
Moths and Butterflies			
<i>Abagrotis nefascia</i>	Coastal heathland cutworm	SC	-
<i>Acronicta albarufa</i>	Barrens daggermoth	T	-
<i>Callophrys irus</i>	Frosted elfin	SC	-
<i>Catocala herodias gerhardi</i>	Gerhard's underwing moth	SC	-
<i>Chaetagnathia cerata</i>	Waxed sallow moth	SC	-
<i>Cicinnus melsheimeri</i>	Melsheimer's sack bearer	T	-
<i>Cingilia catenaria</i>	Chain dot geometer	SC	-
<i>Cycnia inopinatus</i>	Unexpected cycnia	T	-
<i>Euchlaena madusaria</i>	Sandplain euchlaena	SC	-
<i>Dargida rubripennis</i>	The Pink streak	T	-
<i>Hemaris gracilis</i>	Slender Clearwing Sphinx	SC	-
<i>Hemileuca maia</i>	Barrens buckmoth	SC	-
<i>Lycia ypsilon</i>	Pine barrens lycia	T	-
<i>Metarranthia pilosaria</i>	Coastal swamp metarranthia	SC	-
<i>Papaipema sulphurata</i>	Water-willow stem borer	T	-
<i>Psectraglaea carnosa</i>	Pink sallow moth	SC	-
<i>Speranza exonerata</i>	Pine barrens speranza	SC	-
<i>Zale lunifera</i>	Pine barrens zale	SC	-
Beetles			
<i>Cincindela purpurea</i>	Purple tiger beetle	SC	-
Crustacea			
<i>Eulimnadia agassizii</i>	Agassiz's clam shrimp	E	-
Mammals			
<i>Myotis septentrionalis</i> *	Northern long-eared bat	E	T
<i>Myotis leibii</i> *	Small-footed myotis	E	-
<i>Myotis lucifugus</i> *	Little brown bat	E	-
<i>Perimyotis subflavus</i> *	Tri-colored bat	E	-

Source: NHESP letter dated 16 August 2019

* From surveys performed at Camp Edwards

E = Endangered, T = Threatened, SC = Special Concern

4.8 Infrastructure and Transportation

Existing range buildings (i.e., ammunition building) and a range tower are present at the KD Range. These will be demolished for the construction of the new MPMG Range Buildings. In addition, the existing target berms, concrete walls, target supports, etc. will be demolished. Electricity is supplied to the range via overhead wires by Eversource. There is no sewer or water available at the site.

Camp Edwards has an extensive transportation system including 120 miles of roads, a railroad access point, and an ARNG aviation facility with associated access points throughout the training area. Railroad access from the Bourne-Falmouth railroad line has historically served to transport large tracked vehicles (e.g., tanks and APCs) and other equipment that is typically too large for transporting on existing public roads to Camp Edwards. The off-installation transportation systems serving Camp Edwards are in good condition and provide adequate access throughout the installation. U.S. Highway 6 and State Highways 28 and 130 border the Camp Edwards to the north, west, and east, respectively. State Highway 28 provides access to the Camp Edwards via the Bourne Gate; the Sandwich Gate is accessible via State Highway 130; and the Falmouth Gate is accessible via State Highway 151. The Bourne Gate is the most commonly used gate. Local highways are located on the east and west of Camp Edwards with the main access to Camp Edwards from MacArthur Boulevard to the west. This is a State controlled four lane divided highway which leads north to the Bourne Bridge where it connects to State Highway 25 and State Highway 495. Dirt roads are present to the north of the KD Range.

4.9 Recreation and Open Space

Camp Edwards has been a limited access facility since 11 September 2001. In addition, access to the 2,200 acre Impact Area is only accessed for UXO surveys. Persons interested in utilizing Camp Edwards for recreational or other purposes must request access from Camp Edwards Headquarters, Range Control, and the Camp Edwards E&RC. Consistent with this, SOPs for hunting on Camp Edwards were created by the Natural Resource Office in conjunction with Camp Edwards Headquarters, Facilities Engineers, Range Control, Massachusetts Division of Fisheries and Wildlife, the Senior Environmental Corps. Each year, sections of Camp Edwards on JBCC are open to deer hunting in the fall and turkey hunting in the spring. About 11,000 acres of this active military training area are open to hunting. However, access is strictly controlled. Camp Edwards is the largest tract of undeveloped land on Cape Cod. This area is also the Upper Cape Water Supply Reserve created for the permanent protection and coordinated management plans for water supply, wildlife, and open space protection, consistent with necessary and compatible military activities.

4.10 Cultural Resources

The National Historic Preservation Act (NHPA) of 1966, as amended (Public Law 89-665; 54 USC §300101 et seq.), establishes the policy of the Federal government to provide leadership in the preservation of historic properties and administer Federally-owned or controlled historic properties. Section 106 of the NHPA (54 USC §306108) requires Federal agencies to consider the effect an undertaking may have on historic properties; its implementing regulations, 36 CFR Part 800, describe the procedures for identifying and evaluating historic properties; assessing the effects of Federal actions on historic properties; and consulting to avoid, reduce, or minimize adverse effects. As part of the Section 106 process, agencies are required to consult with the State Historic Presentation Office (SHPO). The Section 106 process requires each undertaking to define an Area of Potential Effect (APE). An APE is “the geographic area or areas

within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any properties exist...[and the APE] is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking” (36 CFR Part 800.16[d]).

The MAARNG has been managing cultural resources at Camp Edwards for several years under the Integrated Cultural Resources Management Plan (ICRMP), last revised in 2009. In 2016, an archaeological survey of the MPMG Range was performed by The Public Archaeology Laboratory, Inc. (PAL) with no “finds” reported. A Project Notification Form (PNF) was submitted to MHC for comment. No comment was received and a MFR is included in **Appendix E** documenting this process.

4.10.1 Archaeological and Architectural Resources

The existing KD Range and Project area are in locations assessed with low archaeological sensitivity (Goodfellow 2003). At the request of MAARNG, PAL conducted an intensive (locational) archaeological survey of the KD Range in 2016 as part of planning efforts for the range expansion (Heitert and Fahey 2016). The survey consisted of the excavation of 94 shovel test pits across 103 acres flanking the east and west sides of the existing range. No artifacts were collected or cultural features identified as part of the survey and PAL recommended no additional archaeological survey of the then-proposed expansion area. Massachusetts Historical Commission (MHC) concurred with PAL’s recommendation on 14 October 2016. No further correspondence or response to a Project Notification Form (PNF) submitted earlier this year.

The Preferred Alternative (Project) area abuts and expands north of the existing range into a landscape that also has been assessed with low archaeological sensitivity and is located within the Impact Area. In consideration of PAL’s 2016 survey results and the identical results of other surveys conducted in low archaeological sensitivity areas (e.g., Heitert and Fahey 2017; Luttge and Heitert 2018), the Project area – inclusive of the previously surveyed and unsurveyed acreage – has low/no potential to affect potentially significant archaeological resources.

4.10.2 Native American Consultation

Based on the MAARNG’s ICRMP, Federally-recognized tribes that are historically affiliated with the Camp Edwards geographic region have been and will be invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. These include the Wampanoag Tribe of Gay Head – Aquinnah, the Mashpee Wampanoag Tribal Council, and the Stockbridge – Munsee Community Tribe of Mohican Indians of Wisconsin. Tribal consultation has been initiated for the Project. Consultation with the Mashpee Wampanoag is also conducted through the EMC and the CAC as these groups include representatives of the Tribes. Correspondence was initiated via certified mail and letters sent to the tribes. No responses have been received to date.

4.11 Built Environment

Camp Edwards specializes in supporting military training for infantry exercises. Camp Edwards is comprised of approximately 582 acres (4%) of improved grounds, 675 acres (5%) of semi-improved grounds, and 13,311 acres (91%) of unimproved grounds. The land use of Camp Edwards consists of certain training activities, including assembly, tactical maneuvering, tactical bivouacking, small arms range firing, engineering, ammunition storage, support, maintenance, and aviation facilities, and environmental management. Tactical maneuvering, either on foot throughout the training area or in vehicles along roads, occurs as Soldiers travel from the assembly area to their area of operation. From the area of operation,

Soldiers engage in training missions specific to their mission requirements (e.g., engineering, infantry, medevac) throughout the training area. Small arms range firing and ammunition storage at the Ammunition Supply Point (ASP) also occur in the northern training area. The support, maintenance, and aviation facilities exist in a centralized region within the Cantonment Area.

JBCC is divided into two major sections. The southern section is comprised of approximately 5,000 acres of Cantonment Area, which is the industrialized portion of the base where administrative buildings, barracks, vehicle and equipment maintenance shops, housing, and runways are located. The northern section is comprised of approximately 15,000 acres and is a largely wooded area with rolling topography, trails, and paved roads with training areas, ranges where small arms firing and maneuver training occur, and the Central Impact Area where small arms firing and maneuver training occur and is primarily undeveloped. Camp Edwards is the largest tract of undeveloped land on Cape Cod. This area is also the Upper Cape Water Supply Reserve created for the permanent protection and coordinated management plans for water supply, wildlife, and open space protection, consistent with necessary and compatible military activities.

The Impact Area is a 330-acre area located within the Camp Edwards Impact Area (totaling 2,200 acres) and was the primary target area for artillery, mortar, and other firing activities from the early 1900s until firing ceased in 1997 due to contamination concerns. The Impact Area is considered a high hazard impact area due to UXO from weapon systems and due to safety concerns, no public access is allowed in this portion of the installation. The KD Range is located immediately south and separated from the Impact Area by Wheelock Road, an unimproved dirt road.

There are six active small arms ranges on Camp Edwards, which the MAARNG uses for weapons familiarization, weapons zeroing and qualification located within the 2,200-acre Impact Area but outside of the Impact Area. Camp Edwards has a series of paved and dirt roads throughout the area which is used for training in addition to over 7,600 acres of training areas comprised primarily of woodlands.

The installation is bounded by U.S. Highway 6 to the north, State Highway 130 and the Forestdale area of the town of Sandwich to the east, the Frances A. Crane Wildlife Management Area to the south, and State Highway 28 to the west. The predominant land use surrounding Camp Edwards is residential or commercial development. To the south of Camp Edwards is the Cantonment Area at Otis ANGB, the USCG Air Station Cape Cod, USCG Housing, and the Veteran's Affairs (VA) Cemetery.

The area located immediately to the east of the JBCC boundary is comprised of single-family residences and is the most densely populated area surrounding Camp Edwards. Land to the east of Camp Edwards near the KD Range is all residential (see **Figure 1.1**). The KD Range is approximately 300 meters (0.2 miles) west of the nearest residential homes located off of Meredith Road in the Forestdale neighborhood of Sandwich.

The existing KD Range is not presently used for live-fire training but is used for other training operations such as UAS. The Massachusetts Unmanned Aircraft Systems Test Center (MA UASTC) coordinates all non-military UAS flight operations at JBCC. The KD Range is the primary location for UAS operations in the Camp Edwards Training Area.

4.12 Oil and Hazardous Materials

According to the 2015 Environmental Condition of Property (ECOP) Pre-Construction Assessment (PCA) prepared by GEI Consultants specific to the KD Range, the following findings were presented:

- Between the mid-1970s and 1990s, the KD Range (formerly referred to as the CTR-1, or the CTR-1 Aerial Gunnery Range) was used for a variety of types of ordnance, including small arms marksmanship, grenade launching and rocket-type munitions training. The KD Range is currently used for unmanned drone flight training.
- In December 1993, the KD range was cleared of surface ordnance and explosives including ordnance remnants such as 22 mm rounds, 35 mm sub caliber rounds, and Dragon and tube-launched, optically-tracked, wireless-guided missile motors. However, a 2001 report concluded that several items of various types of Munitions and Explosives of Concern (MEC) had been discovered at the surface and that possible MEC exists in the subsurface.
- During site reconnaissance, an armored personnel carrier was observed, previously used for target practice. Visible debris from fired rockets and missiles including portions of housings, tail fins, and electronic components was also observed.
- The Property (KD Range) is listed by the MassDEP under Release Tracking Number (RTN) 4-15033. Concentrations of metals including antimony, copper, and lead, the explosive compound nitroglycerin (NG), and pesticide dieldrin, were detected in surface soil samples above the MCP Reportable Concentrations (RCs). MAARNG conducted a Rapid Response Action (RRA) to address soil contamination and protect groundwater conditions in 2000. Surface soil was excavated and removed from six areas to depths of approximately 1 to 2 feet. Excavated areas included the primary target area, pistol and rocket firing points, and the suspected former target area.
- The KD Range is also listed by the MassDEP under RTN 4-15075. The MAARNG investigated the potential application of the pesticide dieldrin at the KD Range and JBCC at the request of MassDEP. Based on historic file reviews no records documenting the application of dieldrin at the JBCC have been found. However, based on the distribution and concentrations detected in soil across the JBCC, it was concluded that application was the most likely source of the pesticide.
- There were no available records of current or past hazardous materials use or hazardous waste generation. No hazardous materials or wastes were observed during the site reconnaissance. The Range Captain stated that all oils and fuel are removed from vehicles before they are used for target practice.
- Per the EPSs, no vehicle or equipment maintenance is permitted in the Camp Edwards Training Area. Also, per EPSs, no storage or movement of fuel in anything larger than a five gallon can is permitted without prior approvals from MAARNG and EMC.
- Past and present operations and waste disposal practices at the JBCC have resulted in subsurface contamination including areas near the Impact Area of the JBCC where the KD Range is located. Contaminants associated with eight JBCC areas are fly ash, bottom ash, waste solvents, waste fuels, herbicides, and transformer oil. According to groundwater contaminant plume maps, the nearest plume, located on L Range, is located 0.5 mile to the east of the KD Range. The plume is being remediated. Based on the mapped extent of this plume, the plume is unlikely to affect conditions at the KD Range.
- According to the IAGWSP Final JBCC Training Areas Investigation Report (2 April 2018), the IAGWSP will remove the munitions debris and targets from the KD Range and collect a confirmatory soil sample from the primary target Army Personnel Carrier (APC). No additional action is

recommended for KD Range. Based upon investigation results, residual dieldrin concentrations in some soils are somewhat elevated. The observed concentrations of dieldrin ranged from 0.0026 to 0.18 mg/Kg with an overall average concentration of 0.048 mg/Kg, which is slightly higher than the JBCC background concentration of 0.03 mg/Kg. However, it is below the MCP S-1/GW-1 standard of 0.08 mg/Kg. It is likely that these detections are the result of use of a pesticide for its intended purpose according to the manufacturer's specifications. Therefore, no additional response action is recommended for the dieldrin detections.

- Sampling in 2018 identified RDX (an explosive) and HMX (a high melting explosive) were reported in exceeding MassDEP S-1/GW-1 standards. As required by the Final Training Areas Operable Unit Decision Document (February 2019), the APC was removed and soil will be excavated to a depth of one-foot from a 35 x 35-foot grid from this area. All excavated soil will be placed on and covered with impermeable plastic sheeting and will be characterized for offsite disposal at an approved facility.

The ECOP PCA concluded with the following: "Based on our evaluation of current Property conditions and our review of available Property records, we have categorized the Property as Category III. Category III is a site known to be contaminated, or there is a strong suspicion contamination will be encountered during construction. Specifically, MEC has been discovered at the surface and possible MEC [munitions and explosives of concern] exists in the subsurface. In addition, known propellant and explosive compounds and heavy metals, including lead, resulting from past range activities have been identified in soil. Targeted soil remediation has been performed, but there is a possibility that additional contamination is still present."

In January of 2000, the USEPA issued Administrative Order 3 (AO3), which required the NGB and the MAARNG to conduct rapid response actions, feasibility studies and remedial actions to address contamination in certain areas of the training ranges and Impact Area. It required the NGB to undertake a feasibility study to address UXO and munitions, which have been disposed of or fired at the training ranges and Impact Area. It also required the NGB, upon approval from USEPA, to implement remedial measures relating to UXO and munitions. As a result of the evidence of contamination, the USEPA in January 2000 ordered the NGB to begin the process for the removal of UXO from the base and to clean up contaminated groundwater and soils.

Soil investigations at KD Range were intended to focus on evaluation of the nature and extent of any contaminants potentially associated with target practice for multiple types of ordnance, including past use for rocket training. Investigations at these ranges focused on firing locations where propellants may have been present and target locations where explosives may have been deposited in compliance with the SDWA §1431(a), 42 USC §300i(a), as amended, and with AO3. Remedial actions to address localized contaminated soil have been conducted at the KD Range and involved soil excavations focused on localized soil contamination. At KD Range (West) over 500 yards of soil were excavated in 2000 to reduce elevated concentrations of several explosives including hexahydro-1,3,5-trinitro-1,3,5-triazine, octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine, and trinitrotoluene.⁷

The MAARNG maintains a Hazardous Waste Management Plan, as well as an installation-specific Spill Prevention Control and Countermeasure Plan (SPCC). This plan identifies potential sources of pollution, BMPs to limit this potential, procedures to respond to pollution events, and procedures to handle hazardous materials.

⁷ USEPA Decision Document February 2019

5.0 Assessment of Impacts

The Preferred Alternative, Reduced-Scale Alternative, Full Build Alternative, and No Action Alternative were evaluated against the following significance criteria to determine if impacts would result from the MPMG Range on the following environmental resources.

5.1 Topography, Geology, and Soils

No adverse environmental impacts on topography, geology, and soils are anticipated. Work associated with soil during construction is provided in **Section 6.1** and soil remediation is discussed in **Section 6.12**.

5.2 Water Resources – Groundwater

The groundwater beneath the proposed MPMG Range is being managed by the Impact Area Groundwater Study by the IAGWSP. Construction and operation of the MPMG Range will be coordinated with the IAGWSP regarding their monitoring and treatment programs. Due to the depth of groundwater beneath the site, no impacts to groundwater are anticipated during the construction and operation phases of this Project.

5.3 Air Quality

Sensitive receptors for air quality assessments include, but are not limited to, asthmatics, children, and the elderly, as well as specific facilities, such as long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, and childcare centers. The MPMG Range is proposed approximately 300 meters (0.2 miles) from the eastern JBCC boundary and the nearest offsite receptor (residential neighborhood, see **Figure 5.1**), making the potential air pathway to offsite residents highly unlikely. The nearest receptor on Camp Edwards is located over two miles to the southwest in the Cantonment area where residential areas are available for military personnel.

The Project would have non-significant, temporary effects on air quality. Construction of any range may generate some dust resulting from earth-moving operations during construction. This effect would be localized to the construction site and immediate surroundings and last for the duration of construction. This effect would be non-significant, localized to the construction area and would occur during daylight hours on weekdays during the construction period which is anticipated to be eight months. Effects on air quality from operating a training range would largely result from vehicles travelling to and from the range and would have a *de minimus* (negligible) effect on air quality. Under the Preferred Alternative, the Project would result in a *de minimus* localized, short-term increase in air emissions during construction from construction vehicles onsite and the short-term generation of fugitive dust due to proposed earth disturbance within the collective 209.0-acre construction area. This would not result in a significant or long-term adverse increase of criteria pollutants at the JBCC or the surrounding area. No adverse environmental impacts on air quality are anticipated therefore, no mitigation measures are proposed. Impacts would be similar for each of the MPMG Range layout alternatives. The No Action Alternative would not result in any change to air quality.

MAARNG will look into participating in MassDEP's Clean Air Construction Initiative (CACI) and the MassDEP Diesel Retrofit Program to mitigate the construction-period impacts of diesel emissions to the maximum extent feasible. The CACI program helps proponents identify appropriate mitigation for minimizing air pollution from construction vehicles such as retrofit of construction equipment with particulate filters and oxidation catalysts and/or use of on-road low sulfur diesel (LSD) fuel. The MAARNG

may consult with MassDEP to develop appropriate construction period diesel emission mitigation, which could include the installation of after-engine emission controls such as diesel oxidation catalysts or diesel particulate filters (DPFs).

5.4 Greenhouse Gas

As described in **Section 4.5**, the majority of CO₂ emitted from the Project, all alternatives, is generated from the land clearing and the biomass removal. For each alternative, the biomass removal accounts for anywhere between 97.4% and 98.1% of the total CO₂ generated. If you eliminate the land clearing (biomass removal) from the calculated totals in **Table 4-1** and compare the emissions to the 726 US Tons under the baseline conditions, the Preferred Alternative result in an increase of emissions of 32%, the Full Build resulting in an increase of 68% over baseline emissions. Mitigation is discussed in **Section 6.4** and focuses primarily on the land clearing emissions.

5.5 Noise

The alternatives were evaluated against the following criteria to determine if they would result in a significant impact on the noise environment:

- Alternative would create a Zone III (>104 dB) boundary that extends off-base during favorable weather conditions.
- Alternative would include routine activities that result in a Zone II that extends off-base.
- Alternative would substantially increase noise resulting from traffic.
- Alternative would result in substantial disruptions to nearby sensitive receptors.

As part of the preliminary planning process, Camp Edwards conducted a test fire at KD Range in August 2015, to simulate noise from the proposed MPMG range in the Southern Location Alternative. The results of the test fire showed noise levels did not exceed MassDEP levels for nuisance noise. As the 2015 study showed additional acreage off-base located within the Zone II, a revised more northern location was identified and assessed in the 2019 update for the Preferred Alternative Location. The USAPHC performed a Noise Assessment for the proposed MPMG Range in May of 2019 which analyzed the Preferred Alternative (with the .50 caliber lanes), the Reduced-Scale Alternative (without the .50 caliber lanes), and the Southern Location Alternative. The Full Build Alternative was not studied. A copy of this report is provided in **Appendix D**.

USAPHC developed noise contours using the Small Arms Range Noise Assessment Model (SARNAM) which is the standard U.S. Army small caliber weapons (.50 caliber and below) noise simulation program (US Army Corp of Engineers, 2003). The program requires operations data concerning types of weapons, quantity of ammunition, and range layout. The SARNAM calculation algorithms assume weather conditions or wind direction that favors sound propagation in all directions and includes baseline activities from other small arms ranges at Camp Edwards. **Figure 5.1** provides the Noise Zones from the Preferred Alternative and **Table 5-1** provides a summary of impacts.

Under this alternative, Zone III remains within the JBCC boundary. Zone II extends approximately 300 meters (0.2 miles) to the east beyond the eastern boundary where there are multiple residential neighborhoods as well as an elementary school. Short-term and long-term impacts to the local noise environment would be anticipated. Direct impacts would include short-term increased noise levels as a

result of land clearance activities and long-term increased noise levels as a result of proposed firing operations.

Noise generating sources during land conversion activities would be associated primarily with standard construction and maintenance equipment. These increased noise levels could directly affect the areas adjacent to the proposed range. Given the distance between the MPMG Range footprint and sensitive receptors (i.e., residential areas), coupled with the short duration of these activities, no effect to the off-base noise environment is anticipated to occur as a result of land clearing activities.

Indirect impacts include noise from workers commuting and material transport. Area traffic volumes and noise levels would increase slightly from travel to and from the site within Camp Edwards. Under the Preferred Alternative, the area near the proposed range activities would experience temporary increases in traffic noise during daytime hours and some night time hours during operations. These effects would be anticipated to be negligible because they are temporary and the location of the proposed range is relatively remote and heavily wooded.

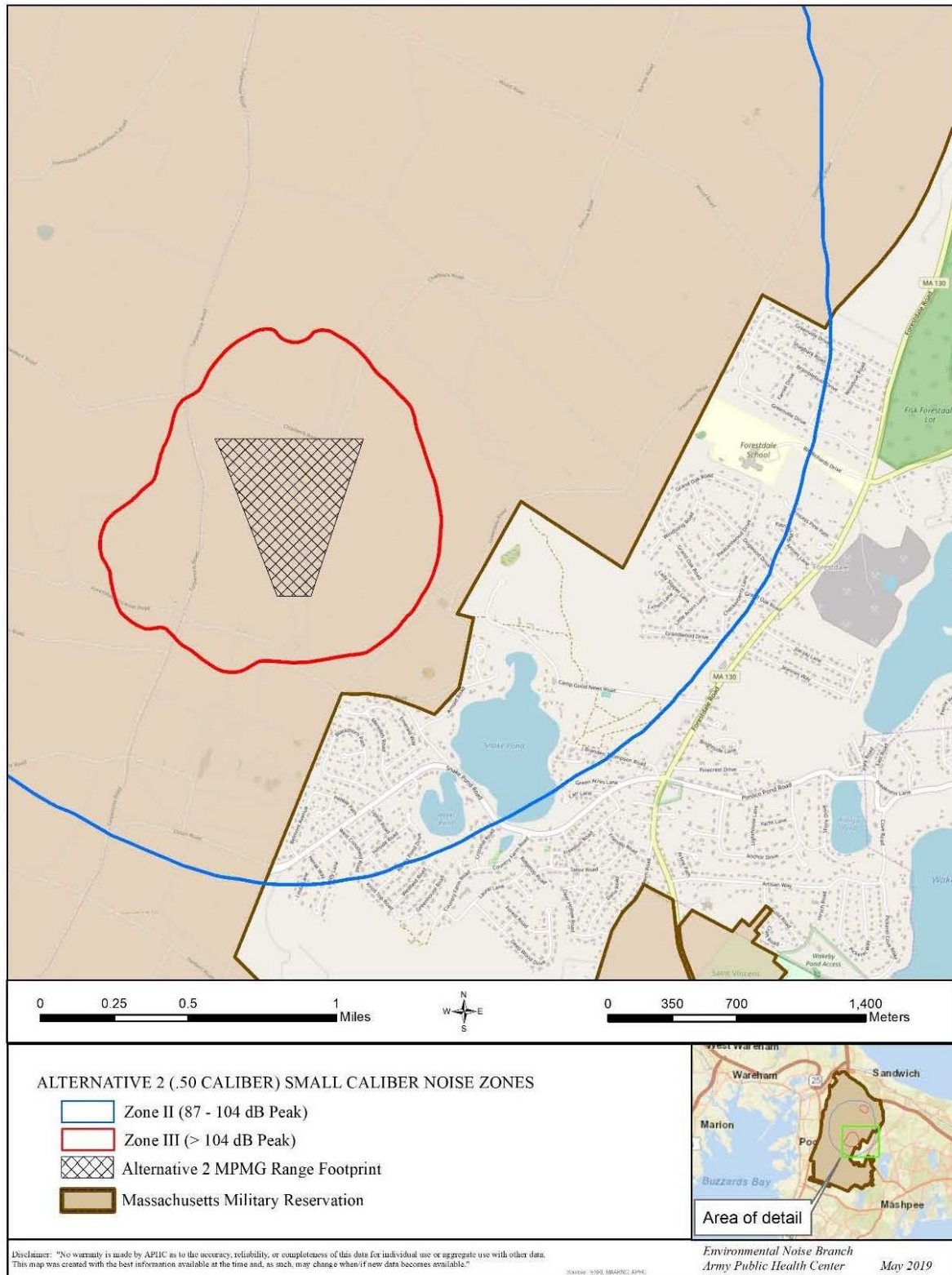
Table 5-1: Summary of Impacts from 2019 USAPHC Report

Noise Zone	Total Acreage	Off-Base Acreage	Total Acreage	Off-Base Acreage
Baseline				
Zone II (87-104 dB Peak)	2,754	26	-	-
Zone III (> 104 dB Peak)	394	0	-	-
Preferred Alternative (USAPHC Alternative 2)				
Noise Zone	Without .50 caliber		With .50 caliber	
Zone II (87-104 dB Peak)	3,293	127	7,323	832
Zone III (> 104 dB Peak)	693	0	802	0
Southern Location Alternative (USAPHC Alternative 1)				
Noise Zone	Without .50 caliber		With .50 caliber	
Zone II (87-104 dB Peak)	3,257	166	7,395	921
Zone III (> 104 dB Peak)	667	0	788	0

Legend:

	No Action Alternative
	Preferred Alternative (Project)
	Reduced-Scale Alternative
	Southern Location Alternative

Long-term operational noise impacts are anticipated due to increased site use and firing operations on the MPMG Range. While site usage would increase as no weapons training is presently occurring at the KD Range, overall Camp Edwards site usage would only increase by approximately 20% under the Preferred Alternative. Noise impacts associated with increased training use would be anticipated to be minimal and temporary.



Although the annual average noise levels are compatible with the surrounding area, there is potential for individual event peak noise levels to generate noise complaints within the Zone II located off-base. Potential noise impacts on the surrounding communities and property owners can vary based on weather conditions due to differences in sound propagation. Citizens within these areas may find the activity noticeable and distinct, and there is a moderate risk of MAARNG receiving noise-related complaints. Peak noise levels above 130 dB, subjectively defined as very loud or possibly startling, would not extend beyond the JBCC boundary. Therefore, proposed training activities are anticipated to have minimal long-term impacts on the local noise environment with implemented BMPs. Noise mitigation is described in **Section 6.5**.

Under the Reduced-Scale Alternative and Full Build Alternative, no short-term impacts on noise would occur during the construction phase similar to the Preferred Alternative. During the operations phase, long-term minimal impacts would occur as identified in **Table 5-1**. However, the impact would be less than the Preferred Alternative as the range size is smaller. Zone III remains within the boundary of JBCC. Although not studies, the Full Build Alternative would result in an increase of the Zone II off-site. Implementation of the No Action Alternative would have no effect on the current local noise environment. Training and operations at Camp Edwards would continue under current conditions at current locations and noise levels.

5.6 Biological Resources

The Preferred Alternative, Reduced-Scale Alternative, Full Build Alternative, and the No Action Alternative were evaluated to determine impacts to biological resources such as vegetation and wildlife. Rare Species impacts are discussed in **Section 5.7**. Impacts to vegetation and wildlife are discussed below.

5.6.1 Vegetation

Short-term minimal impacts to biological resources would be anticipated during land cover conversion within MPMG Range due to the removal of existing vegetation. As shown in **Figure 3.2**, the MPMG Range is comprised primarily of pine barrens, scrub oak shrublands, and grasslands which are home to State-listed rare species. These vegetative communities are abundant within Camp Edwards. No rare plants have been observed within the proposed MPMG footprint although access within the Impact Area has been limited. The Project allows for the opportunity to have the part of the MPMG footprint within the Impact Area cleared of UXO so plant surveys may occur. **Table 5-2** provides a breakdown of vegetative cover types as they relate to the proposed MPMG Range.

Additionally, large scale restorations of these habitats are being conducted across Camp Edwards. Rare species mitigation programs are already underway in consultation with NHESP. Under the Preferred Alternative, a total of approximately 170.5 acres of pine barrens would be cleared and permanently converted to maintained grassland. Native species would be used when revegetating the cleared areas where targets and support structures (i.e., access roadways) are not proposed. Impacts to vegetative communities at Camp Edwards are anticipated to be minor due to the relatively limited amount of tree clearing compared to the total habitat available at Camp Edwards and the management and restoration efforts being conducted.

Table 5-2: Proposed MPMG Range Footprint by Cover Type

Cover Type	MPMG Range Footprint	MPMG Range-specific Firebreaks	Total Project Footprint
PPOF	47.0	4.0	51.0
PPSO	51.0	3.0	54.0
SOS	62.5	3.0	65.5
MG	36.0	-	36.0
ROCA	2.5	-	2.5
Total Acres	199.0	10.0	209.0

* Roadway edges adjacent to Impact Area

5.6.2 Wildlife

Wildlife in the proposed footprint of the range would sustain direct and indirect, short-term and long-term minimal impacts associated with construction and land clearing activities and from proposed site maintenance and training activities (i.e., from noise). Wildlife would be expected to vacate the immediate areas during these activities if they are able. Some individuals of the less mobile species (i.e., small mammals, reptiles, amphibians) could potentially suffer loss of life during land disturbing activities. While species may be disturbed by increased human presence and noise levels, the relatively small areas of disturbance and large areas of undeveloped land make expected impacts to wildlife less-than-significant.

Large-scale habitat restorations are underway at Camp Edwards and established procedures are in place to avoid and minimize impacts to wildlife species from routine military activities. The Project would be anticipated to affect these species, but would be unlikely to adversely affect them if the following procedures and management measures are followed as described in **Section 6.6**.

Overall, proposed land clearing would be minor relative to the available habitat at Camp Edwards. Further, MAARNG actively manages its property for the benefit of wildlife, including migratory birds. To minimize potential impacts associated with vegetation removal specifically in the Project area, land clearing activities would be scheduled to occur, to the extent feasible, outside the breeding season or late in the breeding season, under guidance from the E&RC.

Potential long-term effects to migratory birds could occur during land management operations (e.g., periodic mowing) and training activities. Proposed training activities at the proposed range could have the potential to injure or kill migratory birds, but the likelihood of birds being struck during operational activities is considered highly unlikely. Individual birds may temporarily relocate from the Project area during training exercises to other suitable habitat within Camp Edwards due to disturbance from noise and/or human presence. However, these birds would likely return upon completion of the training exercises. Therefore, no significant adverse impacts to migratory birds would be anticipated. To minimize potential impacts to migratory birds and special status species, operational activities would be conducted in accordance with the Camp Edwards INRMP and the Memorandum of Understanding (MOU) between the DoD and USFWS to promote the conservation of migratory birds. In the unlikely event that proposed training activities start a fire on the range, the fire would be extinguished in accordance with existing range management rules before it reaches adjacent natural areas.

Under the Preferred Alternative, impacts to biological resources would involve the removal of 170.5 acres of trees. Impacts to vegetation and wildlife would be less under the Reduced-Scale Alternative which is Phase 1 of the Preferred Alternative, as there would be approximately 71.0 acres less disturbance. Under the Full Build Alternative, there would be an additional 97 acres of impact to the biological resources. Under the No Action Alternative, no impacts to biological resources would occur. Nonetheless, The No Action Alternative and the Reduced-Scale alternative would not allow the management of the SOS frost bottom located north of the KD Range maintaining the dramatic incursion of the pitch pines into this significant habitat.

5.7 Endangered Threatened, and Rare Species

The following section describes the Project impacts to State-listed species including rare moths and Eastern Box Turtle. In addition, this section describes avoidance and minimization efforts to reduce impacts to these and other species. The MPMG Range Footprint is 199.0 which includes the 38.5 acres of the KD Range. In addition to the MPMG Range, an additional 10.0 acres of range specific firebreaks are proposed for a Project Footprint of 209.0 acres. Of the 209.0 acres, approximately 2.5 acres of the southern part of the KD Range the houses the previously existing ROCA is not considered as rare species habitat. Based on the presence of PPOF, PPSO, SOS, and MG, it is presumed that all remaining acreage (206.5 acres) within the Project Footprint is considered as rare species habitat. The draft CMP Application is provided in **Appendix B** which provides additional detail. Mitigation efforts are described in **Section 6.7**.

Table 5-3: MPMG Range Impacts

Acres	Description
199.0	MPMG Range Footprint
10.0	Firebreak Footprint
209.0	Project Footprint
209.0	Project Footprint
2.5	ROCA Footprint
206.5	MPMG Range Rare Species Take Footprint
206.5	MPMG Range Take Footprint
36.0	MPMG Range Grassland Take Footprint
170.5	MPMG Range Pine Barrens Take Footprint

Under the Preferred Alternative, impacts to rare species would involve the removal of 170.5 acres of trees within mapped habitat. Impacts to rare species would be less under the Reduced-Scale Alternative which is Phase 1 of the Preferred Alternative, as there would be approximately 71.0 acres less clearing of trees. Under the Full Build Alternative, there would be an additional 97 acres of tree removal. Under the No Action Alternative, no impacts to rare species would occur. Nonetheless, the No Action Alternative and the Reduced-Scale alternative would not allow the management of the SOS frost bottom located north of the KD Range maintaining the dramatic incursion of the pitch pines into this significant habitat.

5.8 Infrastructure and Transportation

No adverse environmental impacts on infrastructure and transportation are anticipated. For the construction of the firebreak roadways associated with the MPMG Range, 10.0 acres (4.5 miles) of pine barrens will be impacted. These impacts are addressed under **Section 5.7** for rare species impacts. The new roadways are expected to be a benefit for fire management relative to the MPMG Range but will also be available for controlling any wildland fires which may occur at Camp Edwards. There will be a temporary increase in construction equipment although this is anticipated to be minimal as all soils will be reused on site to the extent possible. This will almost eliminate traffic on local roads outside of the base.

5.9 Recreation and Open Space

No short-term adverse environmental impacts on recreation and open space are anticipated. Active programs exist at Camp Edwards to allow hunting under controlled conditions. Hunting will not be allowed when the MPMG Range is in operation due to the location of the SDZs and for the safety of the users of Camp Edwards.

5.10 Cultural Resources

As the MPMG Range Site has low/no potential to affect potentially significant archaeological resources, no adverse environmental impacts on cultural resources are anticipated.

5.11 Built Environment

The proposed MPMG Range is in compliance with the MMR Master Plan and with existing uses at Camp Edwards, therefore, no adverse environmental impacts on the built environment are anticipated.

5.12 Oil and Hazardous Materials

The Preferred Alternative, Reduced-Scale Alternative, Full Build Alternative, and the No Action Alternative were evaluated against the following significance criteria to determine if they would result in a significant impact from the use of oil and hazardous materials (OHM):

- Alternative would substantially increase generation of, or exposure of the public to, hazardous substances.
- Alternative would substantially increase the presence of hazardous substances in the environment (i.e., contamination).
- Alternative would substantially restrict the use of property due to hazardous waste, materials, or potential site remediation requirements.

Under the Preferred Alternative, short-term and long-term impacts associated with oil and hazardous waste (OHW) would be anticipated due to minor land conversion activities (short-term) and maintenance and training operations (long-term). Impacts would be managed through BMPs and ongoing regulatory compliance. Implementation of the Preferred Alternative would not substantially affect the installation's hazardous materials storage and handling procedures and hazardous waste disposal processes.

In general, the potential short-term and long-term impacts related to OHW would result from collective implementation of the Preferred Alternative, rather than from any one component. The Preferred Alternative would produce minor increases in handling, storage, use, transportation, and disposal of OHW. The anticipated increases would include additional vehicle and equipment use associated with vegetation removal activities, site maintenance, and training operations. These proposed activities would have potential contamination sources, including such products as diesel fuel, oil, antifreeze, and lubricants. Even without major release events, multiple minor releases could have potential effects to the environment. Releases over a long period of time could potentially lead to soil contamination, and thus could require some form of remediation. All OHW that would be used or generated would be handled and disposed of in compliance with Federal and State requirements, as well as the EPS to minimize potential impacts to the extent feasible. No stationary sources of hazardous or toxic materials/wastes occur within the proposed MPMG Range. The area is accessed occasionally by military and civilian vehicles. Examples of hazardous materials often associated with vehicles include antifreeze, motor oil, brake fluid, hydraulic oil, grease, battery acid, fuel oil, diesel fuel, and other fuels for vehicle maintenance.

Under the Reduced-Scale Alternative, potential OHW impacts would largely be the same as those described (i.e., minor) under the Preferred Alternative. Under the Full Build Alternative, the same potential OHW impacts would occur although the construction period would be longer increasing the potential for an incident to occur. Implementation of the No Action Alternative would have no effect with respect to OHW at Camp Edwards. All phases will require the use of UXO and MEC contractors to assess areas vegetated with trees before land clearing occurs.

5.13 Construction Phase Impacts

The MAARNG will evaluate construction period impacts, including erosion and sedimentation, air quality and solid waste disposal and commit to measures to minimize construction impacts and ensure the Project is consistent with the applicable Solid Waste and Air Quality control regulations and applicable EPS. A construction management plan will be prepared by MAARNG for approval by the EMC with more details on these impacts and associated mitigation. The Preferred Alternative would be constructed in two phases as previously described in **Section 1.5**. See **Section 6.13** for additional mitigation information.

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6.0 Mitigation Measures

6.1 Topography, Geology and Soils

No adverse environmental impacts on topography, geology, and soils are anticipated other than from grading or the construction of the MPMG Range. The MAARNG will prepare a detailed, site-specific Erosion and Sedimentation Control Plan to address all earth-disturbance aspects of the Project. The Erosion and Sedimentation Control Plan will include standard BMPs, such as specific guidelines and engineering controls to address anticipated erosion and resultant sedimentation impacts from establishing and operating the proposed MPMG Range. Soil contamination, if encountered, will follow procedures described in **Section 6.12**. The MAARNG will implement the following measures:

- Install and monitor erosion-prevention measures such as silt fences and water breaks, sedimentation basins, filter fences, sediment berms, interceptor ditches, straw bales, rip-rap, and/or other sediment control structures; re-spreading of stockpiled topsoil; and seeding/revegetation of areas temporarily cleared of vegetation.
- Plant and maintain native soil-stabilizing vegetation on the range where soils have been disturbed.

6.2 Water Resources – Groundwater

Due to the depth of groundwater beneath the site (100 feet deep), no impacts to groundwater are anticipated during the construction and operation phases of this Project. As such, mitigation measures are not proposed. Nonetheless, the MAARNG will conduct periodic visual inspections to verify that the Erosion and Sedimentation Control Plan is being followed and is working. Long-term groundwater protection during training operations would be accomplished by implementing stormwater BMPs, maintaining vegetative cover, and implementing the applicable EPS. The Site is located within the IAGWSP and may be subject to the MCP and the USEPA SOWA AOs for Camp Edwards. Environmental sampling and investigation activities are ongoing at portions of these sites. MassDEP recommends that the proposed Project be designed and constructed to not impede any ongoing or future environmental site investigation, remediation, system performance and/or monitoring activities at the MMR. The MAARNG will work closely with the Air Force Civil Engineer Center (AFCEC), Army National Guard, USEPA and MassDEP to coordinate activities during the design and construction of the proposed MPMG Range to avoid or mitigate impacts.

No dewatering is anticipated during construction due to the depth of groundwater beneath the site and the relatively shallow construction of the MPMG Range and associated buildings.

Pursuant to the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, MGL c. 21E, the MAARNG must notify MassDEP if oil, hazardous material and/or UXO and MEC are identified or released during Project construction. The MAARNG should commit to ensuring that the Project contractors and sub-contractors maintain an emergency response plan for performing appropriate response actions in the event contamination is encountered during Project construction.

6.3 Air Quality

The MAARNG would ensure dust control associated with land clearing activities and proposed training activities are conducted in accordance with MassDEP – Air and Climate Division guidelines and EPS Air Quality Performance Standard 8 (which requires compliance with the SIP and the CAA). To minimize the potential for adverse air quality impacts, the MAARNG would implement the following typical dust control BMPs, as applicable:

- Use appropriate dust suppression methods during on-site construction activities, and if necessary, during dry weather training activities (i.e., available methods include application of water [fresh water only], soil stabilizers, or vegetation; use of enclosures, covers, silt fences, or wheel washers; and suspension of earth-movement or disturbance activities during high wind conditions);
- Require a speed of less than 15 miles per hour for land clearing equipment on unpaved surfaces;
- Use low volatile organic compounds supplies and equipment;
- Repair and service vehicular and construction equipment to prevent excess emissions;
- Shut down heavy equipment when not needed; and
- Clean excess soil from heavy equipment and trucks leaving the construction zone to prevent off-site transport.
- Dust-reducing measures would be briefed to the contractor or Soldiers responsible for implementing these activities.
- The MAARNG's on-site manager would be responsible for bringing air quality issues, if they arise, to the Range Control and the MAARNG Environmental Office.

6.4 Greenhouse Gas

Mitigation for the Proposed Project includes phasing of the construction and preservation of forested acreage within Camp Edwards. The Project will be constructed in two phases as described with the first phase being the Reduced-Build Alternative. Following the construction of the first phase, the two extended lanes will be constructed with the total impacts represented by the Preferred Alternative. Substantial mitigation efforts are being proposed relative to impacts to rare species in consultation with the NHESP which includes the preservation of approximately 310 acres of land within Camp Edwards that is presently forested. Other management strategies includes the management of approximately 832 acres of forests through mechanical forestry. The land preservation acreage alone provides mitigation for the impacts from the Proposed Project. Mitigation will continue each year with the annual sequestration occurring in the preserved forests. Grassland alteration during land clearing will also result in the release of CO₂ but will be mitigated by the replanting and restoration of the range floor with native grasses.

In addition to the annual sequestration, mature forests sequester carbon throughout its life. One acre of forest provides 230 US Tons of sequestration. The estimated amount of sequestered carbon in the 13,500 acres of forest at Camp Edwards is estimated to be approximately 3,105,000 US Tons. One acre of grassland provides 10 US Tons of sequestration. The estimated amount of sequestered carbon in the 175 acres of grassland at Camp Edwards is estimated to be approximately 1,750 US Tons of sequestration. The annual GHG sequestration and lifetime sequestration from the mitigation acreage is summarized in **Table 6-1**.

Camp Edwards continues to provide carbon sequestration on an annual basis through maintenance of forested land. Construction of the Proposed Project would only represent 1.3% of the carbon sequestered

in the forests at Camp Edwards. The release of CO₂ from the Proposed Project will be mitigated in 3.5 years based on just the annual sequestration of GHG provided by the forested land at Camp Edwards. According to the latest GHG emissions inventory by Massachusetts, in CY 2016, the state sources emitted 74,200,000 million metric tons of CO₂e emissions. This is equivalent of 81,620,000 US tons of CO₂e emissions in CY 2016 where complete dataset was available. The estimated CO₂e emissions for the Preferred Alternative (immediately after project completion) represents an insignificant amount (less than one hundredth fraction of 1%). Regardless, after the completion of Project, the continued annual sequestration by forested land at Camp Edwards will make up for the release during Project construction. Please refer to **Appendix H** for the GHG Analysis.

Table 6-1: Sequestration and Mitigation

Management Action	Acreage	Annual Sequestration		Lifetime Sequestration	
		Rate*	US Tons	Rate	US Tons
Land Preservation	310	0.85 US Tons/acre/year	263.5	230 US Tons/acre	71,300
Forestry Management	832	0.85 US Tons/acre/year	707.2	230 US Tons/acre	162,012
Total Mitigation	1,142	0.85 US Tons/acre/year	967.3	230 US Tons/acre	233,312
Forests at Camp Edwards	13,500	0.85 US Tons/acre/year	11,475	230 US Tons/acre	3,105,000

* see Section 1.8

6.5 Noise

As a result of the noise studies, the location of the MPMG Range has been shifted to the north to reduce the Zone II location within the adjacent residential areas. Therefore, the noise impacts are being mitigated partly through the design. In addition, the USAPHC provided the recommendation to provide public notification of upcoming training events, particularly the .50 caliber activity as mitigation. A Noise Notification Protocol has been established in the SONMP and utilizes, among other communication methods, postings on social media such as Facebook. Additional testing is anticipated to be performed once the range is actually built in order to determine the actual Zone II locations which can then be used to determine if other mitigation measures such as constructing noise barriers to lower noise levels would be recommended.

To minimize adverse noise impacts resulting from proposed small arms firing operations on the MPMG Range, the MAARNG will continue to implement the noise notification protocol and noise complaint protocol. In addition, the MAARNG would conduct training activities in accordance with Camp Edwards Range Regulations and the MAARNG SONMP further reducing operational noise effects.

The following BMPs will be used by the MAARNG as appropriate to limit noise impacts during land conversion activities:

- Stationary equipment and material transportation routes will be located as far away from sensitive receivers as possible.

- Equipment will be operated per manufacturer's recommendations, and noise-generating heavy equipment will be shut down when not needed.
- Construction personnel will be directed to operate equipment in the quietest manner practicable (e.g., speed restrictions, retarder brake restrictions, engine speed restrictions, etc.).
- Noise-reducing measures will be briefed to the contractor or Soldiers responsible for implementing these activities.
- The MAARNG's on-site construction manager would be responsible to bring noise issues, if they arise, to the Range Control or the MAARNG Environmental Office.
- These BMPs will be incorporated into construction contracts.

6.6 Biological Resources

The MAARNG will limit ground disturbing activities during the establishment of the proposed MPMG Range to the extent feasible. Native plant species will be used to the maximum extent practicable when revegetating the firing points. Long-term land management and training operations will be conducted in accordance with the INRMP and other applicable management plans for Camp Edwards. Large-scale habitat restorations are underway at Camp Edwards and established procedures are in place to avoid and minimize impacts to wildlife species from routine military activities. The Project would be anticipated to affect these species, but would be unlikely to adversely affect them if the following procedures and management measures are followed.

- Carry out the vegetation and wildland fire management recommendations outlined in the INRMP and Integrated Wildland Fire Management Plan (IWFMP) as applicable.
- Implement a Turtle Protection Plan relative to the Eastern Box Turtle to prevent any takes during the construction of the MPMG Range (including tree removal).
- Implement conditions of the CMP to be issued by NHESP.

While it is anticipated that short-term and long-term impacts may occur as a result of the Project on biological resources, mitigation measures are being developed in order to offset any impacts. These mitigation measures are outlined for rare species but will benefit all biological resources in the CMP which is presently being prepared. These measures would reduce any adverse environmental impacts to below significant levels. Additional mitigation measures relative to rare species and rare species habitat is provided in **Section 6.7**.

6.7 Endangered, Threatened, and Rare Species

Impacts from the MPMG Range will be mitigated through a combination of mitigation methods. Initially, the Project will be constructed in two phases which will allow rare species in the area to adapt to the existence of the range. Mitigation for the MPMG Range has already begun and has occurred during 2019 and additional actions will occur in subsequent years. The Project consists of significant mitigation measures related to impacts to the Site's rare species habitat. To address potential impacts to the Eastern Box Turtle, the Whip-Poor-Will, rare moth and grassland species, MAARNG proposes a number of mitigation strategies including land transfers, land preservation, and land management. **Tables 6-2 and 6-3** provide the proposed actions and mitigation standards which have been completed or are proposed to be completed as part of the MPMG Range mitigation. In order to determine the mitigation to impacts of rare

species for the MPMG Range Project, the following steps were taken. These steps will also be used for determining rare species impacts for future projects.

- Determine if project can be designed to avoid or minimize impacts to rare species habitat
- Determine vegetative communities impacts by acreage within project footprint
- Determine which State-listed species will be impacted based on vegetative community
- Apply mitigation ratios under MESA based on State ranking to determine required mitigation acreage
- Assess mitigation methodologies to required mitigation acreage for habitat improvement
- Identify land preservation or mitigation parcels
- Identify other mitigation or minimization actions

Table 6-2: MPMG Range Mitigation

Acres	Mitigation
171	MPMG Range Pine Barrens Take Footprint
2:1	2:1 mitigation ratio for Pine Barrens
341	Pine Barrens Mitigation Required
341	Pine Barrens Mitigation Required
- 133	Land Preservation Tract 5
208	Remaining Mitigation Acres Needed
208	Remaining Mitigation Acres Needed
2:1	Double Mitigation Acres Needed proposed by MAARNG (total of 4:1 mitigation ratio)
416	Acres to be Managed
125	30% of 416 (Standard #1 Mechanical Forestry)
+ 291	70% of 416 (Standard #2 Prescribed Burn)
416	Acres to be managed (at 4:1 ratio)
416	Acres to be Managed (Standard #3 Continued Management and Maintenance)
2:1	Additional Mitigation proposed
832	Acres to be Managed (at 8:1 ratio)

Acreage rounded up

Under MESA, impacts to rare species may be permitted if a project has long-term net benefits to the affected rare species. In accordance with 321 CMR 10.23(7)(b), NHESP reserves the right to require, on a permit-by-permit basis, an areal habitat mitigation ratio or an alternative mitigation approach that differs from the ratios noted above. As impacts resulting from the proposed MPMG Range will only impact Threatened and Special Concern species, the MAARNG is proposing land preservation at the required 2:1 ratio for this Project. The MAARNG has also offered to double the acreage needed to ensure net benefit and that the long-term or perpetual component of mitigation will be addressed through the INRMP. That is, management of any habitat will be performed at a 4:1 ratio for impacts to Threatened species

In consultation with NHESP, MAARNG has developed this draft CMP Plan to provide a long-term net benefit to the conservation of the State-listed species that may be impacted from the construction and operation of the MPMG Range. Implementation of this Plan will provide net benefit across much more area of Camp Edwards and will combine with ongoing site-wide management through the INRMP and additional habitat improvement beyond mitigation to support the MPMG Range use. The INRMP provides effect mechanisms to ensure net benefit despite loss of habitat. The INRMP is presently being updated. In addition, this Plan will be memorialized, not only in the INRMP, but also in the required Annual Reports (State of the Reservation). This section describes condition and intent for the various types of land actions, units, and parcels discussed for mitigation planning. Other types of land protection may come available and be included to this the Plan through coordination with MassWildlife and NHESP. However, this current Plan focuses on the following mitigation efforts; each one described in a section below.

Table 6-3: MPMG Range Mitigation

Mitigation Standard	Location	2019	2020	2021	Other years	Acres of Mitigation	
						Target	Provided
Land Preservation	Tract 5	133				310	310
Land Preservation	Primary Forest Canopy Reserve Area - Northern Unit (for Eastern Box Turtle)	177					
Total Land Preservation		310				310	310
#1 Mechanical Forestry	Pine Barrens Mitigation Focal Areas - Western Unit	50				125 (30% of 416)	125
#1 Mechanical Forestry	Pine Barrens Mitigation Focal Areas - Western Unit		40				
#1 Mechanical Forestry	Pine Barrens Mitigation Focal Areas (TBD)			35			
#2 Prescribed Burn	Pine Barrens Mitigation Focal Areas - Northern Unit	47				291 (70% of 416)	291
#2 Prescribed Burn	Pine Barrens Mitigation Focal Areas - Western Unit (Total burn = 399, remainder 145 for other projects)	244					
#3 Continued Management	Pine Barrens Mitigation Focal Areas		50	150	216	416	416
Total Pine Barrens Management		341	90	185	216	832	832
#4 Manage Grasslands	Grassland Mitigation Focal Area Parcel H – Unit K fire (Total burn = 42, remaining 6 for other projects)	36				36	36
#4 Manage Grasslands	Grassland Mitigation Focal Area Parcel H – Unit K herbicide						
#4 Manage Grasslands ¹	Grassland Mitigation Focal Area Parcel H – Unit K mowing (Total mow = 80, remaining 44 for other projects)		36				
Total Grasslands Management		36				36	36

¹ Parcel H – Unit K managed for other projects

- Land Preservation
 - Land Preservation by Transfer of Parcels to MassWildlife
 - Land Preservation with Management (Parcel H – Unit K)
 - Pine Barrens Forest Canopy Reserve Areas (FCRA)
- Management of existing habitat within Mitigation Focal Areas

- Pine Barrens Mitigation Focal Areas
- Grasslands Mitigation Focal Areas
- Monitoring and research of rare species
- Avoidance and minimization
- Cost of management

In addition, MAARNG developed “Mitigation Standards” to be used for the MPMG Range project and other projects proposed at Camp Edwards as outlined in the Draft CMP Application and summarized here. These Mitigation Standards are designed to be applied to the management of existing habitat for the benefit of rare species. MESA requires high level of Priority Habitat mitigation to provide net benefit to State-listed species. The number and breadth of impacted State-listed species results in a mitigation plan to provide for overall positive benefit for pine barrens and grassland associates of both open and closed forest conditions. The MAARNG has developed the following mitigation standards or actions for management at Camp Edwards which can be applied to proposed projects. In order to develop a Camp Edwards-wide approach to mitigation, percentages and associated acreages have been provided as a guide where appropriate.

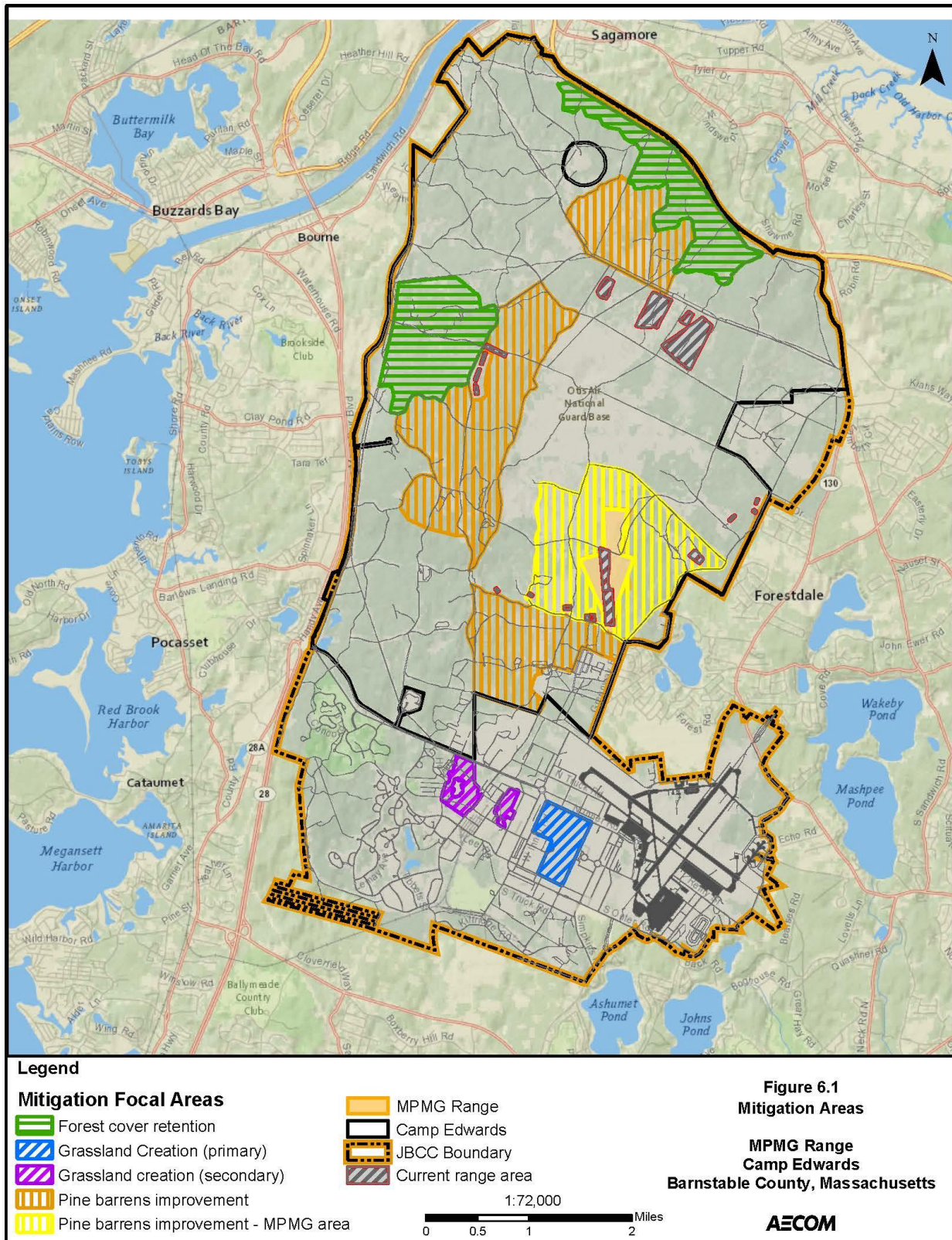
- Standard #1 Mechanical Forestry (Pine Barrens)
- Standard #2 Prescribed Burns (Pine Barrens)
- Standard #3 Continued Management and Management (Pine Barrens)
- Standard #4 Manage Grasslands
- Standard #5 Monitoring and Research

Figure 6.1 provides an overview map of JBCC including the location of land preservation parcels and mitigation focal areas. To date, the MAARNG has already performed actions which contribute to the net benefit of the rare species at Camp Edwards and JBCC including the following:

- Land Transfer of Tract 5 (133.0 acres) 2014, 2017 (PPSO)
- Land Transfer of Tracts 1-4 (128.0) 2019 (PPOF)
- Land Transfer of Parcel H of unit K (150.0 acres) (MG)
- Development and implementation of Range Complex Master Plan
- Development and implementation of site-wide INRMP

On-going actions are continuing which contribute to the management of resources at Camp Edwards:

- Collaborative development of mutually beneficial mitigation and monitoring strategies
- Range and infrastructure environmental review and design process
- Mitigation implementation



The conversion, management, and protection of rare species habitat will be assigned to “Mitigation Focal Areas”. Benefits of using focal areas including consolidating mitigation for maximum benefit while providing flexibility of management and ensuring sufficient acreage for new or revised projects. The Mitigation Focal Areas include two types of areas where active or passive mitigation through management may occur:

- Pine Barrens Mitigation Focal Areas
- Grassland Mitigation Focal Areas

These mitigation areas are explained in greater detail in the attached CMP Application in **Appendix B**. This combination of mitigation strategies will allow MAARNG to establish a robust mitigation bank and overall strategy for success to facilitate implementation of long-term planning efforts including modernization of the range complex and infrastructure, thereby maximizing positive impacts. The schedule for implementing mitigation efforts for the MPMG Range began in 2019 and will continue through to 2025 and beyond.

The robust mitigation components committed to by the MAARNG in the draft CMP Application specific to the MPMG Range include:

- Approximately 133 acres within Camp Edwards will be preserved in perpetuity as open space through the transfer of land to MassWildlife. The land is identified as the 133-acre Tract 5 located within the towns of Falmouth, Bourne, and Sandwich along the JBCC southern boundary and abuts the Crane Wildlife Management Area.
- Approximately 177 acres of land has been identified by MAARNG to be set aside for land preservation with management of vegetation for rare species. This land is identified as a Forest Canopy Reserve Area within Camp Edwards.
- Approximately 36 acres of has been identified for grassland management for rare species. This land is identified as a Grassland Mitigation Focal Area located in the Cantonment Area to optimize conditions for grassland species.
- The MAARNG will monitor the MPMG Range construction area prior to, and during construction, to remove Eastern Box Turtles from the construction areas if found.
- The MAARNG will provide construction staff with information and materials about the likely presence of State-listed species and appropriate responses to any sightings
- The MAARNG will implement a Turtle Protection Plan during the construction phase of the Project Eastern Box Turtles.
- The MAARNG will monitor Eastern Box Turtles and other species to be determined for a period to be determined after the construction of the Project to assess the effectiveness of mitigation measures.
- The MAARNG will implement a long term monitoring and management plan to maintain habitat quality within the pine barrens using the INRMP for guidance.
- The cost of the mitigation is more fully detailed in the draft CMP Application. Financial resources are budgeted for the proposed actions through Federal (Army, National Guard Bureau) funding.
- Mitigation funding for range MILCON projects is through the environmental budget of Army National Guard while facilities projects are through a combination of environmental (e.g., staff) and installation funding. Environmental funding is entered through the Status Tool for Environmental Programs (STEP) and is maintained with a seven-year budget.

- The MAARNG will be funding mitigation habitat management actions proposed as described in the draft CMP Application.
- The MAARNG will provide monitoring and research funding detailed more fully in the draft CMP Application which identifies actions and associated costs through to 2025.

6.8 Infrastructure and Transportation

No adverse environmental impacts on infrastructure and transportation are anticipated, therefore, no mitigation is proposed. Construction phase BMPs are discussed in **Section 6.13** below.

6.9 Recreation and Open Space

No adverse environmental impacts on recreation and open space are anticipated, therefore, no mitigation is proposed. Hunting will not be allowed when the MPMG Range is in operation due to the location of the SDZs and for the safety of the users of Camp Edwards.

6.10 Cultural Resources

As no adverse environmental impacts on cultural resources are anticipated, no mitigation is proposed. Should archaeological materials or human remains be inadvertently discovered during construction activities, all work will cease immediately and the MAARNG ICRMP SOP would be followed.

6.11 Built Environment

No adverse environmental impacts on the built environment are anticipated, therefore, no mitigation measures are proposed. Removal of construction and demolition debris from the tear down of the existing buildings will be transported to the Integrated Solid Waste Management landfill located adjacent to Camp Edwards. The proposed demolition of existing buildings, roadways or parking areas must be handled in accordance with the Massachusetts Solid Waste Regulations (310 CMR 16.00 and 310 CMR 19.000).

6.12 Oil and Hazardous Materials

Impact to the environment from OHW is expected to be minimal and mostly associated with the construction phase. To mitigate and prevent any releases of OHW, the following will be implemented:

- Comply with the EPS general performance standards for pollution prevention and management of the Camp Edwards training ranges.
- Ensure all MAARNG field staff members are trained in spill response.
- During construction and operation of the proposed MPMG Range, all OHW that would be used or generated will be handled and disposed of in compliance with the performance standards.

Pursuant to the Massachusetts Oil and Hazardous Material Release Prevention and Response Act, MGL c. 21E, the MAARNG shall notify MassDEP if oil, hazardous material and/or UXO and MEC are identified or released during Project construction. The MAARNG shall commit to ensuring that the Project contractors and sub-contractors maintain an emergency response plan for performing appropriate response actions in the event contamination is encountered during Project construction.

6.13 Construction Phase Mitigation

The following are items anticipated to be included in the construction management plan to reduce or eliminate impacts to the environment during the construction phase.

- MAARNG will coordinate with the IAGWSP to protect and or relocate any existing groundwater quality monitoring wells currently located within the Project site.
- Construction and demolition material will be disposed of off-Site in compliance with State regulations. The proposed demolition of existing buildings, roadways or parking areas must be handled in accordance with the Massachusetts Solid Waste Regulations.
- MAARNG will look into participating in MassDEP's Clean Air Construction Initiative (CACI) and the MassDEP Diesel Retrofit Program to mitigate the construction-period impacts of diesel emissions to the maximum extent feasible.
- Porto-potties will be used throughout the construction phase as no latrines are allowed in this area.
- Refueling: All construction-related refueling must be conducted in accordance with an EMC-approved refueling plan.
- Construction traffic will result in the temporary increase from construction equipment being brought to and from the site. Construction traffic during the construction phase will be limited as machinery will be stored at the site or within Camp Edwards and all soils will be reused on site to the extent possible. This will almost eliminate traffic on local roads outside of the base.
- In the event that UXO/MEC are encountered during construction, an "on-call" UXO/MEC expert will be contacted immediately. This expert will handle all aspects of the removal process to include regulator notification, implementation of safety measures and removal of such items. This expert will be contracted from the start of the start of the project through the finish.
- MAARNG must notify MassDEP if OHM are identified and/or released above reportable quantities during Project construction.

6.14 Best Management Practices

Per established protocols, procedures, and requirements, the MAARNG will implement BMPs and will satisfy all applicable regulatory requirements in association with the Project. BMPs are included as components of the Preferred Alternative, as appropriate, and are described below. BMPs are regulatory compliance measures that the MAARNG regularly implements as part of their activities, as appropriate, across the State of Massachusetts. These are different from "mitigation measures," which are defined as project-specific requirements (not routinely implemented by the MAARNG) necessary to reduce identified potentially significant adverse environmental impacts to less-than-significant levels.

With implementation of the following routine BMPs, the Preferred Alternative would not result in significant adverse impacts to the current environmental setting. Extensive BMPs were developed in the SAR P2 Plan including the following, which deal with the design, administration, and operation of the MPMG Range, as applicable. **These BMPs have been incorporated into the design of the MPMG Range. Administrative and operation BMPs include the following:**

- Operation BMPs
 - Ammunition
 - Unit Evaluation SOP

- Range Residue and Expended Cartridge Casing Management SOP
- Range Turn-in/Clearing SOP
- Metals Monitoring/Sampling
- Periodic Metals Removal
- Periodic Inspection of Range Conditions
- Administrative BMPs
 - Support Personnel and Training
 - Budgeting and Funding
 - Small Arms Range Supplement Update

6.15 Mitigation Funding

MAARNG has developed a budget for the rare species mitigation of MPMG Range. This budget has been proposed to include all management costs, including mechanical, fire, monitoring and research. Financial resources are budgeted through Federal (Army, NGB) funding. The Project has been designed to meet the long-term net benefit performance standard for rare species by providing for financial or in-kind contributions toward the development.

Monitoring and research funding will be provided over a period of years as described in **Table 6-4**. Mitigation funding for range MILCON projects is through the environmental budget of ARNG while facilities projects are through a combination of environmental (e.g., staff) and installation funding. Environmental funding is entered through the STEP. MAARNG maintains a seven-year budget including these plans and projects which are included in the INRMP project tables. In addition to the monitoring and research funding, the MAARNG will be funding the various habitat management actions proposed as described in the draft CMP Application.

Due to early planning for mitigation needs, MAARNG accessed \$76,600 funds dedicated to MPMG Range mitigation and leveraged this for an additional \$158,791 of funded mitigation projects. Funding is also approved for the coming seven years in the Federal budget, but will benefit from the funding assurance provided by a formal CMP. The direct FY 2019 funds and associated acres were obligated for mitigation implantation to the amount of \$235,391, details of which are provided in the draft CMP Application.

Table 6-4: Actions Proposed by Year

Year		Action	Acres	Cost	Year total
1	2019	Land transfer	132		\$181,700
		Mechanical harvest (Wheelock)	52	\$114,000	
		Prescribed burn	406	\$42,500	
		Mechanical prep for burns*	18	\$11,200	
		Admin (plans, permits)		\$14,000	
2	2020	Prescribed burn	160	\$51,000	\$458,600
		Mechanical harvest (RAW3)	40	\$88,000	
		Mechanical prep for burns	42	\$54,000	
		Admin (plans, permits)		\$22,500	
		Moth survey plan		\$26,500	
		Eastern Box Turtle support		\$216,600	
3	2021	Prescribed burn	160	\$51,000	\$334,500
		Mechanical harvest (BA-7/BA-1)	50	\$110,000	
		Mechanical prep for burns	30	\$36,000	
		Admin (plans, permits)		\$22,500	
		Moth survey year 1		\$55,000	
		Eastern Box Turtle support		\$60,000	
4	2022	Prescribed burn	160	\$51,000	\$162,000
		Mechanical prep for burns	30	\$36,000	
		Admin (plans, permits)		\$15,000	
		Eastern Box Turtle support		\$60,000	
5	2023	Prescribed burn	160	\$51,000	\$205,000
		Mechanical prep for burns	20	\$24,000	
		Admin (plans, permits)		\$22,500	
		Moth survey year 2		\$55,000	
		Eastern Box Turtle support		\$60,000	
6	2024	Prescribed burn	160	\$51,000	\$162,000
		Mechanical prep for burns	30	\$36,000	
		Admin (plans, permits)		\$15,000	
		Eastern Box Turtle support		\$60,000	
7	2025	Prescribed burn	160	\$51,000	\$205,000
		Mechanical prep for burns	20	\$24,000	
		Admin (plans, permits)		\$22,500	
		Moth survey year 3		\$55,000	
		Eastern Box Turtle support		\$60,000	

7.0 Small Arms Range Management and the Environmental Performance Standards

The EPS are standards for performance that guide both military and civilian users in the protection of Camp Edwards Training Areas natural, cultural, and groundwater resources. These standards apply to MAARNG properties at JBCC. The EPS were established in 2001 under EO 443 and Chapter 47, Acts of 2002. The 19 EPSs that, under the oversight of the EMC, regulate and guide training in the Camp Edwards Training Area, are discussed below, updated as of 6 April 2017. This section is provided as the EPS have been reviewed during the MEPA process. A copy of the EPS are provided in **Appendix G**.

7.1 Adaptive Management

The Camp Edwards Training Area, including the small arms ranges and their associated SDZs, and any areas where small arms or other munitions or simulated munitions are used, shall be managed as part of a unique water supply area under an adaptive management program that integrates pollution prevention and BMPs including the recovery of projectiles. This will be done through individual range-specific plans that are written by the MAARNG and approved for implementation through the EMC and any other regulatory agency having statutory and/or regulatory oversight. Adaptive, in this context, means making decisions as part of a continual process of monitoring, reviewing collected data, evaluating advances in range monitoring, design and technology, and responding with management actions as dictated by the resulting information and needs of protecting the environment while providing compatible military training within the Camp Edwards Training Area / Upper Cape Water Supply Reserve. The small arms range management program components required in each range-specific plan shall include:

- Consultation with applicable agencies with oversight of the training area before undertaking any actions that are subject to State and/or Federal regulatory requirements.
- Specific recovery plans for the removal and proper disposition of spent projectiles, residues and solid waste associated with the weapons, ammunition, target systems, and/or their operation and maintenance.
- Reduction of adverse impacts to the maximum extent feasible, including consideration for the design/redesign and/or relocation of the activity or encouraging only those activities that result in meeting the goal of overall projectile and/or projectile constituent containment.
- Internal and external coordination of documentation for the Camp Edwards range management programs and other related Camp Edwards management programs including: the Integrated Training Area Management Program (ITAM), Range Regulations, Camp Edwards Environmental Management System, Civilian Use Manual, and SOPs.
- Long-term range maintenance, monitoring and reporting of applicable parameters and analysis within the annual State of the Reservation Report.

Goals for the adaptive ecosystem management of Camp Edwards / Upper Cape Water Supply Reserve are as follows:

- Management of the groundwater for drinking water resources
- Conservation of endangered species.
- Management of endangered species habitat for continuation of the species.

- Ensuring compatible military training activities.
- Allowing for compatible civilian use.
- Identification and restoration of areas impacted by training activities.

7.2 Small Arms Range Operations, Maintenance and Monitoring Plans

The OMMP identifies the operations and management practices that MAARNG will implement at the SARs. These plans identify BMPs that allow the employment of small arms at Camp Edwards Training Area in a manner that:

- Meets current and future training requirements, and
- Employs maximum feasible use of pollution prevention (P2) strategies to protect the Upper Cape Water Supply Reserve, which is managed as a MassDEP Zone II for public water supplies.

These plans are in concert with range management envisioned in the Camp Edwards Pollution Prevention Overview (Small Arms Range Supplement) (SAR P2 Overview) and are designed to be approved by the EMC in accordance with the EPSs. The potential pathways for migration of and potential receptors to contaminants from the ranges include surface and subsurface soils, surface water, groundwater, and air. Environmental management and P2 BMPs are selected and analyzed based on their ability to disrupt the pathways to potential receptors. These plans addresses the use of lead and lead-free copper ammunition at the SARs on Camp Edwards Training Area.

The OMMPs are limited to the operation and use of approved small arms ranges at Camp Edwards. They support the use of the ranges to meet current and anticipated requirements for small arms training exercises military and civilian users.

Although these plans identify specific BMPs for the management of metals to sustain operations at ranges, the scope of the BMPs addressed is not limited to typical environmental management options. It also includes BMPs for safe and efficient administration, use, management, and maintenance. The BMPs recommended in the range-specific sections of the plans are based on range-specific conditions and are not intended to apply to all ranges at Camp Edwards / Reserve or on other Army or DoD installations or ranges.

7.3 Summary of EPS and Proposed MPMG Range

The following sections will discuss each of the EPSs in the context of the proposed MPMG Range. Responses are provided in italics.

EPS 1. Groundwater Resources Performance Standards

- 1.1. All actions, at any location within the Camp Edwards Training Areas, must preserve and maintain groundwater quality and quantity, and protect the recharge areas, existing and potential water supply wells. All areas within Camp Edwards Training Areas will be managed as State Zone II, and, where designated, Zone I, water supply areas.

Camp Edwards is managed, as a Zone II therefore the MPMG range is located within a Zone II. Groundwater at the Project site is approximately 100 feet deep and no contamination of groundwater has been encountered. All work and range operations will be performed in accordance with the

approved construction plans, SAR P2 Plan and OMMP (BMPS) to prevent impacts to groundwater quality and quantity.

1.2. The following standards shall apply to designated Wellhead Protection Areas:

- The 400-foot radius around approved public water supply wells will be protected from all access with signage. That protection will be maintained by the owner and/or operator of the well, or the leaseholder of the property.
- No new stormwater discharges may be directed into Zone I areas.
- No in ground septic system will be permitted within a Zone I area.
- No solid wastes may be generated or held within Zone I areas except as incidental to the construction, operation, and management of a well.
- Travel in Zone I areas will be limited to foot travel or to vehicles required for construction, operation, and maintenance of wells.
- No new or existing bivouac activity or area shall be located within a Zone I area.
- All other areas will be considered as Zone II designated areas and will be subject to the standards of the Groundwater Protection Policy.

The MPMG Range is not located within any mapped Zone I areas. As the Project is located within numerous Zone IIs, the Groundwater Protection Policy is applicable.

- *7.a.ix. Firebreaks and fire management are allowed activities.*
- *7.a.x. Small arms ranges are not identified as a prohibited use or a permitted use. Nonetheless, in accordance with 7.a.x “operations, and maintenance, providing that all federal and state regulations are complied with, and BMP’s are implemented”.*
- *7.b.viii. A small arms range is not a prohibited use as ranges are not defined as hazardous waste generators.*
- *7.c.viii. The Project includes a stormwater management design to handle any runoff from paved areas that will prevent degradation of groundwater quality.*

1.3. Land-use activities that do not comply with either the state Wellhead Protection regulations (310 CMR 22.00 et seq.) or the Groundwater Protection Policy are prohibited.

The Project does not involve any of the prohibited uses within Zone IIs as defined at 310 CMR 22.21(a) which are similar to the prohibited uses within the Groundwater Protection Policy.

1.4. All activities will support and not interfere with either the Impact Area Groundwater Study and/or the Installation Restoration Program. All activities shall conform to the requirements of Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the MCP, and the SOWA.

As described in Section 5.12, targeted remediation has been performed at the KD Range. Additional action may be required at the KD Range to address residual contamination from previous training exercises including metals such as tungsten and lead. MAARNG will coordinate with the IAGWSP in order to schedule this work relative to the construction phase of the MPMG Range.

1.5. Extraction, use, and transfer of the groundwater resources must not degrade [e.g. draw down surface waters] in freshwater ponds, vernal pools, wetlands, and marine waters, unless properly reviewed, mitigated, and approved by the managing and regulating agencies.

Not applicable.

1.6. Land uses and activities in the Camp Edwards Training Areas will meet the following standards:

- Will conform to all existing and applicable federal, state and local regulations.
- Must be able to be implemented without interference with ongoing remediation projects.
- Allow regional access to the water supplies on the MMR.

The Project is designed to not interfere with remediation projects and is presently being reviewed under Federal and State laws and regulations. The Project will not impact regional access to water supplies.

1.7. The following programs and standards will be used as the basis for protecting groundwater resources in the Camp Edwards Training Areas:

- JBCC Groundwater Protection Policy.
- Federal and DoD environmental programs: INRMP, ITAM, Range Regulations, SPCC (or equivalent), Installation Restoration Plan, Impact Area Groundwater Study, or other remediation programs.
- State and federal laws and regulations pertaining to water supply.

The Project is designed in compliance with these policies, plans, and standards.

EPS 2. Wetlands and Surface Water Performance Standards

This section is not applicable to the Project as there are no wetlands or surface waters within or nearby to the MPMG Range Project footprint.

- 2.1. Since there are relatively few wetland resources found at the MMR, and since they are important to the support of habitat and water quality on the properties, the minimum standard will be no net loss of any of the wetland resources or their 100-foot buffers.
- 2.2. Land uses and activities will be managed to prevent and mitigate new adverse impacts and eliminate or reduce existing conditions adverse to wetlands and surface water resource areas. Impacts from remediation activities may be acceptable with implementation of reasonable alternatives.
- 2.3. Wetland area management priorities:
 - Protection of existing; wetland resource areas for their contributions to existing and potential drinking water supplies.
 - Protection of wetlands for rare species and their habitats.
 - Protection of human health and safety.
- 2.4. Activities will be managed to preserve and protect wetlands and vernal pools as defined by applicable, federal, state, and local regulations. These activities will include replacement or replication of all wetland resource buffer areas, which are lost after completion of an activity or use.
- 2.5. All land altering activities within 100 feet of a certified vernal pool must be reviewed before commencement by the MassDEP/Wetlands Unit and the NHESP within the Division of Fish and Wildlife for impacts to wildlife and habitat. The certification of vernal pools will be supported by the on-site personnel and will proceed with the assistance of the appropriate state agencies.

- 2.6. All new uses or activities will be prohibited within the wetlands and their 100-foot buffers, except those associated with an approved habitat enhancement or restoration program; those on existing improved and unimproved roads where appropriate sediment and erosion controls are put in place prior to the activity; or those where no practicable alternative to the proposed action is available. No new roads should be located within the 100-foot buffers. Existing roads within such buffers should be relocated provided that:
- The relocation does not cause greater environmental impact to other resources.
 - There are funds and resources allocated for resource management and that those resources are approved and available for the relocation.
- 2.7. During the period of 15 February to 15 May, listed roads/trails within 500 feet of wetlands will be closed to vehicle access to protect the migration and breeding of amphibians. Emergency response and environmental management activities will not be restricted.
- Donnelly and Little Halfway Ponds maneuver trails (excluding the permanently closed section along the eastern edge of Donnelly Pond) from Frank Perkins Road north to Wood Road
 - Red Maple Swamp trail from Wood Road north and east to Avery Road
 - Orchard and Jefferson Roads (continuous) from Cat Road south and east to Burgoyne Road
 - Maneuver trail(s) in powerline easement north of Gibbs Road from Goat Pasture Road west to the boundary of training areas C-13 and C-14
 - Grassy Pond trail (side access to Sierra Range) from Gibbs Road south to Sierra Range
 - Sandwich Road from the powerline easement north to the gas pipeline right of way
 - Bypass Bog/Mike Range Road from entrance to Mike Range south and west to Greenway Road
- 2.8. No new bivouac area shall be located within 500 feet of any wetland. Any existing bivouac within a wetland buffer shall be relocated provided there are funds and resources allocated for the relocation.

EPS 3. Rare Species Performance Standards

- 3.1. As the NHESP of the Massachusetts Division of Fisheries & Wildlife has identified the entire MMR as State Priority habitat for state-listed species, all activities and uses must comply with the MESA and its regulations.

*MAARNG has been coordinating with NHESP over the past year specifically regarding the MPMG Range impacts on rare species and mitigation measures. The Draft CMP Application is being submitted to NHESP which is summarized throughout this document and provided in **Appendix B**.*

- 3.2. Where activities and uses are not specifically regulated under the Camp Edwards Training Area Range and Environmental Regulations, including these EPS, the E&RC must review the activities for conformance with the INRMP and shall consult with the NHESP regarding potential impacts to state-listed species.

See above response.

- 3.3. All activities impacting rare species habitat must be designed to preserve or enhance that habitat as determined by the MMR E&RC in consultation with the NHESP.

Impact to rare species habitat is unavoidable for this Project and efforts with NHESP have focused on developing a comprehensive mitigation plan for this Project and other possible future projects, all part of the CMP Application.

- 3.4. Users are prohibited from interfering with state and federal listed species.

MAARNG is presently studying the Project site for Eastern Box Turtles and if found, radio transmitters will be used to track the individuals. During the construction phase, sweeps will be made to make sure no additional turtles are within the work zone. During operation of the MPMG Range, it is likely that noise and activity from training will flush out any animals that may be using this area temporarily.

- 3.5. Users will report all sightings of recognized listed species, e.g. box turtles, within any area of the MMR.

The MAARNG has been communicating with NHESP over the past years regarding all sightings whether identified during surveys or other sightings. The MAARNG also has an education and signage program that teaches users about identifying turtles and report all sightings.

EPS 4. Soil Conservation Performance Standards

- 4.1. Activities and uses must be compatible with the limitations of the underlying soils. Limitations on uses and activities may be made where the soils or soil conditions would not support the activity.

The soils at the Project site are comprised of fine sandy loams soils which are highly erodible. Most of the Project site is flat and these soils should not pose an erosion problem. Where steeper slopes exist (where the .50 caliber lanes are proposed), erosion and sedimentation controls will be needed during construction until soils are stabilized with vegetation. All soils will be reused on-site.

- 4.2. Agricultural soil types will be preserved for future use.

The majority of the site contains soils units that are identified as Prime Farmland or soils of State Importance. Nonetheless, due to past Site uses and the partial location of the Site within the Impact Area, it is likely that this area has not and would not be used for agricultural activities.

- 4.3. Any perennial or intermittent stream identified by the E&RC Office will be protected from siltation by retaining undisturbed vegetative buffers to the extent feasible.

Not applicable.

- 4.4. Cultural resource evaluations must be completed before any earth-moving operation may take place in undisturbed areas with high potential for cultural resources, and earth moving may be limited to specific areas (See Cultural Resource Performance Standards).

*Cultural resource evaluations have been completed for this site. See **Section 5.10**. No further cultural work is anticipated based on the findings of the evaluations.*

- 4.5. An erosion control analysis will be made part of the land management programs (INRMP, ITAM, Range Regulations, Civilian Use, and SOPs) for the Camp Edwards Training Area, including appropriate mitigation measures where existing or potential erosion problems are identified.

Although there are no wetlands or surface water resources within or near to the Project footprint, all stormwater measures will be designed to meet Massachusetts Stormwater Standards to the extent feasible.

- 4.6. For all improved and unimproved roads, ditches and drainage ways:

- All unimproved roads, ditches, roads and drainage ways identified for maintenance will be cleaned of logs, slash and debris.

- Unimproved roads and roads may not otherwise be improved unless approved for modification.
- Any trail, ditch, road, or drainage way damaged by activities will be repaired in accordance with the hazard and impact it creates.

*The Project includes construction of paved access roads to the ROCA and gravel access roads to each of the target berms and the exterior of the range. The stormwater management will be for the paved area. In addition, there will be approximately 10.0 acres (4.5 miles) of new firebreak roadways as described in **Section 5.8**.*

- 4.7. Erosion-prone sites will be inspected periodically to identify damage and mitigation measures.

Inspections will be part of the OMMP for this range. It is not expected that erosion will be a concern in Phase 1. There are steeper slopes in Phase 2 that may be prone to erosion and will require an erosion and control plan and inspections during construction.

EPS 5. Vegetation Management Performance Standards

- 5.1. All planning and management activities impacting vegetation

- Will ensure the maintenance of native plant communities, and
- Shall be performed to maintain the biological diversity.

Native grasses will be used to revegetate the areas disturbed during construction. These areas will be managed as grasslands in accordance with the grassland management guidelines developed for Camp Edwards.

- 5.2. Revegetation of disturbed sites will be achieved by natural and artificial recolonization by native species.

See response above.

- 5.3. Timber harvesting or clear-cutting of forested areas should not occur on steep slopes with unstable soils or within the buffers to wetland resources.

Approximately 170.5 acres of trees will be cleared for this Project. Steep slopes are located at the northwestern portion of the Site where Phase 2 is proposed and will be protected during the tree clearing to avoid erosion.

- 5.4. Vegetation management will be subject to a forest management and fire protection program prepared by the users in accordance with federal standards, and carried out in a manner acceptable to the MMR Committee and other state agencies or commissions, as may be designated by the Commonwealth of Massachusetts.

As part of the Project operations, fire management is critical to control any fires that may result from the range during training. Strategic firebreak and management of these areas will be in accordance with the INRMP and Fire Management Plan.

EPS 6. Habitat Management Performance Standards

- 6.1. The Camp Edwards Training Area will be managed as a unique rare species and wildlife habitat area under an adaptive ecosystem management program that integrates ecological, socio-economic, and institutional perspectives, and which operates under the following definitions:

- Adaptive means making decisions as part of a continual process of monitoring, reviewing collected data, and responding with management actions as dictated by the resulting information and needs of the system.
- Ecosystem means a system-wide understanding of the arrangements of living and non-living things, and the forces that act upon and within the system.
- Management entails a multi-disciplinary approach where potentially competing interests are resolved with expert analysis, user and local interest considerations, and a commitment to compromise interests when the broader goal is achieved to manage the Camp Edwards Training Area as a unique wildlife habitat area.

*The Draft CMP Application included here as **Appendix B** provides details regarding the comprehensive management of rare species and wildlife habitat areas at the MPMG Range and throughout Camp Edwards. The management and mitigation strategies take into consideration adaptive management and a multi-disciplinary approach in order to make sure that mitigation efforts are successful or can be adapted to changing conditions. Annual evaluations will occur and presented in the State of the Reservation reports and managed actions adjusted as needed.*

6.2. The adaptive ecosystem management program will include:

- Coordinated documentation for the management programs, INRMP, ITAM Program, Range Regulations, Civilian Use, and SOPs.
- The MAARNG E&RC staff and necessary funding to support its ecosystem management plans, as related to the amount of training occurring.
- Cooperative agreements to create a management team of scientific and regulatory experts.
- Long-term land maintenance, monitoring of resources and trends, study and analysis.
- Recovery plans for species and habitats identified for improvement.
- Consultation with Federal and State agencies charged with oversight of the Endangered Species Program before any actions that may affect state and federal-listed species habitat.
- Reduction of adverse impacts to the maximum extent possible, including consideration for the relocation of the activity or encouraging only those activities that result in meeting a habitat management goal.
- Habitat management activities designed to promote protection and restoration of native habitat types.

*The MAARNG is responsible for the management of the habitat at Camp Edwards. A comprehensive management plan for the ecosystem of Camp Edwards has been in place for years through various environmental programs and MAARNG continues to coordinate on a regular basis with NHESP and USFWS and this will continue into the future. See **Section 6.7** for a summary of mitigation proposed for the MPMG Range.*

EPS 7. Wildlife Management Performance Standards

7.1. Native wildlife habitats and ecosystems management will focus on the following:

- Protecting rare and endangered species, and,
- Maintaining biodiversity.

See response to EPS 6 above.

- 7.2. Hunting, recreation and educational trips must be approved, scheduled, planned, and supervised through Range Control.

Hunting will not be allowed when the MPMG Range is in operation due to the location of the SDZs. Hunting is allowed within Camp Edwards but not within the Impact Area.

- 7.3. Any activity or use will prioritize protection of life, property, and natural resource values at the boundaries of the Camp Edwards Training Area where wildlife interfaces with the surrounding built environment.

The design of the range incorporates the SDZs in order to protect life and property. The CMP Application provides detailed information regarding the management of the natural resources.

- 7.4. Wildlife management will include the following actions, specific to the species targeted for management:

- Development and implementation of a plan to monitor hunting of game species.
- Planning for multi-use objectives for recreation and hunting that incorporate public input and recommendations.
- Development of suitable monitoring programs for federal and state-listed species, and regular exchange of information with the Natural Heritage and Endangered Species Program.

*Please see the Draft CMP Application for specific wildlife management strategies in **Appendix B**.*

EPS 8. Air Quality Performance Standard

- 8.1. All uses and activities will be responsible for compliance with both the SIP for Air Quality and the Federal CAA.

*See **Section 4.3** for additional air quality discussion.*

- 8.2. Air quality management activities will include air sampling if required by regulation of the activity.
Not applicable.

EPS 9. Noise Management Performance Standards

- 9.1. Noise management activities shall conform to the Army's Environmental Noise Management Program policies for evaluation, assessment, monitoring, and response procedures.

*Noise studies have been performed for the Project and additional studies will be performed when the range is in operation in order to determine if any mitigation of noise is needed as described in **Section 5.5**.*

EPS 10. Pest Management Performance Standards

No pest management is anticipated relative to the MPMG Range at this time.

- 10.1. Each user will develop and implement an Integrated Pest Management Program to control pest infestations that may include outside contracting of services. Non-native biological controls should not be considered unless approved by federal and state agencies.
- 10.2. Each user will be held responsible for management of pests that threaten rare and endangered species, or are exotic and invasive species, Invasive plant species that may be considered pest species are

- those defined by the USFWS and the NHESP of the Division of Fisheries and Wildlife office. Site-specific analysis will be performed before implementation of any proposed pest management plans.
- 10.3. Pest vegetation control must be balanced against environmental impact and any proposed pest management activities, including the use of herbicides and mechanical methods, within rare species habitat areas must be approved by the NHESP, or in the case of federally listed species, by the USFWS
 - 10.4. Only herbicide formulations approved by the USEPA, the Department of Agriculture, the agency managing the user, and the Commonwealth of Massachusetts may be applied.
 - 10.5. Herbicides and pesticides will not be applied by aerial spraying unless required by emergency conditions and approved under applicable state and federal regulations.

EPS 11. Fire Management Performance Standards

A firebreak plan is being designed relative to the MPMG Range. In addition, there is an existing IWFMP which has been utilized for a very successful prescribed burn program as described in Section 2.4.

- 11.1. All activities and uses shall manage, prevent, detect, and suppress fires on the Camp Edwards Training Area in coordination with the local and state fire services and natural resource managers in the E&RC.
- 11.2. Prescribed burns will be used as a habitat management and fire prevention tool. Prescribed burns will be used to reduce natural fire potential and create or maintain diverse and rare species habitat.
- 11.3. Pre-suppression activities will include strategic firebreaks and other management of vegetation in high risk and high-incidence areas. The INRMP and Fire Management Plan will be consulted for proposed actions.
- 11.4. Other than the above, no open fires are allowed.

EPS 12. Stormwater Management Performance Standards

Stormwater management is being provided for the paved areas of ROCA. As no wetlands or surface water resources are located in or near the site, stormwater will be managed to prevent groundwater contamination and will be designed in accordance with the Massachusetts Stormwater Standards.

- 12.1. All stormwater facilities shall comply with the MassDEP Guidelines for Stormwater Management, including BMPs and all other applicable standards for control and mitigation of increased storm water flow rates and improvement of water quality.
- 12.2. All increases in stormwater runoff will be controlled within the user's property.
- 12.3. No new stormwater discharges will be made directly into wetlands or wetland resource areas.

EPS 13. Wastewater Performance Standards

- 13.1. All wastewater and sewage disposal will be in conformance with the applicable Federal and MassDEP agency regulations.

Portable toilet facilities will be provided at the MPMG Range as latrines are not allowed in accordance with EPS Standards 1.2. Wastewater and sewage from MAARNG training activities at

Camp Edwards are pumped from portable toilet facilities and hauled off-base for disposal at licensed disposal facilities.

EPS 14. Solid Waste Performance Standards

During training events at the MPMG all trash and other waste is removed from the range at the end of the event and disposed of in accordance with local, State, and Federal, laws and regulations. During construction and demolition debris will be managed in accordance with the contract and local, State, and Federal regulations and laws.

- 14.1. All solid waste streams (i.e., wastes not meeting the criteria for hazardous wastes) will be monitored and managed to substitute, reduce, recycle, modify processes, implement best management practices, and/or reuse waste, thereby reducing the total tonnage of wastes,
- 14.2. All users will be held responsible for collection, removal and disposal outside of the Camp Edwards Training Areas of solid wastes generated by their activities.
- 14.3. All users must handle solid wastes using best management practices to minimize nuisance odors, windblown litter, and attraction of vectors.
- 14.4. No permanent disposal of solid waste within the Groundwater Protection Policy area/Camp Edwards field training areas will be permitted.

EPS 15. Hazardous Materials Performance Standards

*The MPMG Range is not considered to be a generator of hazardous waste. Nonetheless the KD Range has a history of soil contamination which has been remediated. See **Section 4.12** for additional details.*

- 15.1. Where they are permitted, use and application of hazardous materials shall be otherwise minimized in accordance with pollution prevention and waste minimization practices, including material substitution.
- 15.2. No permanent disposal of hazardous wastes within the Groundwater Protection Policy area/Camp Edwards field training areas will be permitted.
- 15.3. Fuel Management
 - 15.3.1 The SPCC is in place to reduce potential for a release. Camp Edwards Spill Response Plan is in place to respond to a release if an event should occur. All users will comply with these plans at the Camp Edwards Training Area.
 - 15.3.2 If found, non-complying underground fuel storage tanks will be removed in accordance with state and federal laws and regulations to include remediation of contaminated soil.
 - 15.3.3 No storage or movement of fuels for supporting field activities, other than in vehicle fuel tanks, will be permitted except in approved containers no greater than five gallons in capacity.
 - 15.3.4 New storage tanks are prohibited unless they meet the following requirements:
 - Are approved for maintenance heating, or, permanent emergency generators and limited to propane or natural gas fuels.
 - Conform to the Groundwater Protection Policy and applicable codes.

15.4. Non-fuel Hazardous Material Storage

- 15.4.1 No storage above those quantities necessary to support field training activities will be allowed within the Camp Edwards Training Area except where necessary to meet regulatory requirements, and where provided with secondary containment.
- 15.4.2 When required by applicable regulation, the user shall implement a Spill Prevention, Control and Containment/Emergency Response or other applicable response plan.

EPS 16. Hazardous Waste Performance Standards

- 16.1. All uses shall comply with applicable local, state, and federal regulations governing hazardous waste generation, management, and disposal (including overlays relative to Wellhead Protection, Zone II's within the Cantonment Area).

See response above.

- 16.2. Accumulations of hazardous waste shall be handled in accordance with regulations governing accumulation and storage.

Ammunition projectiles (copper) will be recycled when they are harvested from the range during maintenance of the target and auxiliary berms.

- 16.3. Existing facilities must implement pollution prevention and waste minimization procedures (process modifications, material substitution, recycling, and best management practices) to minimize waste generation and hazardous materials use.

*The MAARNG at Camp Edwards has moved to copper munitions and has BMPs (e.g. auxiliary berms for projectile capture) in place per the OMMP. See **Section 7.1.2**.*

- 16.4. Occupants and users will be held responsible for removing all solid or hazardous wastes generated during the period of use/tenancy/visitation upon their departure or in accordance with other applicable or relevant regulations.

During training events at the MPMG Range, all trash and other waste is removed from the range at the end of the event and disposed of in accordance with local, State, and Federal, laws and regulations.

- 16.5. Remedial activities undertaken under the Installation Restoration Program, the IAGWSP, the MCP, or other governing remediation programs are exempt from additional regulation (e.g., waste generation volume limits). Removal, storage, and disposal of contaminated material are required to comply with all state, and federal regulations.

MAARNG will be coordinating with the IAGWSP during the construction and operation phases of the MPMG Range Project.

- 16.6. Post-remedial uses and activities at previously impacted sites will be allowed in accordance with terms and conditions of the applicable regulations.

MAARNG will be coordinating with the IAGWSP during the construction and operation phases of the MPMG Range Project.

- 16.7. All hazardous wastes will be transported in accordance with Federal Department of Transportation regulations governing shipment of these materials.

It is not anticipated that any hazardous wastes will be generated during the construction or operation phases of the MPMG Range.

- 16.8. Transport shall reduce the number of trips for transfer and pick-up of hazardous wastes for disposal to extent feasible. Tills may include planning appropriate routes that minimize proximity to sensitive natural resource areas, and reducing internal transfers of material, including transfers from bulk storage tanks to drums, tankers, carboys, or other portable containers or quantities.

It is not anticipated that any hazardous wastes will be generated during the construction or operation phases of the MPMG Range.

- 16.9. No permanent disposal of hazardous wastes within the Groundwater Protection Policy area/Camp Edwards field training areas will be permitted.

It is not anticipated that any hazardous wastes will be generated during the construction or operation phases of the MPMG Range.

EPS 17. Vehicle Performance Standards

- 17.1. Vehicles within the Camp Edwards Training Area will be limited to the existing improved and unimproved road system except where required for natural resource management or property maintenance or where off-road activity areas are located and approved by the E&RC in consultation with the Massachusetts Division of Fisheries and Wildlife.

Users of the MPMG Range will be limited to the use of access road and parking within the ROCA. Maintenance roadways are to be utilized by maintenance crews.

- 17.2. Unimproved, established access ways will be limited to use by vehicles in accordance with soil conditions as described in the Soil Conservation Performance Standards.

Unimproved range roads will be managed in accordance with the standards and the OMMP and will be maintained as firebreaks.

- 17.3. The number of military and civilian vehicles within the Camp Edwards Training Area will be controlled using appropriate scheduling and signage.

Camp Edwards Range Control will control access when the MPMG Range is in use as the SDZs prohibit the use of several Training Areas.

EPS 18. General Use and Access Performance Standards

The MPMG Range will be operated and managed in accordance with these standards.

- 18.1. General User Requirements. Requirements that will apply to all users, both public and private, in the Camp Edwards Training Area include the following:

- All acts that pollute the groundwater supply are prohibited.
- No litter or refuse of any sort may be thrown or left in or on any property.
- All users will be held responsible for providing, maintaining, and re- moving closed-system, sanitary facilities necessary for their use and activity.
- No person shall wade or swim in any water body except for activities approved by the MAARNG including remediation, scientific study, or research.
- Vehicles may only be driven on roads authorized and designated for such use and parked in designated areas, and may not cross any designated wetland.

- Public users may not impede the military training activities.
- 18.2. Civilian Use Manual. To guide public conduct on the MMR, a Civilian Use Manual will be prepared and periodically updated. All civilian users will obtain and follow this Manual.
- 18.3. Siting and Design Performance Standards
- 18.4. New or expanded buildings should not be proposed within the Camp Edwards Training Areas, with the following exceptions:
- Buildings to support allowed training, operations and activities, including upgrading of those facilities currently in place,
 - Buildings used for the purposes of remediation activities,
 - Buildings used for the purposes of development, operation and maintenance of water supplies,
 - Buildings used for the purpose of natural resource and land management.

The buildings proposed within the ROCA are all buildings designed to support the training and operations of the MPMG Range.

EPS 19. Range Performance Standards

- 19.1. All operational ranges including but not limited to small arms ranges (SAR) shall be managed to minimize harmful impacts to the environment within the Upper Cape Water Supply Reserve. Range management at each range shall include to the maximum extent practicable metal recovery and recycling, prevention of fragmentation and ricochets, and prevention of sub-surface percolation of residue associated with the range operations. Camp Edwards shall be held responsible for the implementation of BMPs by authorized range users, including collection and removal of spent ammunition and associated debris.

*The MAARNG at Camp Edwards has moved to copper munitions and has BMPs (e.g. auxiliary berms for projectile capture) in place per the OMMP. See **Section 7.1.2**.*

- 19.2. Small arms ranges shall only be used in accordance with approved range plans. These plans shall be designed to minimize to the maximum extent practicable the release of metals or other contaminants to the environment outside of specifically approved containment areas/systems. Occasional ricochets that result in rounds landing outside of these containment areas is expected and every effort to minimize and correct these occurrences shall be taken. Failure to follow the approved range plans shall be considered a violation of this EPS.

*The MAARNG at Camp Edwards has BMPs (e.g. auxiliary berms for projectile capture) in place per the OMMP. See **Section 7.1.2**.*

- 19.3. All operational SARs shall be closely monitored by the MAARNG to assess compliance of the approved range plans as well as the implementation and effectiveness of the range specific BMPs.

The OMMPs identify and require range inspections by both the MAARNG and the EMC.

- 19.4. Camp Edwards/MAARNG E&RC shall staff and request appropriate funding to support its SAR management plans.

Staff and funding are in place to support the SAR management plans.

- 19.5. All users must use and follow Camp Edwards' Range Control checklists and procedures to:

- Minimize debris on the range (e.g. shell casings, used targets)
- Minimize or control residues on the ranges resulting from training (e.g., unburned constituents, metal shavings from the muzzle blast)
- Ensure the range is being used for the designated purpose in accordance with all applicable plans and approvals

The MPMG Range has been designed in accordance with this standard and the checklists and procedures will be followed.

- 19.6. Camp Edwards is responsible for following range operation procedures and maintaining range pollution prevention systems. Range BMPs shall be reviewed annually for effectiveness and potential improvements in their design, monitoring, maintenance, and operational procedures in an effort to continually improve them. Each year the annual report shall detail the range-specific activities including, but not limited to, the number of rounds fired, number of shooters and their organization, and the number of days the range was in use. The annual report will also detail active SAR groundwater well and lysimeter results, as well as any range maintenance/management activities that took place that training year and the result of such activities, i.e. lbs. of brass and projectiles recovered and recycled, etc. The MAARNG shall provide regular and unrestricted access for the EMC to all its data and information, and will provide immediate access to environmental samples from the range, including range management and monitoring systems and any other applicable activities operating on the ranges.

The OMMPs are reviewed annually for effectiveness and any identified changes are made. Currently the MAARNG has drafted a consolidated OMMP for all ranges and will have it reviewed and approved by the EMC as required. The MAARNG publishes an annual State of the Reservation Report with all required information presented.

- 19.7. Range plans and BMPs for training areas shall be reviewed and/or updated at least every three years. Management plans for new and upgraded ranges shall be in place prior to construction or utilization of the range. Range plans, at a minimum, will address long-term sustainable use, hydrology and hydrogeology, physical design, operation, management procedures, record keeping, pollution prevention, maintenance, monitoring, and applicable technologies to ensure sustainable range management. Range plans shall be integrated with other training area planning processes and resources.

Currently the MAARNG has drafted a consolidated OMMP for all ranges and will have it reviewed and approved by the EMC as required.

- 19.8. The MAARNG shall establish procedures for range maintenance and where applicable, maintenance and/or clearance operations to permit the sustainable, compatible, and safe use of operational ranges for their intended purpose within the Upper Cape Water Supply Reserve. In determining the frequency and degree of range maintenance and clearance operations, the MAARNG shall consider, at a minimum, the environmental impact and safety hazards, each range's intended use, lease requirements, and the quantities and types of munitions or simulated munitions expended on that range.

EPS 19 requires efforts to minimize harmful impacts to the Reserve to include "to the maximum extent practicable metal recovery and recycling prevention of fragmentation and ricochets and preventions of sub-surface percolation of residue associated with range operations". Ammunition

that is fired at Camp Edwards is to be captured and contained in accordance with EPS 19. The MAARNG is developing an OMMP for each range.

8.0 Response to Comment Letters

As part of the Federal NEPA process, Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) is required in order to request information from local, State, and Federal Agencies, and other interested parties for input in the preparation of the EA. A separate but similar process under the Native American Consultation (NAC). We have included the comment letters we have received to date with responses provided and have used these letters to assist us in the preparation of this NPC. Comment letters are provided in **Appendix E**.

8.1 EMC Comment Letter

The MAARNG has received a comment letter dated 13 September 2019 from the EMC regarding the preparation of the EA for the MPMG Range. EMC had the following recommendations for conditions to be added to their approval of the MPMG Range Project.

- EPS: The construction, operation and maintenance of the proposed MPMG Range must comply with the current revision of the EPS, dated April 6, 2017. The final design and the operation, maintenance and monitoring plan for the MPMG Range will require approval by the EMC prior to construction and operation

*See **Section 7.0** for a discussion of the EPS relative to the MPMG Range.*

- Solid and Hazardous Waste: The MAARNG is advised that there may be soils contaminated with OHM and munitions items located at the proposed Project location. A plan for the management of OHM and munitions items which may be found during construction should be developed by the Massachusetts National Guard. (EPS 14.0-16.0)

If soils contaminated with OHM are encountered the MAARNG will follow the procedures set forth in the Massachusetts Contingency Plan MCP including the contracted “on call” UXO removal experts. This contractor will be contracted throughout the entire construction Project.

- Construction Management Plan: A construction management plan should be provided which defines the limits of the proposed work area, how construction vehicles and personnel will be controlled to remain within work areas, construction and laydown areas, erosion control, dust suppression, vehicle parking and refueling areas and noise during construction. (EPS 4.5, 4.6, 5.0, 8.0, 9.0, 12.0)

This plan will be developed along with the Project plans and specifications to be reviewed by EMC.

- Refueling During Construction: EPS 15.3.3 states that no storage or movement of fuels supporting field activities, other than in vehicle fuel tanks is permitted except in approved containers no greater than five gallons in capacity. The MAARNG is advised that a waiver of EPS 15.3.3 may be granted by the EMC for the duration of the construction period subject to EMC review and approval of a site specific SPCC.

There is currently no qualifying facility (55 gallons or larger) authorized in the Training Area. Camp Edwards has an SPCC for qualifying activities, however since there are no “qualifying facilities” in the Training Area, this area is not identified in the SPCC. Protocols are in place within the Training Area to report all spills of any type/size to Range Control immediately. All soldiers/users are required to carry “soldiers field card” that has all necessary 24/7 contact information.

All construction-related refueling and equipment maintenance activities will be conducted in accordance with an EMC-approved refueling plan. Currently the MAARNG is working with the EMC and its advisory councils to refine EPS 15.3.3. However, if the EPS is not changed the MAARNG will request a waiver of EPS 15.3.3. The will implement its SPCC as needed.

- Access Control/Coordination/Communication: The MAARNG is advised to develop an access control and communications plan during construction activities with Camp Edwards Range Control personnel. This plan will be particularly important during the MAARNG Annual Training cycle and for the recreational hunting program at Camp Edwards.

Procedures will be identified within the construction management plans and specifications requiring the general contractor to contact the MAARNG Range Control office on a daily basis to identify Camp Edwards activities including Project briefings.

- Ammunition: The EMC recommends that the MPMG Range be designated as a copper ammunition-only range. (EPS 1 9.0)

The range is only authorized and designed for copper ammunition. The range will be signed as copper ammunition only.

- Southern Location Alternative: The MAARNG has stated that this alternative would result in greater noise impacts to the community. The MAARNG has performed an on-site noise study and noise modeling for the MPMG Range. The studies concluded that there would be noise impacts to the community during range use (the nearest off-post community is approximately 500 meters to the southeast and 1000 meters to the east). The EMC has recommended additional noise studies to be performed during training activities at the MPMG Range to determine if nuisance conditions exist and if noise mitigation is necessary. (EPS 9.0)

As the noise study assumes no vegetation between the MPMG Range and the sensitive receptors, studies will be performed once the MPMG Range is operational. At that time, it can be determined if mitigation measures should be developed.

- MPMG Range Operation and Maintenance: The EMC recommends that appropriate funding be appropriated to ensure that the MPMG Range will be adequately staffed to ensure operation and maintenance activities are compliant with the required OMMP. (EPS 19.0)

The MPMG Range will be fully staffed to ensure that all operations and maintenance activities’ are compliant with the requirements of the OMMP.

- Finally, the MAARNG should continue to work closely during the permitting and the execution of the Project with the MassDEP the EMC, and the MassWildlife, who maintains custody, care and control of the Upper Cape Water Supply Reserve. Early coordination with Commonwealth and municipal resource agencies is recommended with regard to rare species and wetland resources which may be impacted by the proposed project.

Early coordination has been ongoing and will continue during and after this Project has been constructed.

8.2 USEPA Comment Letter

MAARNG received a comment letter from the USEPA on 5 September 2019 following a request for input to the EA for the MPMG Range.

- The KD Range has been subject to investigation and cleanup under Section 1431(a) of the SOWA, 42 USC § 300i(a), as amended, and two Administrative Orders (AOs) concerning response actions issued thereunder (USEPA AO SOWA 1-97-1019 (AO1) and AO SOWA-1-2000-0014 (AO3).

No response needed.

- The final cleanup remedy under AO3 for the KD Range is contained in two (2) separate Decision Documents (DD). The February 2019 Training Areas Operable Unit DD (KD West is one of 36 sites or locations contained within this DD) presents the selected remedy for the KD West Range. The selected action for KD West was data review and/or confirmatory soil sampling and geophysical screening. Details of these proposed actions are contained in Appendix F to the DD. These actions are ongoing and the findings memo for all Training Areas post-DD work will be prepared in 2020. The need for Land Use Controls (LUCs) will be determined after completion of the investigations as described in the Decision Document.

MAARNG will continue to work with the USEPA on any required actions at the MPMG Range.

- The September 2015 Small Arms Ranges (SAR) DD (KD East is one of 40 locations contained within this DD) presents the selected remedy for the KD East Range. The selected action for KD East was confirmatory soil sampling and potential removal actions. Details of these proposed actions are contained in Appendix D to the DD. These actions have been completed and the findings memo for all SAR post-DD work is currently being drafted. LUCs have been established in the DD to protect groundwater monitoring wells and other environmental sampling equipment on and around the small arms ranges

MAARNG will continue to work with the USEPA on any required actions at the MPMG Range.

- USEPA established use restrictions at the KD Range in May 1997 with the issuance of AO2 (SOWA I-97-1030), but those restrictions were lifted in May 2017 when USEPA issued a Final Response to a 31 August 2016 MAARNG Request to modify the AO2 Scope of Work (SOW). USEPA modified Sections II.A.1.a and Section II.A.1.f of the SOW to not prohibit firing of lead ammunition or other "live" ammunition at small arms ranges at or near the Training Range and

Impact Area to the extent those actions receive approval and oversight from the EMC in accordance with the EPS.

- The authorization was conditioned upon continued compliance with all conditions established by the EMC.
 - The authorization was conditioned upon MAARNG requesting and then receiving funds necessary to ensure compliance with the approved OMMP.
 - The authorization does not extend to any other ammunition or training device.
 - The proposed use of this ammunition or training device was authorized only to the extent it does not interfere with the completion of investigation and cleanup activities.
 - This decision will be reviewed as appropriate, but no less often than every five years. The purpose of the review is to revisit the appropriateness of the decision in providing adequate protection of human health. The scope of the review will include, but is not limited to, the following questions: are the ranges operating as designed (i.e., monitoring or maintenance); have any of the cleanup standards changed since the decision; and is there any new information that would warrant modifying or withdrawing the decision? If appropriate, additional actions (including, if necessary, reopening the decision) may be required as a result of these reviews. USEPA retained all its enforcement authorities pursuant to existing AOs.
- The EMC should continue to be consulted during the range design and development process, including the selection of pollution prevention strategies and best management practices that will be codified in an OMMP for the MPMG Range. These strategies and practices should also be developed to adhere to the conditions described above.

An OMMP is required for the MPMG Range and will be provided for the EMC to review and approve as required. The MPMG Range is being addressed in the new consolidated OMMP for the small ranges. The final plan will come after the construction of the range.

- It may also be a worthwhile exercise for the EA to consider how the adaptive management strategies employed during the Juliet, Kilo, Tango and Sierra Range pilot periods might apply to development and use of the KD Range.

All strategies for range management will be considered especially those that were found to be beneficial to range operations and the environment.

8.3 MassDCR Comment Letter

MAARNG received a comment letter from the Massachusetts Department of Conservation and Recreation on 10 September 2019 following a request for input to the EA for the MPMG Range.

- The MassDCR is represented on the EMC and Leonard Pinaud is our point of contact. We will prepare comments through the EMC process.

No response needed.

9.0 Proposed Section 61 Findings

Pursuant to Section 61 of the Massachusetts Environmental Policy Act (MEPA) M.G.L. Chapter 30 Sections 61- 62H, and Section 11.12(5) of the MEPA regulations (301 CMR 11.00) the Massachusetts Army National Guard (MAARNG) has designed the proposed Multi-Purpose Machine Gun (MPMG) Range project so that all feasible measures have been taken to avoid damage to the environment or, to the extent this damage to the environment cannot be avoided, to minimize and mitigate that damage to the maximum extent practicable. The only State permit required for this project is the Conservation and Management Permit (CMP) to be issued by the Natural Heritage and Endangered Species Program (NHESP), in compliance with applicable performance standards of the Massachusetts Endangered Species Act (MESA) and implementing regulations (321 CMR 10.00).

Documentation to support these findings, include the 2020 Notice of Project Change (NPC), past MEPA documents such as the Draft and Final Master Plan and Area-Wide Environmental Impact Reports and Annual Reports prepared by MAARNG and noticed in the Environmental Monitor. The NPC and other MEPA documents have been widely distributed and reviewed by local, State, and Federal agencies and the general public. Public and other agency comments will be considered in making these findings.

Certain projects and activities at Camp Edwards are subject to a Special Review Procedure (SRP) created and jointly executed by Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) and the MAARNG so that the process under MEPA could be used more efficiently for the long-term use of Camp Edwards. Given the importance of the Range to the future operation and viability of the base, the MAARNG has taken its responsibilities under Massachusetts regulations extremely seriously. Therefore, the MAARNG has been working in close cooperation over the past two years with the NHESP to determine mitigation of rare species habitat impacts as a result of the MPMG Range project. In addition, MAARNG has been in communication with the Massachusetts Department of Environmental Protection (MassDEP), Environmental Management Commission (EMC), and United States Environmental Protection Agency (USEPA) relative to this project. The MAARNG has established mutually respectful relationships with these agencies and the four towns in which Camp Edwards resides (Bourne, Falmouth, Mashpee, Sandwich). The MAARNG meets regularly with the EMC and its two supporting councils, the Science Advisory Council (SAC) and the Community Advisory Council (CAC) including pre-application meetings, development of presentations, public meeting facilitation, outreach, and informal and formal consultations.

A Conservation and Management Plan (presently in draft form) for the MPMG Range project has been prepared in consultation with the NHESP, in compliance with MESA and implementing regulations (321 CMR 10.00). Although the project will result in a "take" of several State-listed lepidopterans (moths and butterfly) species identified on the site, and that there could potentially be a "take" of Eastern Box Turtle (*Terrapene carolina*), Eastern Whip-poor-will (*Caprimulgus vociferus*), and sandplain grassland bird species, the project meets the standards for issuance of a Conservation and Management Permit (CMP) pursuant to MESA.

The components of the CMP as drafted in consultation with NHESP staff include:

- Approximately 133 acres within the 15,000-acres Camp Edwards will be preserved in perpetuity as open space through the transfer of land to MassWildlife. The land is identified as the 133-acre

Tract 5 located within the towns of Falmouth, Bourne, and Sandwich along the Joint Base Cape Cod (JBCC) and abuts the Crane Wildlife Management Area.

- Approximately 177 acres of land has been identified by MAARNG to set aside for land preservation with management of vegetation for rare species. This land is identified as a Forest Canopy Reserve Area.
- Approximately 36 acres of has been identified for grassland management for rare species. This land is identified as a Grassland Mitigation Focal Area.
- The proponent will monitor the MPMG Range construction area prior to, and during construction, to remove Eastern Box Turtles from the construction areas.
- The proponent will provide construction staff with information and materials about the likely presence of State-listed species and appropriate responses to any sightings
- The proponent will implement a Turtle Protection Plan during the construction phase of the project Eastern Box Turtles.
- The proponent will restore grassland habitat in an acreage to be determined in the CMP in order to optimize conditions for grassland species.
- The proponent will monitor Eastern Box Turtles and other species to be determined for a period to be determined after the construction of the project to assess the effectiveness of mitigation measures.
- The proponent will implement a long term monitoring and management plan to maintain habitat quality within the pine barrens.
- The schedule for implementing mitigation efforts began in 2019 and will continue through to 2025 and beyond.
- The cost of the mitigation is more fully detailed in the draft CMP Application. Financial resources are budgeted for the proposed actions through Federal (Army, National Guard Bureau) funding.
- Mitigation funding for range Military Construction (MILCON) projects is through the environmental budget of Army National Guard (ARNG) while facilities projects are through a combination of environmental (e.g., staff) and installation funding. Environmental funding is entered through the Status Tool for Environmental Programs (STEP) and is maintained with a seven-year budget.
- The MAARNG will be funding the various habitat management actions proposed as described in the plan.
- Monitoring and research funding is also detailed more fully in the CMP Application which identifies actions and associated costs through to 2025.
- Mitigation for Greenhouse Gas (GHG) emissions will occur along with the land preservation and management of habit for rare species as described above.

10.0 Circulation of Notice of Project Change

This list has been developed from previous NPCs submitted to MEPA, notably the 2012 NPC. In addition, other local, State, and Federal agencies, individuals, and non-profit organizations were updated as well as updates to the JBCC agencies.

Executive Office of Energy and Environmental Affairs 100 Cambridge Street, Suite 900 Boston, MA 02114-2524 Attn: Page Czepiga, MEPA Assistant Director
Executive Office of Energy and Environmental Affairs 100 Cambridge Street, Suite 900 Boston, MA 02114-2524 Attn: Kathleen Theoharides, Executive Secretary
Executive Office of Energy and Environmental Affairs 100 Cambridge Street, Suite 900 Boston, MA 02114 Attn: Bob O'Connor, Land Policy Director
Massachusetts Department of Environmental Protection One Winter Street Boston, MA 02108 Attn: Martin Suuberg, Commissioner
Massachusetts Department of Environmental Protection Bureau of Water Resources One Winter Street Boston, MA 02108 Attn: Kathleen Baskin, Assistant Commissioner
Massachusetts Department of Environmental Protection Division of Waterways & Wetlands One Winter Street Boston, MA 02108 Attn: Stephanie Moura, Division Director
Massachusetts Department of Environmental Protection One Winter Street Boston, MA 02108 Attn: MEPA Coordinator
Massachusetts Department of Environmental Protection 20 Riverside Drive Lakeville, MA 02347 Attn: MEPA Coordinator
Massachusetts Department of Environmental Protection Southeast Regional Office Attn: Millie Garcia-Serrano, Regional Director 20 Riverside Drive Lakeville, MA 02347
Massachusetts Department of Environmental Protection 20 Riverside Drive Lakeville, MA 02347 Attn: Len Pinaud, Federal Facilities

Massachusetts Department of Environmental Protection 20 Riverside Drive Lakeville, MA 02347 Attn: Ellie Donovan, Federal Facilities and Solid Waste
Massachusetts Department of Transportation Public/Private Development Unit 10 Park Plaza, Suite 4150 Boston, MA 02116
Massachusetts Department of Transportation District #5 1000 County Street Taunton, MA 02780 Attn: Mary-Joe Perry, District Highway Director
Massachusetts Historical Commission State Historic Preservation Officer 220 Morrissey Boulevard Boston, MA 02125 Attn: Brona Simon, Executive Director
Massachusetts Division of Marine Fisheries 251 Causeway Street, Suite 400 Boston, MA 02114 Attn: Project Review Coordinator
Massachusetts Division of Marine Fisheries (South Shore) 836 Rodney French Boulevard New Bedford, MA 02744 Attn: Environmental Reviewer
Massachusetts Office of Coastal Zone Management 251 Causeway Street, Suite 800 Boston, MA 02114 Attn: Project Review Coordinator
Massachusetts Department of Fish and Game 251 Causeway Street, Suite 400 Boston, MA 02114 Attn: Ronald S. Amidon, Commissioner
Massachusetts Natural Heritage and Endangered Species Program MassWildlife 1 Rabbit Hill Road Westborough, MA 01581 Attn: Eve Schluter, NHESP Assistant Director
Massachusetts Natural Heritage and Endangered Species Program MassWildlife 1 Rabbit Hill Road Westborough, MA 01581 Attn: David Paulson
Massachusetts Department of Conservation and Recreation Planning and Engineering 251 Causeway Street, 9 th Floor Boston, MA 02114-2104 Attn: Jim Montgomery, Interim Commissioner

Massachusetts Department of Conservation and Recreation Division of Water Supply Protection 251 Causeway Street Boston, MA 02114-2104 Attn: John Scannell, Director
Massachusetts Department of Agricultural Resources 251 Causeway Street, Suite 500 Boston, MA 02114
Massachusetts Executive Office of Health and Human Services One Ashburton Place, 11th Floor Boston, MA 02108
Massachusetts Department of Public Health 250 Washington Street Boston, MA 02108
Massachusetts Department of Energy Resources 100 Cambridge Street, Suite 1020 Boston, MA 02114
US Environmental Protection Agency Superfund and Emergency Management Division 5 Post Office Square, Mail Code 07-5 Boston, MA 02109-3912 Attn: Bryan Olson, Director
US Environmental Protection Agency Massachusetts Superfund Program 5 Post Office Square, Mail Code 07-1 Boston, MA 02109-3912 Attn: Lynne Jennings, Section Chief
US Environmental Protection Agency 5 Post Office Square, Suite 100 Boston, MA 02109-3912 Attn: Environmental Reviewer
US Environmental Protection Agency - Region 1 5 Post Office Square, Suite 100 Boston, MA 02109-3912 Attn: Dennis Deziel, Regional Administrator
US Environmental Protection Agency 5 Post Office Square – Mail Code 07-03 Boston, MA 02109-3912 Attn: Jane Dolan, JBCC (MMR) Team Member
US Fish and Wildlife Service New England Field Office 70 Commercial Street, Suite 300 Concord, NH 03301-5087 Attn: Tom Chapman Attn: Susi von Oettingen
US Fish and Wildlife Service Northeast Region 300 Westgate Center Drive Hadley, MA 01035-9589 Attn: Wendi Weber, Regional Director

US Army Corps of Engineers New England District 696 Virginia Road Concord, MA 01742-2751 Attn: Col. William M. Conde, District Engineer, Commander
US Department of Agriculture Natural Resources Conservation Service 451 West Street Amherst, MA 01002-2953 Attn: Daniel Wright, State Conservationist
Senator Julian Cyr (Cape and Islands) State House, Room 218 24 Beacon Street <u>Boston, MA 02133-1053</u> Barnstable Town Hall, Room 2L 367 Main Street Hyannis, MA 02601
Cape Cod Chamber of Commerce 5 Patti Page Way Centerville, MA 02632
Cape Cod Conservation District 303 Main Street W. Yarmouth, MA 02673
Cape Cod Commission 3225 Main Street, P.O. Box 226 Barnstable, MA 02630 Attn: Kristy Senatori, Executive Director Attn: Jonathan Idman, Chief Regulatory Officer
Association to Preserve Cape Cod 482 Main Street Dennis, MA 02638
Environmental Management Commission Building 3468, Beaman Street Camp Edwards, MA 02542-500 Attn: Len Pinaud, EMC Environmental Officer
Wampanoag Tribe of Gay Head (Aquinnah) 20 Black Brook Road Aquinnah, MA 02535 Attn: Bettina Washington, Tribe Historic Preservation Officer
Mashpee Wampanoag Tribe P.O. Box 1048 483 Great Neck Road South Mashpee, MA 02649 Attn: David Weeden, Tribal Historic Preservation Officer
Stockbridge - Munsee Tribe of Mohican, Wisconsin W13447 Camp 14 Road Bowler, WI 54416 Attn: Bonney Hartley, Tribal Historic Preservation Manager/NAGPRA

Massachusetts National Guard JFHQ Hanscom AFB, MA 01731 Attn: Mr. Paulo Baganha
Headquarters, Camp Edwards JFHQ Hanscom AFB, MA 01731 Attn: Mr. Dave Shannon
Massachusetts National Guard Environmental & Readiness Center Building 3468, Beaman Street Camp Edwards, MA 02542 Attn: Mike Ciaranca, Ph.D., Deputy Director
Impact Area Groundwater Study Program PB 0515, West Outer Road Camp Edwards, MA 02542 Attn: Ben Gregson, Remediation Manager
Impact Area Groundwater Study Program PB 0515, West Outer Road Camp Edwards, MA 02542 Attn: Pam Richardson, Community Involvement Specialist
Impact Area Groundwater Study Program PB 0515 West Outer Road Camp Edwards, MA 02542 Attn: LTC Shawn Cody
Air Force Civil Engineering Center Installation Restoration Program 322 East Inner Road Otis ANG Base, MA 02542 Attn: Doug Karson, Community Involvement Lead
Air Force Civil Engineer Center Installation Restoration Program 322 East Inner Road Otis ANG Base, MA 02542 Attn: John Davis
Massachusetts Air National Guard 253rd Cyberspace Engineering Installation Group Otis ANG Base, MA 02542 Attn: COL James Hoyer
Massachusetts Air National Guard 102d Intelligence Wing 158 Reilly Street, Box 25 Otis ANG Base, MA 02542 Attn: COL McNulty
US Coast Guard Environmental Health and Safety 5215 E. Hospital Road, 2 nd Floor Buzzards Bay, 02542 Attn: Elizabeth Kirkpatrick

6th Space Warning Squadron (PAVE PAWS) 1 Flatrock Road Sagamore, MA 02561-0428 Attn: LTC James E. Roberts
Upper Cape Regional Water Supply Cooperative P.O. Box 373 Mashpee, MA 02649-0373 Attn: Dan Mahoney, Chair
Sheriff James Cummings Barnstable County Sherriff's Office 6000 Sheriff's Place Bourne, MA 02532
Dr. Paul Cavanaugh 225 Thomas Landers Road East Falmouth, MA 02536
Mark Harding 25 Devon Street Mashpee, MA 02649
Mimi McConnell P.O. Box 832 Cotuit, MA 02635
Jimmy Dishner P.O. Box 955 South Orleans, MA 02653
The Nature Conservancy 99 Bedford Street, Suite 500 Boston, MA 02111
Department of Natural Resources Conservation University of Massachusetts, Amherst 205 Holdsworth Way Amherst, MA 01003-9285
Anthony Schiavi, Town Administrator Bourne Town Hall 24 Perry Avenue Buzzards Bay, MA 02532
Bourne Board of Selectmen Bourne Town Hall 24 Perry Avenue Buzzards Bay, MA 0253
Bourne Planning Board Bourne Town Hall 24 Perry Avenue Buzzards Bay, MA 02532
Bourne Conservation Commission Bourne Town Hall 24 Perry Avenue Buzzards Bay, MA 02532
Bourne Board of Health Bourne Town Hall 24 Perry Avenue Buzzards Bay, MA 02532

Jonathan Bourne Public Library 19 Sandwich Road Bourne, MA 02532
Rodney C. Collins, Town Manager Mashpee Town Hall 16 Great Neck Road North Mashpee, MA 02649
Mashpee Board of Selectmen Mashpee Town Hall 16 Great Neck Road Mashpee, MA 02649
Mashpee Planning Board Mashpee Town Hall 16 Great Neck Road Mashpee, MA 02649
Mashpee Conservation Commission Mashpee Town Hall 16 Great Neck Road Mashpee, MA 02649
Mashpee Board of Health Mashpee Town Hall 16 Great Neck Road Mashpee, MA 02649
Mashpee Public Library 64 Steeple Street PO Box 657 Mashpee, MA 02649
George Dunham, Town Manager Sandwich Town Hall 130 Main Street Sandwich, MA 02563
Sandwich Board of Selectmen Sandwich Town Hall 130 Main Street Sandwich, MA 02563
Sandwich Planning Board 16 Jan Sebastian Drive Sandwich, MA 02563
Sandwich Conservation Commission 16 Jan Sebastian Drive Sandwich, MA 02563
Sandwich Board of Health 16 Jan Sebastian Drive Sandwich, MA 02563
Sandwich Public Library 142 Main Street Sandwich, MA 02563
Julian Suso, Town Manager Falmouth Town Hall 59 Town Hall Square Falmouth, MA 02540

Falmouth Board of Selectmen Falmouth Town Hall 59 Town Hall Square Falmouth, MA 02540
Falmouth Planning Board Falmouth Town Hall 59 Town Hall Square Falmouth, MA 02540
Falmouth Conservation Commission Falmouth Town Hall 59 Town Hall Square Falmouth, MA 02540
Falmouth Board of Health Falmouth Town Hall 59 Town Hall Square Falmouth, MA 0254
Falmouth Public Library 300 Main Street Falmouth, MA 02540

List of Appendices

Appendix A: MEPA and State Documents

- 10 July 1997 MEPA Certificate for the Notice of Project Change for the MMR Master Plan
- 16 July 2001 MEPA Certificate for the Final Area-Wide Environmental Impact Report
- 4 October 2001 Memorandum of Agreement between the Commonwealth of Massachusetts and the United State Army and National Guard Bureau



The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street, Boston, 02202

WILLIAM F. WELD
GOVERNOR

ARGEO PAUL CELLUCCI
LIEUTENANT GOVERNOR

TRUDY COXE
SECRETARY

May 30, 1997

Tel: (617) 727-9800
Fax: (617) 727-2754
<http://www.magnet.state.ma.us/envir>

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
NOTICE OF PROJECT CHANGE
AND
THE MAJOR AND COMPLICATED PROCEDURE

PROJECT NAME :Massachusetts Military Reservation
Master Plan
PROJECT LOCATION :Bourne, Falmouth, Mashpee and Sandwich
EOEA NUMBER :5834
PROJECT PROPONENT :Massachusetts National Guard
DATE NOTICED IN MONITOR :April 25, 1997

Pursuant to the Massachusetts Environmental Policy Act (G.L. c. 30, ss. 61-62H) and Sections 11.12 and 11.17 of the MEPA regulations (301 CMR 11.00), I have reviewed the Notice of Project Change submitted on this project and hereby establish a Special Procedure for review of this project under MEPA.

By letter dated April 9, 1997, the proponent requested that this project be designated "major and complicated" under MEPA for purposes of establishing a special review procedure for the project and the appointment of a Citizen's Working Group (CWG). I discussed this request in my April 16, 1997 certificate on the Draft Environmental Impact Report (DEIR), which I found to be inadequate. As indicated in that decision, I believe the special review procedure is needed to get the environmental review back on track so that progress can be made towards a comprehensive evaluation of current environmental conditions on the Massachusetts Military Reservation (MMR), to include an environmental review of the proponent's forthcoming master plan for future use of the MMR, within its regional, Cape Cod context. I further believe that the CWG is needed to assure adequate public participation and representation of surrounding communities in the environmental review of the currently proposed projects as well as those which may be developed in the master plan.

Community Working Group Appointments

Following a second nomination period, I was able to review a substantial number of nominations for service on the Community Working Group. Having carefully considered the qualifications of the nominees in light of the need for skills, experience and representation of interests and communities, I appoint the following persons, plus two representatives: one from the Army National Guard and one from the Air National Guard:

Thomas Cahir	at large (Pocasset)
Haydon Coggeshall	Bourne Selectmen
Russell Cookingham	at large (Monument Beach)
Betty Diener	at large (Eastham)
David Dow	Cape Cod Sierra Club
Joseph Griffith	at large (Falmouth)
Robert Jones	Sandwich Selectmen
Judith Koenig	Cape Cod Development Council
Kenneth Marsters	Mashpee Selectmen
Mimi McConnell	at large (Cotuit)
Martine Meijering	Mashpee Planning Board
Christopher Mills	at large (MMR)
Wendy Northcross	Cape Cod Chamber of Commerce
Richard Prince	Cape Cod Commission
Virginia Rasmussen	at large (South Yarmouth)
Henri Rauschenbach	at large (Brewster)
Lillian Sprongberg	League of Women Voters
Pamela Truesdale	Coalition for Buzzards Bay
Virginia Valiela	Falmouth Selectmen
Susan Walker	Association for the Preservation Of Cape Cod.

I have asked Mimi McConnell to serve as chair of the CWG, and I have directed my staff to be available to work closely with her in moderating meetings of the CWG and otherwise ensuring its smooth operation.

I thank the other nominees for their interest and hope they will stay involved and participate in the CWG proceedings. I ask the appointed members to attend CWG meetings themselves and not send delegates. Should changes in membership become necessary, due to changes in the scope of review or because members have

difficulty attending, I ask to be notified in a timely manner and will appoint new or additional members as necessary.

The CWG is constituted informally, not by statutory or regulatory mandate; will be short-lived, in existence during the time required for completion of this special review; will serve without compensation or reimbursement of expenses; will not expend public funds; and will not be required to issue a formal report or conclusions.

I ask that the proponent provide the following services for the CWG: arrangement of meeting rooms, taking of minutes, reproduction of materials, and mailing of minutes, notices and materials to be reviewed.

Meetings of the CWG should be held on an as needed basis. Any materials to be reviewed at a meeting should be provided to the CWG at least a week in advance of the meeting.

Scope and Timeframe of Review

The first task of the CWG will be to assist in developing a more definitive scope for both the overall review and the reports to be prepared as part of that review, including a revised DEIR. The proponent has recently requested that this scoping be delayed until the Fall of 1997, arguing that actions taken by the U.S. Environmental Protection Agency (EPA) may result in significant changes to the "project" under review. I find that further delay is not appropriate. I understand that, as a result of EPA's orders, there is some uncertainty as to the future of certain training facilities slated for "upgrade" in the project proposal. The very purpose of the Notice of Project Change, however, was to broaden the project scope, i.e. to move away from a narrow focus on facilities upgrade to the original proposal. The uncertainty about specific activities is best addressed by developing alternative future use scenarios, which is, again, very much the objective of both my environmental review and the proponent's master planning effort. Moreover, an important part of this review and planning process is to provide a comprehensive overview of environmental baseline conditions. This task was begun in the first DEIR and is continuing on several levels, but much work remains to be done to complete and integrate the results. Given the obvious importance of this information to all

aspects of the cleanup and future use of the MMR, the scoping of the remaining baseline work should, if anything, be accelerated, rather than delayed.

Accordingly, I have instructed my staff to convene the first meeting of the CWG as soon as possible. The first order of business should be to work closely with the proponent as it develops an overall scope and timeframe for the environmental review, a task in which I specifically request input and guidance from the Cape Cod Commission. I expect this proposed Special Review Scope and Schedule to include specific milestones for preparation and public review of at least the following: the draft Impact Area Groundwater Study; the revised DEIR (which should include the final Impact Area Groundwater Study) the Final EIR; and any interim reports that may be necessary and/or become available from other sources. Given the urgent need for better information before elements of the master plan may be implemented consistent with environmental review requirements, I believe that the final master plan and EIR should be completed within no more than 18 months, and that a draft version should be as detailed and fully developed as possible and available within fifteen months, with an interim assessment specifying projects to be analyzed to be available within one year. I ask that a proposed Special Review Scope and Schedule be submitted for public notice and review no later than August, 1997, following which I will issue a Special Review Scope and Schedule Certificate based upon input from the proponent, the CWG and other interested parties.

Exceptions to Special Review Procedure - Accelerated Review

Commenters have suggested, and I agree, that the Special Review Procedure should not serve to delay certain projects or activities at the MMR that are beneficial to the community and that generate no significant environmental impacts (or that even provide environmental benefits). On the other hand, it is clear that piecemeal development and segmented review would be contrary to MEPA and the objectives of a master planning effort. Accordingly, I require public notice of such projects in the form of either a Notice of Project Change or a new Environmental Notification Form. Such notice will be subject to public comment and will in any event be reviewed within the context of this Special Review Procedure (regardless of file number). Specifically, such proposals will be evaluated in terms of

environmental benefit, as well as consistency with the proponent's master planning considerations (including alternatives and mitigation analyses), before being allowed to proceed separately from this MMR review.

Coordination of Multi-Level Review

At the time of the proponent's request for this Special Review Procedure, I received assurances from the National Guard Bureau that it remained committed to coordinating the Federal with the state level environmental impact review and with its other obligations under Federal and state law. For example, the Impact Area Groundwater Study will be incorporated into the draft Environmental Impact Statement (EIS), although this may be done under the heading of a "supplemental" report. Similarly, the master plan will be incorporated into the EIS (most likely as part of the alternatives analysis). These assurances are an important consideration in my decision today. Less than full participation by the Federal proponents in all aspects of this environmental review and master planning process will frustrate its very purpose, including the rebuilding of public confidence and participation, without which this effort cannot succeed.

More generally, interagency coordination on the Federal, state, regional and local levels should be a priority. I have asked my staff to work closely with the U.S. Environmental Protection Agency and the Cape Cod Commission, and to make sure that the CWG proceedings are coordinated with the other project teams working on environmental investigations, cleanup and analysis. In this context, I support efforts to streamline the public participation process by clarifying the responsibilities of the various groups and consolidating overlapping activities.

Conclusion

The purpose of restructuring the environmental review process and establishing the CWG is to expedite the comprehensive evaluation of current environmental conditions at the MMR. I wish the newly appointed CWG members success and pledge my continuing, active support as they and the proponent undertake this complex task.

EOEA#5834

NPC Certificate

May 30, 1997

July 10, 1997
Date

Trudy Cox
Trudy Cox, Secretary

As to the designation of the project as "major and complicated," the establishment of the Special Review Procedure and the appointment of the Community Working Group:

July 10, 1997
Date

Raymond A. Vezina
Raymond Vezina, The Adjutant General

Comments received :

Cape Cod Commission
Department of Environmental Protection
Association for the Preservation of Cape Cod
Division of Capital Planning and Operations
Buzzards Bay Project
Woods Hole, Martha's Vineyard and Nantucket Steamship Authority

cc: CWG Nominees

TC/rf

July 16, 2001

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
FINAL AREA-WIDE ENVIRONMENTAL IMPACT REPORT

PROJECT NAME : Massachusetts Military Reservation
Master Plan
PROJECT MUNICIPALITY : Bourne, Falmouth, Mashpee, Sandwich
PROJECT WATERSHED : Cape Cod
EOEA NUMBER : 5834
PROJECT PROPONENT : Massachusetts National Guard
DATE NOTICED IN MONITOR : June 9, 2001 (originally noticed
May 23)

As Secretary of Environmental Affairs, I have reviewed the Final Area-Wide Environmental Impact Report (FEIR) submitted on this project and find that it adequately and properly complies with the Massachusetts Environmental Policy Act (MEPA, M.G.L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

Upon reviewing the document before me and the public comments, I find that the substantive discussion of alternatives, impacts, and mitigation meets the requirements of MEPA. In particular, the EPS have progressed considerably since the DEIR, and they now meet or (in some cases) exceed the applicable statewide regulatory standards. But as I have stated in previous Certificates, issues of management and oversight, while generally outside of the purview of the MEPA process, are central to ensuring the future protection of this resource. The standards that the FEIR sets forth by which environmental performance will be measured at the MMR are intimately linked to who will be monitoring and overseeing that performance.

Therefore, my finding of adequacy is premised on the

condition that the proponent and the U.S. Department of the Army will execute an enforceable management agreement that embodies the Guiding Principles agreed to by Governor Jane Swift and Deputy Assistant Secretary of the Army Ray Fatz (a copy of the Principles is attached to this Certificate). Without an enforceable management agreement, the review and mitigation of future impacts is open to question, and there cannot be final closure on this MEPA review.

While the management discussions are proceeding, the proponent shall prepare and make available an Informational Supplement that contains further revisions to the EPS and the State of the Reservation scope, and a revised Section 61 Finding containing all applicable mitigation commitments. The proponent cannot adopt its final Section 61 Findings, and none of the proposed projects may commence, until the management agreement is executed. The ongoing discussions on management are targeted to conclude by September 30. If the management agreement has not been executed by that date, a Notice of Project Change (NPC) will be required and additional MEPA review may ensue.

MANAGEMENT OF THE MMR

Many, perhaps most of the commenters on the FEIR, as on previous MEPA filings for MMR, have focused on how the northern 15,000 acres will be managed, and how the guiding principles of the Environmental Performance Standards will be implemented and enforced. I have received many letters urging me to find the FEIR inadequate solely on the grounds that a final management structure is not yet in place.

My finding of adequacy on the DEIR was premised on the assumption that a new management structure would shortly be in place. Since then, the U.S. Department of the Army and the National Guard Bureau in Washington have joined the management discussions. Under the Guiding Principles now agreed to by the federal parties, an oversight body of state environmental agencies will be established. The environmental oversight body will be assisted by an independent Scientific and Technical Advisory Board, as suggested by the Community Working Group (CWG), and by an advisory body representing the affected communities and the general public. All environmental impacts associated with military training will be monitored and reported regularly (including through the annual State of the Reservation reports required under MEPA) to the oversight and advisory bodies. The environmental oversight agencies and the Scientific

and Technical Advisory Board will need to have the ability to verify independently the results of environmental monitoring. When the monitoring shows adverse environmental impacts, military and/or civilian activities will be adjusted accordingly.

Only through implementation of these Principles can we be sure that the work of the CWG and the results of the MEPA process have been carried out. That is why my finding of adequacy today is strictly conditioned on the execution of an enforceable management agreement that embodies the Guiding Principles.

HISTORY OF MEPA REVIEW

Since this MEPA review began in 1986, the project has been transformed from a major physical expansion of military facilities within MMR, to a comprehensive land use plan for the entire Reservation that adheres to the key principles of the CWG: that the northern 15,000 acres should be set aside for permanent protection of water supplies, wildlife habitat, and open space, while allowing compatible military training.

State-level environmental impact review of the Massachusetts Military Reservation (MMR) began with the filing of an Environmental Notification Form in 1986 describing 58 separate projects. A Certificate was issued requiring the preparation of an Environmental Impact Report (EIR) and defining the scope for that report. The EIR was never filed.

In December 1992 a Notice of Project Change (NPC) was filed that reduced the number of projects to 17. In October 1994, the proponent filed another NPC that further reduced the number of projects to ten: six Army Guard projects and four Air Guard projects. Following these filings, a new Certificate was issued in December 1994 that redefined and refocused the scope to include the Air Guard projects and the cumulative effects of all activities on the base. In December 1996, a Draft EIR was filed in response to that scope. In April 1997, a Certificate found that the DEIR did not adequately address the issues required by the scope.

By the spring of 1997, it had become clear that the MEPA review process for MMR would have to be entirely refashioned if it was to produce a vision for the long-term use of the base that

fully reflected community concerns and ensured the protection of the water supply. The May 1997 Certificate created a new Special Review Procedure (SRP) for the project. The SRP also required the selection of the Community Working Group (CWG), which includes representatives of the four affected communities, the Cape Cod Commission, and the branches of the military. In June 1998, Governor Cellucci directed the Army Guard to withdraw the five remaining proposed projects within the northern 15,000 acres.

After a lengthy, comprehensive, and open public process, in September 1998 the CWG issued and adopted its Master Plan Final Report. The CWG Master Plan divides MMR into two primary land use zones. Within the northern 15,000 acres of the Reservation, permanent protection for water supply, wildlife, and open space is paramount, while compatible military training may continue. The Cantonment Zone, comprising 5,000 acres in the southern portion of the base, is identified as the appropriate location for new military and civilian development projects. Following the issuance of the report, the scope for the Guard's Area-wide EIR was issued in January 1999. The Draft Area-wide EIR was found adequate in October 1999. In both the scope and the DEIR Certificate, I expressly stated that the CWG Master Plan would provide the foundation for all ongoing and future planning efforts at the Reservation.

The Special Review Procedure has also allowed for the accelerated review of certain projects and activities at MMR, prior to the completion of the Guard's EIR. In particular, separate MEPA review has been authorized for the development by the U.S. Army Corps of Engineers of a new three million gallon/day regional water supply (EOEA #12277). A Phase I waiver was issued in September 2000 that allowed the start of physical construction, and I expect the full EIR to be submitted in the near future.

As in earlier Certificates, I want to restate that MEPA jurisdiction, and hence the obligations of the National Guard, do not extend to areas of MMR under direct federal control, including the PAVE PAWS site, the Coast Guard transmitters and housing, and the Veterans Administration cemetery. MEPA review is distinct from any federal requirements arising under the National Environmental Policy Act (NEPA).

CONTENT OF THE FEIR

My DEIR Certificate focused the content of the FEIR upon the following four issues:

- To refine the analysis of training alternatives within the northern 15,000 acres.
- To work with a task force of environmental agencies to revise the Environmental Performance Standards (EPS).
- To develop a master plan for the Cantonment to guide current and proposed National Guard and civilian activities and development projects.
- To develop a proposed scope of the monitoring and research activities that will be contained in the first annual State of the Reservation report.

As discussed in more detail below, I have found the analysis of the FEIR generally adequate in each of these four areas. However, in order to ensure the best possible outcome, I am requiring the filing of an Informational Supplement that contains further revisions to the EPS and the State of the Reservation scope, and a revised Section 61 Finding containing all applicable mitigation commitments. This Informational Supplement shall be submitted to the MEPA Office and all commenters on the FEIR no later than August 15, a notice of its availability shall be published in the *Environmental Monitor*, and public comments on the document will be received for at least 30 days.

ALTERNATIVES ANALYSIS

The DEIR identified a preferred alternative that would continue certain military training activities in the Reserve area, while committing to a permanent ban on the most harmful training activities, including artillery and mortar fire, demolition training, artillery bag burning, use of lead bullets, field latrines, and vehicle maintenance and refueling. As required in the DEIR Certificate, the ban on these activities has now been written into the EPS.

I found that the DEIR presented an adequate case for the contention that it was not feasible to relocate all military training activities outside of the Reserve. As required, the FEIR analyzes several variants on the preferred alternative. In each case, the impacts are properly compared to the baseline of current activity levels - not against a baseline of no military activity at all.

The FEIR commits to limiting the use of tired vehicles to existing roads, and to limiting the use of tracked vehicles to existing unimproved trails. (The EPS contain further conditions on road and trail use.) The FEIR also describes limited feasible relocations of two-week annual training programs off-site, and it describes current and potential simulation training within the Cantonment. The FEIR has demonstrated to my satisfaction that the relocation of bivouac activities to the Cantonment is not feasible. However, to protect the most sensitive resources, the EPS require that no existing or new bivouac areas will be located within the Zone I of any water supply well, or within 500 feet of any wetland.

As discussed below, the annual State of the Reservation reports must report on off-site as well as on-site training, and on the status of mitigation measures arising out of the FEIR, including road and track restrictions, relocations, and restoration, new simulation activities, and relocation of bivouacs.

CANTONMENT AREA MASTERPLAN

The environmental masterplanning issues affecting the Cantonment area are very different from those affecting the northern 15,000 acres. The Cantonment contains the 2,692 acre Otis Air Base, home of the 102nd Fighter Wing of the Air Force National Guard; 697 acres of land controlled by the Army National Guard; the 936 acre U.S. Coast Guard facility, which contains family housing, support facilities, and a nine hole golf course; the 749 acre Veterans Administration cemetery; and 662 acres of grasslands wildlife habitat outside the Air Base. In addition, the Cantonment is the location of three Town of Bourne public schools, a regional solid waste transfer facility, and the proposed new Barnstable County Jail (BOEA #11361R).

The CWG Masterplan identified the Cantonment as the appropriate focus for more intensive activities and development projects, both military and civilian. The FEIR provides masterplan level of detail on current proposed military land uses by the Army and Air Guards, and it describes uses by the Coast Guard and other parties outside MEPA jurisdiction. The FEIR shows that proposed land uses are generally compatible with resource protection, and that the existing infrastructure of the Cantonment is adequate for current uses. However, as noted in the DEP comment letter, the MMR wastewater treatment system is

nearing its capacity. Review and permitting of any expansion in this system will need to demonstrate consistency with the FEIR, and it will need to consider the secondary growth impacts of any increased capacity.

As noted in the DFW comment letter, a large portion of the Cantonment provides grassland habitat for two state-listed rare species, the Grasshopper Sparrow and the Upland Sandpiper. This habitat is now at risk because the Air National Guard has not performed any habitat management for more than a decade in this area. To complete the MEPA process, the Air Guard must commit to begin implementing its grasslands management plan.¹ This commitment must be incorporated into the revised Section 61 Findings and into the INRMP for the Air Guard lands.

Of the three proposed projects within the Cantonment, comments have focused upon the Unit Training Equipment Site Facility (UTES) proposed for the 3600 area. This location, which was identified as a potential alternative in the CWG Master Plan, lies outside the northern 15,000 acres, but within a Zone II for two Bourne wells. So long as the UTES is restricted to maintenance and storage of vehicles and there is no bulk storage of fuels, this project may proceed to final site design upon the adoption of the Section 61 Findings.

ENVIRONMENTAL PERFORMANCE STANDARDS

The Environmental Performance Standards (EPS) contained in the FEIR will provide a key link between the MEPA review process and the parallel development of a permanent management and oversight structure. Effective monitoring and reporting of activities will ensure compliance with the EPS, and the adjustment of training activities if adverse environmental impacts are revealed in the future.

In the DEIR certificate I required specific changes to the EPS, including:

- Incorporating the permanent ban on certain training activities;
- Treating the entire 15,000 acres as a potential zone II for public water supply wells; and

¹ Funding constraints do not excuse failure to implement this important environmental mitigation program - particularly since the Massachusetts Port Authority has committed to fund an initial 150 acres of habitat restoration at MMR, as off-site mitigation for EOE #10458.

- Incorporating all regulatory standards arising out of the MOU dated January 27, 1997, and the associated Groundwater Protection Policy.

The DEIR Certificate also required that the MNG engage in a consultation process with an inter-agency task force comprised of DEP, DEM, DFW, the MDC, and the CCC. This task force has met regularly since last fall, and I want to thank its members for all their hard work.

The EPS have progressed considerably since the DEIR. They now meet or (in some cases) exceed the applicable statewide regulatory standards. Notably, the EPS now prohibit any new or existing bivouac areas or roads within the Zone I of any water supply well, and within a 100-foot buffer around all wetlands (including vernal pools). Within a 500-foot buffer around all wetlands, bivouac areas are prohibited, and most roads will be seasonally closed during the rare species breeding season (March 1 - June 15). Because vernal pools comprise so much of the wetlands at MMR, the proponent must commit to seeking certification for all pools as they are identified.

The Informational Supplement shall include the final revision of the EPS. In particular, the wildlife habitat standards of the EPS shall be coordinated with the Sykes Act process (see below), and the EPS shall ensure that there is no long-term storage or permanent disposal of any solid or hazardous material and waste within the 15,000 acres.

ANNUAL REPORTS

The DEIR Certificate required the MNG to file an annual "State of the Reservation" report. The FEIR contains a draft scope for the contents of the first Annual Report. A number of commenters have suggested that the State of the Reservation report would be most valuable if the monitoring and reporting were directly tied to the EPS, so that one could directly measure environmental performance against the goals set forth in the EPS and the EIR. I endorse these suggestions. A revised scope shall be contained in the Information Supplement, which should contain the following elements:

- Reporting on levels of training and range area usage (including usage levels for civilian activities)
- Describing the range of resource management activities
- Reporting on environmental indicators for training

activities (including a separate section for each of the 18 specific resource performance standards for the Camp Edwards Training Area). Environmental performance shall be quantified and/or mapped whenever possible - the revised scope shall identify proposed indicators for each standard.

- Coordination with other activities and projects (summarize status of the regional water supply and other projects undergoing separate MEPA review, and of remediation activities within the IRP and the Impact Area Groundwater Study).
- ENF filings for proposed new National Guard projects within MMR, when required.
- Mitigation status tracking for all MEPA projects.

Information on levels of training and environmental impacts is best understood not for individual years, but rather in the context of long-term trends. Therefore, in each report major categories of information should be reported for the past five years whenever such data is available.

The first Annual Report should be submitted to the environmental oversight agencies, the scientific and public advisory entities, and the MEPA Office within twelve months of the execution of the management agreement (or upon a schedule mutually agreed to by EOEa and the Guard). A notice of the availability of each report shall be published in the *Environmental Monitor*, and the executive summary shall be made available on the proponent's web site.

OTHER ISSUES

Future MEPA Project Reviews

Upon the execution of the management agreement, the adoption of Section 61 Findings, and the completion of the grasslands plan, MEPA review of the masterplanning project shall be deemed complete, and the two airfield projects and the UTES may proceed to project permitting and other final agency actions.

Within the Cantonment, future projects and activities shall only be subject to MEPA review if they exceed a stand-alone review threshold set forth in Section 11.03 of the MEPA

Regulations. Any ENF or EIR for a future project must describe the project's consistency with the FEIR Masterplan.

Within the 15,000 acres, MEPA review shall be required for future projects and activities that exceed a stand-alone review threshold set forth in Section 11.03 of the MEPA Regulations. In addition, the filing of an ENF shall be required for military or civilian projects within the northern 15,000 acres consisting of any new or expanded building or structure, paved or improved roadway, or wastewater infrastructure. The Informational Supplement shall also identify appropriate review thresholds within the 15,000 acres for new impervious surfaces and new vegetative clearing or other land alterations. These lowered thresholds shall not apply to water supply or environmental remediation, restoration, and mitigation projects (such as controlled burns).

I suggest that each annual State of the Reservation report should contain the ENF analysis of all projects proposed for the upcoming year. This will ensure that environmental review of future projects occurs in the context of basewide monitoring and reporting.

Section 61 Findings

The FEIR contains proposed Section 61 Findings that detail the enforceable mitigation commitments arising from this MEPA review process, including a description of each proposed action, its timing, and the party responsible.

Coordination with Sykes Act

Independent of their obligations under MEPA, both the Army and the Air Guards are required by Federal law (the Sykes Act) to undertake a range of environmental planning and performance measures with respect to MMR. The Army Guard and the Air Guard must each complete an Integrated Natural Resources Management Plan (INRMP) for the lands controlled by each agency by November 2001. Both documents must incorporate the enforceable standards of the final EPS and Section 61 Findings and all other applicable provisions of the FEIR.

July 16, 2001
Date

Bob Durand, Secretary

Comments received :

Appleton, Warren
Association for the Preservation of Cape Cod
Birdsey, Charles and Barbara
Bleicken, Eric
Boyd, Lisa
Buessler, Wendi
Cape Cod Chamber of Commerce
Cape Cod Commission
Cape Cod Group of the Sierra Club
Chin, Helen
Citizens United for MMR Watershed and Wildlife Refuge
Clarke, Robin
Cole, Lawrence
Community Working Group
Cormier, Al
Crocker, Jean
Crocker, Merle
Davis, Phyllis
DeMuth, Anne
Department of Environmental Management
Department of Environmental Protection
Department of Fisheries & Wildlife
Department of Food and Agriculture
Department of Public Health
Duquet, Ernest
FMMR, PACERS, STRONG
Foster, Matthew
Herbst, Ralph
International Fund for Animal Welfare
Jacobson, Alan
Jaworski, Walter
Jones, Stan
Judge, Richard and Sharon
Hughus, Richard

King, Maria
Kinney, James
Kleekamp, Charles
LaFleur, Barbara
League of Barnstable County Sportsman's Clubs
League of Women Voters of Falmouth
League of Women Voters of Massachusetts
League of Women Voters of the Cape Cod Area
Lyons, Paul
Manire-Gatti, Eleanor
Mashpee Environmental Coalition
Massachusetts Audubon Society
Massachusetts Sportsmen's Council, Inc.
Murphy, Elizabeth
Murphy, Robert
Murray, Martha
Orenda Wildlife Land Trust
Otis Fish and Game Club
PACERS
Palmer, David
Perkins, Beatrice
Phillips, Susan
Pineyro, Sandra
Representatives Provost and Turkington
Richards, Peter
Rigoli, Mary
Roach, Marilynne
Rosenberg, Beth
Sandwich Director of Planning and Development
Schlesinger, Peter
Senator O'Leary
Sinclair, Harry
Southeast Wildlife District - DF&W
Souza, Teresa
Spellman, Michael
Stetson, Judith
The Compact of Cape Cod Conservation Trusts, Inc.
The Pegasus Foundation
Walker, Chip
Walker, Sue
Wampanoag Tribe of Gay Head-Aquinn
Whately, Kareen
Winn, Jane
Wolk-Hall, Lauren

**Guiding Principles
for
MMR Long-term Management Structure**

The goal of the joint working group is to develop a long-term management structure for the Massachusetts Military Reservation (MMR) guided by the following Principles:

- The primary objectives in developing the management structure will be to ensure permanent protection of the drinking water supply and to preserve the wildlife habitat of the northern 15,000 acres.
- Any long-term management structure will serve the interests of the public and will establish and promote a working and cooperative partnership between the Commonwealth and the military.
- All options and tools potentially useful in the establishment of a long-term management structure will be considered.
- All environmental standards that are dictated by applicable federal, state, and local laws and regulations, including MMR-specific environmental performance standards, will be followed.
- An oversight body comprised of state environmental agencies, with input and advice from the public and scientific communities, will be established.
- The military and other users will adjust their activities when adverse environmental impacts have been identified by the military or the oversight body.
- Military and other activities that are compatible with protection of the water supply and wildlife habitat will continue on MMR.
- The military will conduct and manage compatible training on MMR in order to achieve and maintain military readiness.
- The military will continue to monitor, identify, and provide to the public information regarding the environmental impacts associated with military training.
- The oversight body and users of MMR will regularly provide information to the public on the status of, or activities that may affect, the protection of the drinking water supply and wildlife habitat.



MEMORANDUM OF AGREEMENT
Between
The Commonwealth of Massachusetts
And
The United States Army and National Guard Bureau

This Memorandum of Agreement ("Agreement") is made by and among the Governor of the Commonwealth of Massachusetts (the "Governor"), the United States of America, represented by the Department of the Army ("Army") and the National Guard Bureau, The Adjutant General of the Massachusetts National Guard and the Military Division of the Commonwealth, the Secretary of Environmental Affairs, the Commissioner of the Department of Fisheries, Wildlife, and Environmental Law Enforcement ("DFWELE"), the Commissioner of the Department of Environmental Management ("DEM"), the Commissioner of the Department of Environmental Protection ("DEP"), collectively referred to herein as the "Parties."

The purpose of this Agreement is to establish a long-term management structure for the northern 15,000 acres of the Massachusetts Military Reservation ("MMR") in order to ensure the permanent protection of the drinking water supply and the wildlife habitat, and to ensure that military and other activities are compatible with protection of the drinking water supply and the wildlife habitat.

WHEREAS, the Massachusetts Military Reservation ("MMR"), consisting of approximately 22,000 acres, was established by 1935 Mass. Acts c. 196; 1936 Mass. Acts c. 320; 1936 Mass. Acts c. 344; 1941 Mass. Acts c. 5; 1955 Mass. Acts c. 655; and 1956 Mass. Acts c. 617 (collectively, the "Enabling Acts") for the purpose of the use and training of the military forces of the Commonwealth and entrusted to the jurisdiction of the Special Military Reservation Commission; and

WHEREAS, the 22,000 acres of MMR is currently leased by the Commonwealth to the United States of America until the year 2026 by three separate leases: one to the United States represented by the Department of the Army; one to the United States represented by the Department of the Air Force; and one to the United States represented by the Department of Transportation; and

WHEREAS, the northern approximately 15,000 acres are leased by the Commonwealth to the United States acting through the Department of the Army for military uses; and

WHEREAS, the Department of the Army licensed the northern 15,000 acres of the MMR to the Commonwealth, acting through the Massachusetts Army and Air National Guard (the "Massachusetts National Guard") for year-round training and support of the Massachusetts National Guard;

WHEREAS, the northern approximately 15,000 acres of the MMR are environmentally sensitive lands; and

WHEREAS, the Massachusetts Army National Guard, as the primary occupant of the northern approximately 15,000 acres of the MMR, provides operational staffing, maintenance and repair, environmental compliance and security programs for this property. The Massachusetts Army National Guard's programs for the northern 15,000 acres of the MMR include, but are not limited to, a Real Property and Maintenance program, an Integrated Training Area Management Program, environmental awareness and compliance programs, an Installation Restoration Program, an Integrated Cultural Resources Management Plan, and an Integrated Natural Resources Management Plan, all as described in more detail in Appendix 1; and

WHEREAS, pursuant to the Massachusetts Environmental Policy Act ("MEPA"), Mass. Gen. L. c. 30 §§61-62H, the Secretary of Environmental Affairs issued a Certificate in April 1997 to the Massachusetts National Guard to develop, in coordination with community participants, an environmental master plan for the future use of MMR. A second MEPA Certificate issued by the Secretary to The Adjutant General in May 1997 established a scope for the master plan effort and created a Community Working Group ("CWG") to advise the Secretary and develop a consensus vision for MMR, including public participation in environmental review of the forthcoming master plan, of specific proposed projects, and of those projects that may be developed through the master plan; and

WHEREAS, in September 1998, the CWG issued its *Master Plan Final Report*, which recommended future uses and activities at MMR. The *Master Plan Final Report* distinguished between the Cantonment Zone, where more intensive military and civilian activities may be anticipated, and the Water Supply Management Zone, which is co-extensive with the northern 15,000 acres of the MMR. The *Master Plan Final Report* described the purpose of the northern 15,000 acres as "permanent protection and coordinated management plans for water supply, wildlife habitat, and open space protection consistent with necessary and compatible military activities"; and

WHEREAS, the Final Environmental Impact Report and a subsequent informational supplement proposed a comprehensive set of Environmental Performance Standards (EPS) (Appendix 2) designed to guide all activities on the northern 15,000 acres of the MMR, and in particular training on the northern 15,000 acres. The proposed EPS received extensive review and were strengthened throughout the MEPA process. Each EPS meets or exceeds applicable regulatory standards. On July 16, 2001, the Secretary issued a Certificate finding that the Final Environmental Impact Report adequately and properly complies with MEPA, subject to the execution of an enforceable management agreement that embodies the Guiding Principles (Appendix 3); and

WHEREAS, the Parties mutually agree that a cooperative partnership between the Commonwealth and the military for the management of the northern 15,000 acres of the MMR is necessary in order to ensure the permanent protection of the drinking water supply and wildlife habitat, and to ensure that military and other activities are compatible with protection of the drinking water supply and the wildlife habitat;

NOW, THEREFORE, the Parties agree as follows:

General Responsibilities

1. All military and other activities conducted on the northern 15,000 acres of the MMR shall be conducted in accordance with all applicable federal and state environmental laws and regulations and the EPS.
2. The Massachusetts National Guard shall coordinate the activities of the various military and other users of the northern 15,000 acres of the MMR, excluding the Air Force PAVE PAWS site and the Coast Guard Transmitter site, which are addressed in paragraph 24, to ensure security and maintenance of the area.

Environmental Management Commission

3. The Governor shall establish by Executive Order an independent Environmental Management Commission ("EMC") of MMR. The Governor will file legislation to codify the EMC and its functions. The EMC shall consist of three *ex officio* members: the Commissioner of the Department of Fisheries, Wildlife, and Environmental Law Enforcement; the Commissioner of the Department of Environmental Management; and the Commissioner of the Department of Environmental Protection.
4. The purpose of the EMC shall be to ensure the permanent protection of the drinking water supply and wildlife habitat of the northern 15,000 acres of the MMR. The EMC shall ensure, by independent oversight, monitoring, and evaluation, that all military and other activities on the northern 15,000 acres are consistent with this purpose. The EMC shall oversee compliance with and enforcement of the Environmental Performance Standards (EPS); coordinate the actions of state environmental agencies in the enforcement of laws and regulations, as appropriate; and facilitate an open and public review of all activities on the northern 15,000 acres of the MMR.

Advisory Councils

5. The EMC shall be assisted by two advisory councils:
 - a. Community Advisory Council ("CAC"). The CAC shall be comprised of the following members: one representative of each of the towns of Falmouth, Bourne, Sandwich, and Mashpee; one family member resident of MMR; two representatives of the military; one representative of the Cape Cod Commission; one representative of the Upper Cape Regional Water Supply Cooperative; one representative of the Wampanoag Tribe; and five other members. All members shall be appointed by the Governor, provided that the

town representatives shall be recommended by the towns' respective Boards of Selectmen; the MMR family member resident shall be selected from among a list of five persons provided by the Commander of the Coast Guard Air Station Cape Cod; the military representatives shall be recommended by the Military Division of the Commonwealth; the Cape Cod Commission representative shall be recommended by the Cape Cod Commission; the Upper Cape Regional Water Supply Cooperative representative shall be recommended by the Upper Cape Regional Water Supply Cooperative; and the Wampanoag Tribe representative shall be recommended by the tribal leadership. The CAC shall assist the EMC by providing advice on issues related to the protection of the drinking water supply and wildlife habitat on the northern 15,000 acres of the MMR.

b. ~~Science Advisory Council ("SAC").~~ The SAC shall be appointed by the Governor and be comprised of five (5) to nine (9) scientists and engineers who are recognized for their expertise in the areas of public health, water protection, wildlife habitat management, or land use management. The SAC shall assist the EMC by providing advice on scientific and technical issues related to the protection of the drinking water supply and wildlife habitat on the northern 15,000 acres of the MMR.

Environmental Officer

6. The EMC shall designate a state employee to serve as the MMR Environmental Officer ("EO") and may designate such additional persons as may be necessary to carry out the activities of the Commission. The EO shall report to the EMC. The duties and responsibilities of the EO shall be to monitor the activities being conducted on and the uses of the northern 15,000 acres of the MMR and the impact of such activities and uses on the drinking water supply and wildlife habitat of the northern 15,000 acres of the MMR. The EO shall also coordinate with appropriate personnel from DFWELE, DEM, and DEP to monitor and evaluate the environmental impact of activities conducted on and uses of the northern 15,000 acres of the MMR. The Massachusetts National Guard shall provide the EO with office space located within the Environmental Readiness Center (ERC) or other such location on the MMR as may be appropriate to carry out the EO's duties. The Massachusetts National Guard shall designate an individual as its representative and liaison to the EMC.

Access and Information

7. EMC, DFWELE, DEM, and DEP personnel shall have access to the northern 15,000 acres of the MMR in order to monitor, oversee, evaluate, and report to the EMC on the environmental impact of military training and all other activities. Such access shall be allowed prior to, during, and immediately following training or other activities upon proper notice and in accordance with Camp Edwards Standard Operating Procedures (SOP), regulations, and security requirements.

8. The Massachusetts National Guard and the Army shall allow the EO, acting on behalf of the EMC, regular and unrestricted access to all data and information from the various environmental and management programs and activities operating on Camp Edwards. These programs and activities include, but are not limited to, the Integrated Training Area Management Program

(ITAM); the Integrated Natural Resources Management Plan (INRMP); the Integrated Cultural Resources Management Plan (ICRMP); Camp Edwards SOPs; and any other program or activity created by the Army or the Massachusetts National Guard for the purpose of managing or maintaining the northern 15,000 acres of the MMR. Access to data and information shall not include restricted or classified information, unless the EO obtains the appropriate level of security clearance. The Army and the Massachusetts National Guard shall use its best efforts to assist the EO in obtaining the appropriate level of security clearance. The Massachusetts National Guard shall also submit all draft and final Impact Area Ground Water Study Reports to the EMC for information, as soon as such reports become available.

Annual State of the Reservation Report

9. The Massachusetts National Guard shall submit to the EMC, with copies to the SAC and CAC, the Annual State of the Reservation Report, required by Mass. Gen. L. c. 30, §61, describing in detail: (a) the nature and extent of military training and other activities; (b) all resource management activities and projects; (c) the status of compliance with applicable federal and state environmental laws and regulations and the EPS; and (d) long-term trends in the major areas of resource management and activities. The Massachusetts National Guard shall make the Annual Report publicly available. This report shall be based primarily upon the management programs referenced in paragraph 8.

Notification Requirements

10. The Massachusetts National Guard shall notify the EMC, in writing and within two (2) business days after discovery, of any violation of an EPS. The notification shall include the nature and extent of the violation and any corrective action that has been taken or will be taken to return to compliance. With respect to a violation of federal or state law that is reported to or by a state or federal agency, the Massachusetts National Guard shall provide the EMC with a copy of any such notice provided to or by the federal or state agency.

11. The Massachusetts National Guard shall also notify the EMC, in writing and within two (2) business days after discovery, of any damage or threat of damage to the drinking water supply or wildlife habitat, even if the damage results, or may result from, an activity that is otherwise compliant with law, regulation, or EPS. Damage shall not include any insignificant damage to these resources.

EMC Actions and Enforcement

12. The EMC shall evaluate all information and data regarding the activities and uses of the northern 15,000 acres of the MMR and the environmental impacts upon the drinking water supply and wildlife habitat of the northern 15,000 acres of the MMR and may take appropriate action. The EMC may consult with the SAC, CAC, or other entities in evaluating such information and in taking such action.

13. If the EMC determines that a user has violated or is violating an EPS, the EMC will notify the violator of the violation and may: (1) in the case of an imminent and substantial damage,

order such activity to cease immediately, or require adjustments in the activity to eliminate the imminent and substantial damage or threat of damage; or (2) in all other cases, require the violator to return to compliance within a reasonable time and to notify the EMC of the corrective action taken, including steps to ensure future compliance. Repeat or willful violations of an EPS may result in sanctions up to and including cessation of activities.

14. The state environmental agencies on the EMC retain all their respective, independent enforcement authority. In response to an enforcement action brought by one of the state environmental agencies, including DFWELE, DEM, and DEP, members of the EMC shall work together to implement coordinated actions at the MMR. In order to avoid, minimize, and mitigate any negative impacts, they shall, in good faith and where appropriate, seek comment and input from one another, the military, and the public before issuing decisions or taking actions at the MMR.

15. If the EMC determines, based upon sound and accepted scientific analysis and evidence, that an activity that is otherwise compliant with law, regulation, or EPS is causing or threatens to cause imminent and substantial damage to the drinking water supply or wildlife habitat of the northern 15,000 acres of MMR, the EMC may: (1) order such activity to cease immediately; or (2) require adjustments in the activity to eliminate the imminent and substantial damage or threat of damage.

Cessation of Activities

16. The Massachusetts National Guard, the Army, and any other user of MMR shall immediately cease or adjust any activity that, in the determination of the Massachusetts National Guard or the EMC, causes or threatens to cause imminent and substantial damage to the drinking water supply or the wildlife habitat of the northern 15,000 acres of the MMR.

Adjustment to Environmental Performance Standards

17. After consultation with the SAC and CAC, the EMC may adjust EPS based upon sound and accepted scientific analysis, monitoring data, and other relevant information. The proponent of any adjustment shall bear the burden of justifying the proposed adjustment and demonstrating that the proposed adjustment is protective of the drinking water supply and wildlife habitat. If the EMC determines that a proposed adjustment may be warranted and does not significantly reduce the standard of environmental protection, it shall publish a notice of availability of the proposed adjustment to the EPS in the *Environmental Monitor*, furnish copies to all members of the CAC and SAC, and accept public comment for a period of at least 30 days following the publication date. Thereafter, the proposed EPS will become effective on a date determined by the EMC. The EMC shall not consider adjustments to the EPS prior to submission of the first State of the Reservation Report, required under paragraph 9 above and to be filed on or about 1 January 2003, unless such an adjustment is necessary to abate an imminent and substantial damage or for national security reasons.

Compliance

18. The military agrees to comply with all decisions and orders of the EMC, provided such decisions or orders do not conflict with federal or state law.

Administrative Process and Reconsideration

19. Prior to issuing an order or deciding an issue that does not involve an imminent and substantial damage, the EMC shall provide the military with an opportunity to be heard.
20. If the EMC issues an order to cease or adjust an activity to avoid imminent and substantial damage, the EMC shall provide the military an opportunity to be heard on the matter within two (2) business days after issuing the order.

21. In the case of an order to abate an activity that causes or threatens to cause imminent and substantial damage to the drinking water supply or wildlife habitat, the Parties agree that the activity shall cease during the pendency of any request for reconsideration.

22. The military may request reconsideration of any decision or order of the EMC by submitting its concerns in writing. The EMC will consider all such requests. The EMC shall reconsider its decision or order, in light of all relevant information, and either affirm, amend, or reverse its decision or order and so indicate in writing within 30 days, unless such time is further extended by mutual agreement of the Parties.

Assumption of Duties

23. In the event the Massachusetts National Guard's license is terminated, the duties and obligations of the Massachusetts National Guard under this Agreement shall be assumed by the Army or any subsequent licensee of the northern 15,000 acres of the MMR.

Exclusion of PAVE PAWS and Coast Guard Transmitter Sites

24. This MOA shall not in any way affect the powers, rights, duties, and liabilities of the Parties with respect to the PAVE-PAWS site or the U.S. Coast Guard Transmitter site:

a. The PAVE-PAWS site, so called, consisting of approximately 87 acres as described in permit # DACA 51-4-81-475 issued by the U.S. Department of the Army to the U.S. Department of the Air Force; said site being a portion of land owned by the Commonwealth and leased to the United States of America, represented by the Department of the Army, as described in its lease contract # DACA 51-5-77-127 and associated supplemental lease agreements,

b. The United States Coast Guard Transmitter site, so called, consisting of approximately 542 acres and shown as "Parcel P" on a plan of land titled "Compiled Plan Showing Leased Areas at Camp Edwards Military Reservation," scale 1"=2000', dated September 30, 1982, and prepared by the United States Army Corp of Engineers; said site being a portion of land owned by the Commonwealth and leased to the United States of America, represented by the Department of Transportation,

United States Coast Guard, as described in its lease document #34836, dated July 1, 1976.

Funding

25. The Parties agree to seek sufficient funding through their budgetary processes in order to share the costs of implementing this Agreement.

Anti-Deficiency Act

26. Any requirement for the payment or obligation of funds established by the terms of this Agreement shall be subject to the availability of appropriated funds, and no provision herein shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C §1341.

Amendment, Modification, and Termination of Agreement

27. This Agreement may be amended or modified solely upon the written consent of all Parties. Such amendments or modifications shall have as the effective date that date on which they are signed by all Parties and notice thereof is provided to each signatory. This Agreement shall remain in effect for as long as the Army continues to lease the northern 15,000 acres of the MMR, unless sooner terminated upon the mutual agreement of the Parties.

Other Claims

28. Nothing in this Agreement shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Agreement.

Enforceability

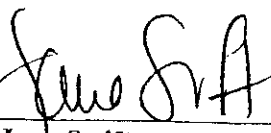
29. In addition to the rights and obligation arising under this Agreement, the Parties retain their rights and obligations under law. This Agreement shall be enforceable in accordance with applicable laws and regulations in any court of competent jurisdiction.

SIGNATURE PAGE FOLLOWS

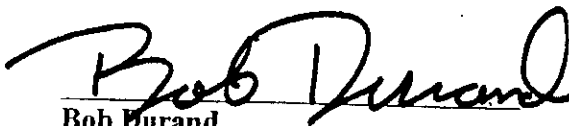
NOW, THEREFORE, this 4th day of October 2001, the Parties so agree:

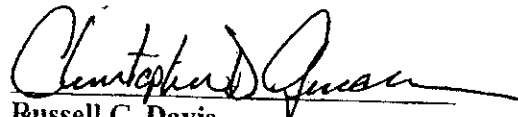
Commonwealth of Massachusetts

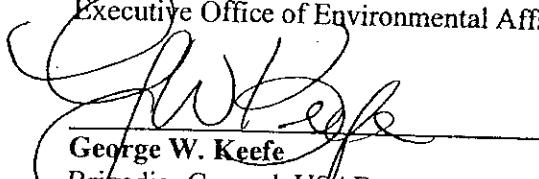
Department of the Army


Jane Swift
Governor

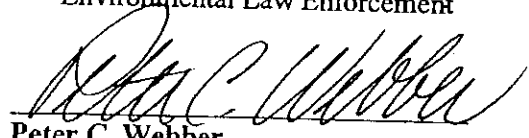

Raymond J. Fatz
Deputy Assistant Secretary of the Army
(Environment, Safety & Occupational Health)
Office of the Assistant Secretary of the Army
(Installations & Environment)

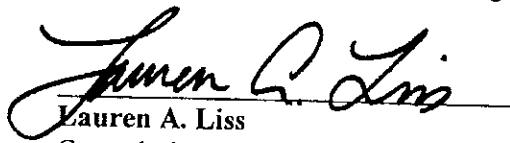

Bob Durand
Secretary
Executive Office of Environmental Affairs


Russell C. Davis
Lieutenant General, USAF
Chief, National Guard Bureau


George W. Keefe
Brigadier General, USAF
The Adjutant General of the Massachusetts National Guard
and the Military Division of the Commonwealth


David M. Peters
Commissioner
Department of Fisheries, Wildlife, and
Environmental Law Enforcement


Peter C. Webber
Commissioner
Department of Environmental Management


Lauren A. Liss
Commissioner
Department of Environmental Protection

APPENDIX 1

Environmental Management Programs

These standards will be implemented through the applicable military environmental and land management programs. Those programs start from the broadest and most comprehensive management plans and move throughout the full hierarchy of users and management down to the specific actions required from each user. The principal environmental and land management programs that the military and the users of the Massachusetts National Guard properties follow are:

1. Integrated Natural Resources Management Plan. In accordance with the Federal Sikes Act, Army Regulation AR 200-3, and Department of Defense Instruction 4715.3, an Integrated Natural Resources Management Plan is required to guide management of the natural resources at military installations. The creation of this Plan is currently in progress.
2. Integrated Land Use Management Plan. This Plan is similar to the Integrated Natural Resources Management Plan, but is the Air National Guard's equivalent for airfields and associated land areas where natural resources are limited and field training areas are not a significant portion of the facility. In the case where more significant natural resources exist, the Air Guard has the option of developing an Integrated Natural Resources Management Plan as the preferred management plan.
3. Massachusetts Military Reservation Groundwater Protection Policy. The Groundwater Protection Policy is equivalent to a municipal wellhead protection (Zone II) zoning regulation. However, because of the unique conditions of management and control of the Massachusetts Military Reservation commands, the Groundwater Protection Policy goes beyond the Department of Environmental Protection's recommended standard regulation to include specific operating and management actions to further protect the groundwater resources.
4. Integrated Training Area Management Program. The Integrated Training Area Management Program establishes a systematic framework for decision-making and management of Army training lands. It integrates elements of operational, environmental, master planning, and other programs that identify and assess land use alternatives. The Integrated Training Area Management Program also supports sound natural and cultural resources management practices and stewardship of land assets, while sustaining those assets to support training, testing, and other installation missions. There are four components to the program:
5. Integrated Cultural Resources Management Plan. This Plan complements other management plans, such as the Integrated Natural Resources Management Plan. The Plans identifies known cultural resources, such as historic buildings and other structures, archaeological sites, and traditional cultural properties. The Integrated

Cultural Resources Management Plan also identifies potential conflicts between the installation's mission and cultural resources, and identifies compliance actions necessary to maintain the availability of mission essential properties. Another component is ensuring government-to-government consultations with federally recognized Indian tribes are initiated. The Integrated Cultural Resources Management Plan meets stewardship responsibilities by protecting and managing sensitive cultural resources, while supporting mission readiness.

6. Camp Edwards Range Regulations. All military areas are covered by regulations regarding the use and activities at those locations. The regulations are comprehensive in that they apply to all actions from the initial coordination between the user and the Training Command to the closure of the activity and confirmation of proper conduct during the activity.
7. Standard Operating Procedures. All military training activities are judged by conformance to a set of standardized actions set down in the Training Manuals issued to all trainers and leaders. Each activity or action requires compliance with the standardized procedures to ensure completion of the task to a minimum standard. These Standard Operating Procedures include actions that protect against accidents, which could cause environmental damage.
8. Environmental Approvals. The implementation of the military training and environmental management strategy is contingent on the approval of the environmental agencies under the mandated reviews. This will entail completion of the National Environmental Policy Act process and documentation before initiation.
9. Environmental Investigations and Remediation. The Massachusetts Military Reservation, with external oversight, has been the subject of investigations and remediation efforts aimed at identifying and remediating environmental conditions caused by past practices. Within the Camp Edwards Training Areas, the program involves the Impact Area Groundwater Study. These program activities take precedent over other potentially competing activities.
10. Groundwater Development for Public Water Supplies. The regional Upper Cape Water Supply Cooperative is actively involved in the process of developing groundwater supplies for public distribution to the base users and the surrounding towns, supported in part by the National Guard Bureau. The activities associated with this program also take precedent over other potentially competing activities.

APPENDIX 2

Environmental Performance Standards For Massachusetts National Guard Properties At The Massachusetts Military Reservation

Camp Edwards Training Area General Performance Standards

None of the banned military training activities will be allowed in the Camp Edwards Training Areas. The restrictions fall into two categories:

- Live weapon fire limitations:
 - It is not allowed outside of the established ranges.
 - Blank ammunition for small arms may be used in areas outside of the ranges, as appropriate.
 - Lead-bullet ammunition is prohibited from all training areas.
- Banned military training activities:
 - Artillery live fire
 - Mortar live fire
 - Demolition live fire training
 - Artillery bag burning
 - Non-approved digging, deforestation or vegetative clearing
 - Use of "CS," riot control, or tear gas for training outside the NBC bunkers
 - Use of field latrines with open bottoms
 - Vehicle refueling outside designated Combat Service Area and Fuel Pad locations
 - Field maintenance of vehicles above operator level

All users of the Camp Edwards Training Area must comply with the provisions of the Groundwater Protection Policy and any future amendments or revisions to the restrictions and requirements. These will apply to all uses and activities within the overlays relative to Wellhead Protection, Zone II's within the Cantonment Area, and the Camp Edwards Training Areas.

Protection and management of the groundwater resources in the Camp Edwards Training Area will focus on the following:

- Development of public and Massachusetts Military Reservation water supplies.
- Preservation and improvement of water quality and quantity (recharge).
- Activities compatible with the need to preserve and develop the groundwater resources.

Development of water supplies will be permitted within the Camp Edwards Training Area after review and approval by the managing agencies, principally the Department of the Army and its divisions, together with the Massachusetts Department of Environmental Protection, and the Massachusetts Division of Fish and Wildlife.

All phases of remediation activities will be permitted within the Camp Edwards Training Area after review and approval by the managing agencies, principally the Department of the Army and its divisions, together with the federal and state agencies who will have jurisdiction for remediation.

Protection and management of the vegetation of the Camp Edwards Training Area for focus on the following:

- Preservation of the habitat for federal- and state-listed rare species and other wildlife.
- Preservation of the wetland resource areas.
- Activities compatible with the need to manage and preserve the vegetative resources.
- Realistic field training needs.
- Identification and restoration of areas impacted by training activities.

Each user will be responsible for proper collection, management, and disposal of the wastes they generate, as well for reporting on those actions.

Use and application of hazardous materials or disposal of hazardous waste shall be prohibited except as described in the Groundwater Protection Policy.

Vehicles are only authorized to use the existing network of improved and unimproved roads, road shoulders, ranges and bivouac areas, except where necessary for land rehabilitation and management, water supply development, and remediation, or where roads are closed for land rehabilitation and management.

Goals for the Adaptive Ecosystem Management approach to management of the Camp Edwards properties will be as follows:

- Management of the groundwater for drinking water resources.
- Conservation of endangered species.
- Management of endangered species habitat for continuation of the species.
- Ensuring compatible military training activities.
- Allowing for compatible civilian use.
- Identification and restoration of areas impacted by training activities.

The Environmental Performance Standards will be incorporated into the programs and regulations of the Massachusetts National Guard as follows. Those standards relating to natural resources management shall be incorporated as standards into each of the state and federal environmental management programs and attached as an appendix or written into the documentation accompanying the plan or program. All the Environmental Performance Standards will be attached to the Integrated Training Area Management Plan 'Trainer's Guide' and to the Camp Edwards Range Regulations. Modification of the Standards Operating Procedures will include review and conformance with the Environmental Performance Standards for trainers and soldiers at Camp Edwards.

Specific Resource Performance Standards in the Camp Edwards Training Area

1. Groundwater Resources Performance Standards

1.1. All actions, at any location within the Camp Edwards Training Areas, must preserve and maintain groundwater quality and quantity, and protect the recharge areas to existing and potential water supply wells. All areas within Camp Edwards Training Areas will be managed as State Zone II, and, where designated, Zone I, water supply areas.

1.2. The following standards shall apply to designated Wellhead Protection Areas:

- The 400-foot radius around approved public water supply wells will be protected from all access with signage. That protection will be maintained by the owner and/or operator of the well, or the leaseholder of the property.
- No new stormwater discharges may be directed into Zone I areas.
- No inground septic system will be permitted within a Zone I area.
- No solid wastes may be generated or held within Zone I areas except as incidental to the construction, operation, and management of a well.
- Travel in Zone I areas will be limited to foot travel or to vehicles required for construction, operation, and maintenance of wells.
- No new or existing bivouac activity or area shall be located within a Zone I area.
- All other areas will be considered as Zone II designated areas and will be subject to the standards of the Groundwater Protection Policy.

1.3. Land-use activities that do not comply with either the state Wellhead Protection regulations (310 CMR 22.00 et seq.) or the Groundwater Protection Policy are prohibited.

1.4. All activities will support and not interfere with either the Impact Area Groundwater Study and/or the Installation Restoration Program. All activities shall conform to the requirements of Comprehensive Environmental Response, Compensation and Liability Act, the Massachusetts Contingency Plan, and the Safe Drinking Water Act.

1.5. Extraction, use, and transfer of the groundwater resources must not degrade [e.g. draw down surface waters] in freshwater ponds, vernal pools, wetlands, and marine waters, unless properly reviewed, mitigated, and approved by the managing and regulating agencies.

1.6. Land uses and activities in the Camp Edwards Training Areas will meet the following standards:

- Will conform to all existing and applicable federal, state and local regulations.
- Must be able to be implemented without interference with ongoing remediation projects.
- Allow regional access to the water supplies on the Massachusetts Military Reservation.

1.7. The following programs and standards will be used as the basis for protecting groundwater resources in the Camp Edwards Training Areas:

- Groundwater Protection Policy.
- Federal and Department of Defense environmental programs: Integrated Natural Resources Management Plan, Integrated Training Area Management Program, Range Regulations, Spill Prevention Control and Countermeasures Plan (or equivalent), Installation Restoration Plan, Impact Area Groundwater Study, or other remediation programs.

- State and federal laws and regulations pertaining to water supply.

2. Wetlands and Surface Water Performance Standards

2.1 Since there are relatively few wetland resources found at the Massachusetts Military Reservation, and since they are important to the support of habitat and water quality on the properties, the minimum standard will be no net loss of any of the wetland resources or their 100-foot buffers,

2.2 Land uses and activities will be managed to prevent and mitigate new adverse impacts and eliminate or reduce existing conditions adverse to wetlands and surface water resource areas. Impacts from remediation activities may be acceptable with implementation of reasonable alternatives.

2.3 Wetland area management priorities:

- Protection of existing wetland resource areas for their contributions to existing and potential drinking water supplies.
- Protection of wetlands for rare species and their habitats.
- Protection of human health and safety.

2.4 Activities will be managed to preserve and protect wetlands and vernal pools as defined by applicable, federal, state, and local regulations. These activities will include replacement or replication of all wetland resource buffer areas, which are lost after completion of an activity or use.

2.5 All land altering activities within 100 feet of a certified vernal pool must be reviewed before commencement by the Massachusetts Department of Environmental Protection/Wetlands Unit and the Natural Heritage and Endangered Species Program within the Division of Fish and Wildlife for impacts to wildlife and habitat. The certification of vernal pools will be supported by the on site personnel and will proceed with the assistance of the appropriate state agencies.

2.6 All new uses or activities will be prohibited within the wetlands and their 100-foot buffers, except those associated with an approved habitat enhancement or restoration program; those on existing improved and unimproved roads where appropriate sediment and erosion controls are put in place prior to the activity; or those where no practicable alternative to the proposed action is available. No new roads should be located within the 100-foot buffers. Existing roads within such buffers should be relocated provided that:

- The relocation does not cause greater environmental impact to other resources.
- There are funds and resources allocated for resource management and that those resources are approved and available for the relocation.

2.7 During the period of 1 March to 15 June, roads within 500 feet of all wetlands will be closed to vehicle access to protect the migration and breeding of herptiles, with the following exceptions:

- The primary roads - Frank Perkins, Burgoyne, Gibbs and Greenway Roads will not normally be closed during this period.
- Emergency response and environmental management activities will not be restricted.

2.8 No new bivouac area shall be located within 500 feet of any wetland. Any existing bivouac within a wetland buffer shall be relocated provided there are funds and resources allocated for the relocation.

3. Rare Species Performance Standards

3.1 As the Natural Heritage and Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife has identified the entire Massachusetts Military Reservation as State Priority Habitat for state-listed species (version dated 2000-2001), all activities and uses must comply with the Massachusetts Endangered Species Act and its regulations.

3.2 Where activities and uses are not specifically regulated under the Camp Edwards Training Area Range and Environmental Regulations, including these Environmental Performance Standards, the MMR Environmental and Readiness Center must review the activities for conformance with the Integrated Natural Resource Management Plan, and shall consult with the Natural Heritage and Endangered Species Program regarding potential impacts to state-listed species.

3.3 All activities impacting rare species habitat must be designed to preserve or enhance that habitat as determined by the MMR Environmental and Readiness Center in consultation with the Natural Heritage and Endangered Species Program.

3.4 Users are prohibited from interfering with state and federal listed species.

3.5 Users will report all sightings of recognized listed species, e.g. box turtles, within any area of the Massachusetts Military Reservation.

4. Soil Conservation Performance Standards

4.1 Activities and uses must be compatible with the limitations of the underlying soils. Limitations on uses and activities may be made where the soils or soil conditions would not support the activity.

4.2 Agricultural soil types will be preserved for future use.

4.3 Any perennial or intermittent stream identified by the Environmental & Readiness Center will be protected from siltation by retaining undisturbed vegetative buffers to the extent feasible.

4.4 Cultural resource evaluations must be completed before any earth-moving operation may take place in undisturbed areas with high potential for cultural resources, and earth moving may be limited to specific areas (See Cultural Resource Performance Standards).

4.5 An erosion control analysis will be made part of the land management programs (Integrated Natural Resource Management Plan, the Integrated Training Area Management Program, Range Regulations, Civilian Use, and Standard Operating Procedures) for the Camp Edwards Training Area, including appropriate mitigation measures where existing or potential erosion problems are identified.

- 4.6 For all improved and unimproved roads, ditches and drainage ways:
- All unimproved roads, ditches, roads and drainage ways identified for maintenance will be cleaned of logs, slash and debris.
 - Unimproved roads and roads may not otherwise be improved unless approved for modification.
 - Any trail, ditch, road, or drainage way damaged by activities will be repaired in accordance with the hazard and impact it creates.
- 4.7 Erosion-prone sites will be inspected periodically to identify damage and mitigation measures.

5. Vegetation Management Performance Standards

- 5.1 All planning and management activities impacting vegetation
- Will ensure the maintenance of native plant communities, and
 - Shall be performed to maintain the biological diversity.
- 5.2 Revegetation of disturbed sites will be achieved by natural and artificial recolonization by native species.
- 5.3 Timber harvesting or clear-cutting of forested areas should not occur on steep slopes with unstable soils or within the buffers to wetland resources.
- 5.4 Vegetation management will be subject to a forest management and fire protection program prepared by the users in accordance with federal standards, and carried out in a manner acceptable to the Massachusetts Military Reservation Committee and other state agencies or commissions, as may be designated by the Commonwealth of Massachusetts.

6. Habitat Management Performance Standards

- 6.1 The Camp Edwards Training Area will be managed as a unique rare species and wildlife habitat area under an adaptive ecosystem management program that integrates ecological, socio-economic, and institutional perspectives, and which operates under the following definitions:
- Adaptive means making decisions as part of a continual process of monitoring, reviewing collected data, and responding with management actions as dictated by the resulting information and needs of the system.
 - Ecosystem means a system-wide understanding of the arrangements of living and non-living things, and the forces that act upon and within the system.
 - Management entails a multi-disciplinary approach where potentially competing interests are resolved with expert analysis, user and local interest considerations, and a commitment to compromise interests when the broader goal is achieved to manage the Camp Edwards Training Area as a unique wildlife habitat area.
- 6.2 The adaptive ecosystem management program will include:
- Coordinated documentation for the management programs, Integrated Natural Resource Management Plan, the Integrated Training Area Management Program, Range Regulations, Civilian Use, and Standard Operating Procedures.

- The Massachusetts National Guard Environmental and Readiness Center staff and necessary funding to support its ecosystem management plans, as related to the amount of training occurring.
- Cooperative agreements to create a management team of scientific and regulatory experts.
- Long-term land maintenance, monitoring of resources and trends, study and analysis.
- Recovery plans for species and habitats identified for improvement.
- Consultation with Federal and State agencies charged with oversight of the Endangered Species Program before any actions that may affect state and federal-listed species habitat.
- Reduction of adverse impacts to the maximum extent possible, including consideration for the relocation of the activity or encouraging only those activities that result in meeting a habitat management goal.
- Habitat management activities designed to promote protection and restoration of native habitat types.

7. Wildlife Management Performance Standards

7.1 Native wildlife habitats and ecosystems management will focus on the following:

- Protecting rare and endangered species, and,
- Maintaining biodiversity.

7.2 Hunting, recreation and educational trips must be approved, scheduled, planned, and supervised through Range Control.

7.3 Any activity or use will prioritize protection of life, property, and natural resource values at the boundaries of the Camp Edwards Training Area where wildlife interfaces with the surrounding built environment.

7.4 Wildlife management will include the following actions, specific to the species targeted for management:

- Development and implementation of a plan to monitor hunting of game species.
- Planning for multi-use objectives for recreation and hunting that incorporate public input and recommendations.
- Development of suitable monitoring programs for federal and state-listed species, and regular exchange of information with the Natural Heritage and Endangered Species Program.

8. Air Quality Performance Standards

8.1 All uses and activities will be responsible for compliance with both the State Implementation Plan for Air Quality and the Federal Clean Air Act.

8.2 Air quality management activities will include air sampling if required by regulation of the activity.

9. Noise Management Performance Standards

9.1 Noise management activities shall conform to the Army's Environmental Noise Management Program policies for evaluation, assessment, monitoring, and response procedures.

10. Pest Management Performance Standards

10.1 Each user will develop and implement an Integrated Pest Management Program to control pest infestations that may include outside contracting of services. Non-native biological controls should not be considered unless approved by federal and state agencies.

10.2 Each user will be held responsible for management of pests that threaten rare and endangered species, or are exotic and invasive species. Invasive plant species that may be considered pest species are those defined by the United States Fish and Wildlife Service and the Massachusetts Natural Heritage and Endangered Species Program of the Division of Fisheries and Wildlife office. Site-specific analysis will be performed before implementation of any proposed pest management plans.

10.3 Pest vegetation control must be balanced against environmental impact and any proposed pest management activities, including the use of herbicides and mechanical methods, within rare species habitat areas must be approved by the Natural Heritage and Endangered Species Program, or in the case of federally-listed species, by the United States Fish and Wildlife Service.

10.4 Only herbicide formulations approved by the United States Environmental Protection Agency, the Department of Agriculture, the agency managing the user, and the Commonwealth of Massachusetts may be applied.

10.5 Herbicides and pesticides will not be applied by aerial spraying unless required by emergency conditions and approved under applicable state and federal regulations.

11. Fire Management Performance Standards

11.1 All activities and uses shall manage, prevent, detect, and suppress fires on the Camp Edwards Training Area in coordination with the local and state fire services and natural resource managers in the Environmental & Readiness Center.

11.2 Prescribed burns will be used as a habitat management and fire prevention tool. Prescribed burns will be used to reduce natural fire potential and create or maintain diverse and rare species habitat.

11.3 Pre-suppression activities will include strategic firebreaks and other management of vegetation in high-risk and high-incidence areas. The Integrated Natural Resource Management Plan Fire Management Plan will be consulted for proposed actions.

11.4 Other than the above, no open fires are allowed.

12. Stormwater Management Performance Standards

12.1 All stormwater facilities shall comply with the State Department of Environmental Protection Guidelines for Stormwater Management, including Best Management Practices and all other applicable standards for control and mitigation of increased stormwater flow rates and improvement of water quality.

12.2 All increases in stormwater runoff will be controlled within the user's property.

12.3 No new stormwater discharges will be made directly into wetlands or wetland resource areas.

13. Wastewater Performance Standards

13.1 All wastewater and sewage disposal will be in conformance with the applicable Federal and Massachusetts Department of Environmental Protection agency regulations.

14. Solid Waste Performance Standards

14.1. All solid waste streams (i.e., wastes not meeting the criteria for hazardous wastes) will be monitored and managed to substitute, reduce, recycle, modify processes, implement best management practices, and/or reuse waste, thereby reducing the total tonnage of wastes.

14.2. All users will be held responsible for collection, removal and disposal outside of the Camp Edwards Training Areas of solid wastes generated by their activities.

14.3 All users must handle solid wastes using best management practices to minimize nuisance odors, wind-blown litter, and attraction of vectors.

14.4 No permanent disposal of solid waste within the Groundwater Protection Policy area/Camp Edwards field training areas will be permitted.

15. Hazardous Materials Performance Standards

15.1 Where they are permitted, use and application of hazardous materials shall be otherwise minimized in accordance with pollution prevention and waste minimization practices, including material substitution.

15.2 No permanent disposal of hazardous wastes within the Groundwater Protection Policy area/Camp Edwards field training areas will be permitted.

15.3 Fuel Management

15.3.1 Spill Prevention, Control, and Countermeasure Plan, is in place to reduce potential for a release. Camp Edwards Spill Response Plan is in place to respond to a release if an event should occur. All users will comply with these plans at the Camp Edwards Training Area.

15.3.2 If found, non-complying underground fuel storage tanks, will be removed in accordance with state and federal laws and regulations to include remediation of contaminated soil.

15.3.3 No storage or movement of fuels for supporting field activities, other than in vehicle fuel tanks, will be permitted except in approved containers no greater than five gallons in capacity.

15.3.4 New storage tanks are prohibited unless they meet the following requirements:

- Are approved for maintenance heating, or, permanent emergency generators and limited to propane or natural gas fuels.
- Conform to the Groundwater Protection Policy and applicable codes.

15.4 Non-fuel Hazardous Material Storage

15.4.1 No storage above those quantities necessary to support field training activities will be allowed within the Camp Edwards Training Area, except where necessary to meet regulatory requirements, and where provided with secondary containment.

15.4.2 When required by applicable regulation, the user shall implement a Spill Prevention, Control and Containment/Emergency Response or other applicable response plan.

16. Hazardous Waste Performance Standards

16.1 All uses shall comply with applicable local, state, and federal regulations governing hazardous waste generation, management, and disposal (including overlays relative to Wellhead Protection, Zone II's within the Cantonment Area).

16.2 Accumulations of hazardous waste shall be handled in accordance with regulations governing accumulation and storage.

16.3 Existing facilities must implement pollution prevention and waste minimization procedures (process modifications, material substitution, recycling, and best management practices) to minimize waste generation and hazardous materials use.

16.4 Occupants and users will be held responsible for removing all solid or hazardous wastes generated during the period of use/tenancy/visitation upon their departure or in accordance with other applicable or relevant regulations.

16.5 Remedial activities undertaken under the Installation Restoration Program, the Impact Area Groundwater Study Program, the Massachusetts Contingency Plan, or other governing remediation programs are exempt from additional regulation (e.g., waste generation volume limits). Removal, storage, and disposal of contaminated material are required to comply with all state, and federal regulations.

16.6 Post-remedial uses and activities at previously impacted sites will be allowed in accordance with terms and conditions of the applicable regulations.

16.7 All hazardous wastes will be transported in accordance with federal Department of Transportation regulations governing shipment of these materials.

16.8 Transport shall reduce the number of trips for transfer and pick-up of hazardous wastes for disposal to extent feasible. This may include planning appropriate routes that minimize proximity to sensitive natural resource areas, and reducing internal transfers of material, including transfers from bulk storage tanks to drums, tankers, carboys, or other portable containers or quantities.

16.9 No permanent disposal of hazardous wastes within the Groundwater Protection Policy area/Camp Edwards field training areas will be permitted.

17. Vehicle Performance Standards

17.1 Vehicles within the Camp Edwards Training Area will be limited to the existing improved and unimproved road system except where required for natural resource management or property maintenance or where off-road activity areas are located and approved by the Environmental and Readiness Center in consultation with the Massachusetts Division of Fisheries and Wildlife.

17.2 Unimproved, established access ways will be limited to use by vehicles in accordance with soil conditions as described in the Soil Conservation Performance Standards.

17.3 The number of military and civilian vehicles within the Camp Edwards Training Area will be controlled using appropriate scheduling and signage.

18. General Use and Access Performance Standards

18.1 General User Requirements. Requirements that will apply to all users, both public and private, in the Camp Edwards Training Area include the following:

- All acts that pollute the groundwater supply are prohibited.
- No litter or refuse of any sort may be thrown or left in or on any property.
- All users will be held responsible for providing, maintaining, and removing closed-system, sanitary facilities necessary for their use and activity.
- No person shall wade or swim in any water body except for activities approved by the Massachusetts National Guard including remediation, scientific study, or research.
- Vehicles may only be driven on roads authorized and designated for such use and parked in designated areas, and may not cross any designated wetland.
- Public users may not impede the military training activities.

18.2. Civilian Use Manual. To guide public conduct on the Massachusetts Military Reservation, a Civilian Use Manual will be prepared and periodically updated. All civilian users will obtain and follow this Manual.

18.3. Siting and Design Performance Standards

18.3.1 New or expanded buildings should not be proposed within the Camp Edwards Training Areas, with the following exceptions:

- Buildings to support allowed training, operations and activities, including upgrading of those facilities currently in place,
- Buildings used for the purposes of remediation activities,
- Buildings used for the purposes of development, operation and maintenance of water supplies,
- Buildings used for the purpose of natural resource and land management.

Cantonment Area General Performance Standards

All users meeting applicable thresholds must have a Spill Prevention, Control and Countermeasures Plans, or equivalent, as may be amended and adopted in accordance with section 311 of the Clean Water Act, containing regulatory restrictions for handling ~~potential polluting materials and laying out emergency responses to accidents within all~~ areas of operation.

Remediation activities and development of uses and activities outside the wetland areas and their buffers will be designed to protect, and where possible, restore wetland and surface water resource areas.

Development within the Cantonment Area will include approved erosion and sediment controls both during construction and as needed for long-term maintenance of the property.

All disturbances and revegetation activities will be designed to conserve grassland bird habitat.

Protect and manage identified habitat areas within the Cantonment Area including box turtle and grassland bird habitats in consultation with the Massachusetts Division of Fisheries and Wildlife, Natural Heritage, and Endangered Species Program.

Bird control on the airfield is established pursuant to the Air Force, Mishap Prevention Program, which requires a Bird Aircraft Strike Hazard (BASH) Program. The Bird Aircraft Strike Hazard Program includes all tenant-flying units. The Bird Aircraft Strike Hazard Program will include defining the nature and extent of wildlife hazards and implementation of the plan. Plan implementation may require environmental controls and changes to bird dispersal techniques and operational procedures. The Bird Aircraft Strike Hazard Program will be coordinated with State and Federal aviation and wildlife agencies.

Storage of pesticides and herbicides will only be allowed in conformance with applicable regulatory programs and standards.

Non-destructive alternative strategies for fire pre-suppression management should be developed for areas of high sensitivity.

New stormwater systems within the Cantonment Area should not discharge into existing stormwater systems unless it has been shown that the existing system can accept the new flows in storm events up to and including a 100-year storm.

All wastewater and sewage generated within the Cantonment Area should be transferred to the Massachusetts Military Reservation Wastewater Treatment Facility when approved by the regulating authority.

All new development should provide areas for storage of recyclables adequate to handle volumes between collections.

A plan for disposal of solid waste will be necessary for those uses not participating with the Upper Cape Solid Waste Transfer Station. This plan will include proposals for disposal, recycling, reduction, and reuse of wastes.

Use and application of hazardous materials shall be limited to activities and uses allowed ~~under existing rules and regulations, and handled in accordance with the applicable~~ procedures.

Handling and storage of hazardous wastes shall be limited to activities and uses allowed under existing rules and regulations, and handled in accordance with the applicable procedures.

Access through the Cantonment Area will be subject to limitations based on the available enforcement assets and designated purpose(s) and uses of the road system.

Specific Resource Performance Standards in the Cantonment

1. Groundwater Resources Performance Standards

1.1. All actions, at any location within the Massachusetts National Guard properties, must seek to preserve and maintain groundwater quality and quantity, and protect the recharge areas to existing and potential water supply wells.

1.2. The goal of the Department of Defense for remediation will be to restore to drinking water quality those groundwater resources that have been degraded below drinking water standards, or to meet those goals agreed upon by users of the properties. The goals shall be met through remediation, restoration, and best management practices, e.g., Installation Restoration Program activities and compliance with applicable rules and regulations.

1.3. Land uses and activities in the Cantonment Area:

- Will conform to all existing and applicable regulations
- Must be able to be implemented without interference with ongoing remediation projects.
- Must allow reasonable access to the water supplies in the Camp Edwards Training Areas, as far as the user controls access.

1.4. The following standards will be used as the basis for protecting groundwater resources in the Cantonment Area:

- Groundwater Protection Policy Plan
- Spill Prevention Control and Countermeasures Plan (or equivalent).
- Remediation plans and restoration activities (e.g., Installation Restoration Plan).
- Military regulations.

2. Wetlands and Surface Water Performance Standards

2.1 New development will be designed to preserve and protect wetland resource areas as defined by applicable local, federal, and state laws and regulations. This will include replacement or replication of all wetland resource buffer areas that are lost after completion of an activity or use.

3. Rare Species Performance Standards

3.1 Management plans for all listed rare species must be prepared in consultation with the Massachusetts Natural Heritage and Endangered Species program office, and United States Fish and Wildlife Service, if applicable.

4. Soil Conservation Performance Standards

4.1 Activities and uses at the Massachusetts National Guard properties must be compatible with the limitations of the underlying soils.

4.2 Erosion-prone sites should be inspected periodically to identify damage and mitigation measures.

5. Vegetation Management Performance Standards

5.1 All planning and management activities will ensure the maintenance of native plant communities.

6. Habitat Management Performance Standards

6.1 Certain portions of the Cantonment Area will be managed as a grassland bird habitat area. A similar habitat program developed for the Camp Edwards Training Areas will be applied to these areas.

7. Wildlife Management Performance Standards

7.1 No actions that impact rare species habitat shall be taken until after consultation with the U.S. Fish and Wildlife Service, if applicable, and the Massachusetts Natural Heritage and Endangered Species Program of the Division of Fisheries and Wildlife.

8. Air Quality Performance Standards

8.1 All uses and activities in the Cantonment Area shall comply with the Federal Clean Air Act.

8.2 Emissions from stationary sources associated with discharge stacks will be reported if required under applicable air quality permits issued by federal and state regulatory agencies.

9. Noise Management Performance Standards

9.1 Noise levels for the Airfield are mapped in accordance with federal guidelines and the Air Installation Compatible Use Zone study results.

9.2 Proposed activities elsewhere within the Cantonment Area should consider applicable federal and state noise guidelines in their design.

10. Pest Management Performance Standards

10.1 Each user will develop and implement an Integrated Pest Management Program to control pest infestations that may include outside contracting of services.

10.2 Only herbicide formulations approved by the United States Environmental Protection Agency, the United States Department of Agriculture, the agency managing the user, and the Commonwealth of Massachusetts may be applied.

11. Stormwater Management Performance Standards

11.1 All stormwater management facilities shall comply with the Massachusetts Department of Environmental Protection Guidelines for Stormwater Management for development projects within wetland resource areas, including Best Management Practices and other applicable standards for control and mitigation of increased stormwater flow rates and improvement of water quality.

11.2 All increases in stormwater runoff should be controlled within the Massachusetts Military Reservation when feasible with the exception of the SD-1 storm drainage system associated with the airfield that may discharge off base under the permits granted.

12. Wastewater Performance Standards

12.1 All wastewater and sewage disposal will be in conformance with the Federal and State Department of Environmental Protection regulations.

13. Solid Waste Performance Standards

13.1 All solid waste streams (i.e., wastes not meeting the criteria for hazardous wastes) will be monitored and managed to substitute, reduce, recycle, modify processes, implement best management practices, and/or reuse waste, with the goal of reducing the total tonnage of wastes from the Cantonment Area.

13.2 All users will be responsible for collection and removal of wastes generated by their activities and for using best management practices to control nuisance odors, wind-blown litter and vectors while handling the wastes.

13.3 No permanent solid waste disposal facilities shall be sited within the Cantonment Area.

14. Hazardous Materials Performance Standards

14.1 Where they are permitted, use and application of hazardous materials shall be otherwise minimized in accordance with pollution prevention and waste minimization practices, including material substitution.

14.2 No permanent hazardous materials disposal facilities shall be located within the Cantonment Area.

14.2 Fuel Management

14.2.1 Before any use or activity may commence, it may require one or more of the following actions: Spill Prevention Control and Countermeasures plans, spill contingency plans, facility response plans, and Standard Operating Procedures related to fuel.

14.2.2 Procedures will require that any activity or use remove all non-complying underground fuel storage tanks.

14.2.3 All storage tanks (above ground or underground) must be constructed and operated in conformance with regulations including secondary containment, leak detection, and regular inspections.

14.3 Non-fuel Hazardous Material Storage

14.3.1 All outdoor permanent storage of non-fuel hazardous materials, which could result in a direct discharge to the soil, must be provided with adequate secondary containment (at least 110% capacity of the largest single container).

14.3.2 All indoor storage of non-fuel hazardous materials, which could result in a direct discharge to the soil directly outside the building, must be provided with adequate secondary containment to prevent such discharge.

14.3.3 Users will develop procedures on a case-by-case basis with private contractors, working under their control on the Massachusetts Military Reservation, to ensure adequate provisions are in place to prevent a release of non-fuel hazardous material to the soil and to report and respond immediately to a release should one occur.

14.3.4 All hazardous materials will be transported in accordance with Department of Transportation regulations governing shipment of these materials.

14.3.5 Transport should reduce to extent feasible the number of trips both for delivery of virgin product and transfer. This should include planning appropriate routes that minimize proximity to sensitive natural resource areas and minimizing internal transfers of material, including transfers from bulk storage tanks to drums, tankers, carboys, or other portable containers or quantities.

15. Hazardous Waste Performance Standards

15.1 All uses shall comply with applicable local, state and federal regulations governing hazardous waste generation, management and disposal (including overlays relative to Wellhead Protection and Zone II's within the Cantonment Area).

15.2 Accumulations of hazardous waste shall be in covered storage and in accordance with regulations governing accumulation and storage.

15.3 Users of Cantonment Area facilities must implement pollution prevention, and waste minimization procedures (process modifications, material substitution, recycling and best management practices) to minimize waste generation and hazardous materials use.

15.4 Occupants and users will be responsible for removing all solid or hazardous wastes generated during the period of use/tenancy/visitation, upon their departure or in accordance with other applicable or relevant regulations.

15.5 Remedial activities undertaken under the Installation Restoration Program, Massachusetts Contingency Plan or other governing remediation programs are exempt from additional regulation (e.g., waste generation volume limits).

15.6 Post-remedial uses and activities at previously impacted sites will be allowed in accordance with terms and conditions of any Activity and Use Limitation applied to the site.

15.7 All hazardous wastes will be transported in accordance with United States Department of Transportation regulations governing shipment of these materials.

15.8 Transport should reduce to extent feasible the number of trips for transfer and pick-up of wastes for disposal. This will include planning appropriate routes that minimize proximity to sensitive natural resource areas, and minimizing internal transfers of material, including from bulk storage tanks to drums, tankers, carboys, or other portable containers or quantities.

15.9 No permanent hazardous waste disposal facilities shall be located within the Cantonment Area.

16. Traffic Performance Standards

16.1 Each user will be responsible for mitigation of impacts to on-site and adjacent roadways in so far as they are responsible for the roadways within the Massachusetts National Guard properties.

16.2 Transportation management strategies should be employed to manage new traffic and reduce existing impacts. Transportation management strategies will consider the following:

- Roads have been constructed for the purpose of military use.
- Improvements, maintenance, and operations of the roadway systems within each designation shall be made in accordance with the original design of the road in terms of speeds, geometry, and construction.
- New uses and operations requiring access onto or across one of the roadways or roadway systems will not derogate from the purpose of those roadways.

17. General Use and Access Performance Standards

17.1 General User Requirements

Requirements that will apply to all users, both public and private, in the Cantonment Area include:

- All acts that pollute the groundwater supply are prohibited.
- No litter or refuse of any sort may be thrown or left in or on any property.

17.2. Civilian Use Manual

To guide public conduct on the Massachusetts National Guard properties, a Civilian Use Manual will be prepared and periodically updated. All civilian users will obtain and follow this Manual.

17.3. Siting and Design Performance Standards

- All new buildings, both public and private, should fit harmoniously with the surrounding environment, including terrain, vegetation, and existing buildings.
- The landscape of the site should be preserved to the extent possible. Open space shall be provided around and in association with the building as needed for the potential users.
- The design and maintenance of the site shall follow the standards for Vegetation set forth in these standards.
- Circulation and parking around the building and onto the adjacent roads should be arranged to not detract from the surrounding landscape and buildings. Delivery systems should be coordinated to reduce the potential for conflicts on the adjacent roads, as detailed previously in this report.

Cultural Resource Area General Performance Standards

1. Before completion of any programs or actions impacting cultural resources, consult with appropriate federally-recognized Native American tribes (the Wampanoags) and any other pertinent review authorities.
2. Cultural resource areas will be defined generally by their sensitivity to disturbance or alteration as Low, Medium, or High Sensitivity. These maps may be updated, refined, and amended as appropriate and as approved by the lease and license holders.
3. No use or activity proposed within areas of High or Medium Cultural Sensitivity may proceed unless the Massachusetts Historical Commission (Massachusetts Historical Commission) and appropriate federally-recognized Native American tribes (the Wampanoags) approve proceeding with the use or activity, finds no jurisdiction over the project, or determines that all research, field work, documentation, and consultation required by the Massachusetts Historical Commission and the tribes, and any other pertinent review authorities is completed.

4. For any use or activity proposed in an area of Low Cultural Sensitivity, the proponent of the use or activity will be required to proceed with the knowledge that cultural resources may exist at the proposed location. Should the potential resources be located, the use or activity must cease and the activities impacting the area must be documented for further review by the Massachusetts Historical Commission (State Historic Preservation Officer) and appropriate federally-recognized Native American tribes (the Wampanoags) and any other pertinent review authorities.

General Procedures

1. Cultural resources on the Massachusetts Military Reservation are to be identified, protected, preserved, recovered, and/or cataloged in accordance to the directives provided by the State and Tribal Historic Preservation Officer, and in accordance with the pertinent state and federal laws and regulations.

2. The primary review authorities for the management and protection of cultural resources are the Massachusetts Historical Commission and appropriate federally-recognized Native American tribes, which will be notified of actions with a filing of a Project Notification Form, in accordance with the appropriate standards.

3. As part of the planning for any project, the proponent will determine which cultural resource regulatory standards apply, verify the status of knowledge about cultural resources in and around the project area, conduct additional studies if necessary to further identify and evaluate cultural resources, and assess the potential of the project to affect significant cultural resources.

4. All proposed uses or activities will avoid or reduce impacts to cultural resources that have been located, identified, evaluated, and documented in accordance with the requirements of the Massachusetts Historical Commission, the appropriate tribes, and any other pertinent review authorities.

5. In the event that the proposed use or activity will not fully avoid impacts to the cultural resources, the project proponent will provide any additional documentation required by the Massachusetts Historical Commission and consult with the Massachusetts Historical Commission and any other pertinent review authorities. Appropriate American Indian tribes, should be periodically consulted to determine their status as petitioners for federal recognition.

APPENDIX 3

Guiding Principles for MMR Long-Term Management Structure

The goal of the joint working group is to develop a long-term management structure for the Massachusetts Military Reservation (MMR) guided by the following Principles:

- The primary objectives in developing the management structure will be to ensure permanent protection of the drinking water supply and to preserve the wildlife habitat of the northern 15,000 acres.
- Any long-term management structure will serve the interests of the public and will establish and promote a working and cooperative partnership between the Commonwealth and the military.
- All options and tools potentially useful in the establishment of a long-term management structure will be considered.
- All environmental standards that are dictated by applicable federal, state, and local laws and regulations, including MMR-specific environmental performance standards, will be followed.
- An oversight body comprised of state environmental agencies, with input and advice from the public and scientific communities, will be established.
- The military and other users will adjust their activities when adverse environmental impacts have been identified by the military or the oversight body.
- Military and other activities that are compatible with protection of the water supply and wildlife habitat will continue on MMR.
- The military will conduct and manage compatible training on MMR in order to achieve and maintain military readiness.
- The military will continue to monitor, identify, and provide to the public information regarding the environmental impacts associated with military training.
- The oversight body and users of MMR will regularly provide information to the public on the status of, or activities that may affect, the protection of the drinking water supply and wildlife habitat.

Appendix B: Draft Conservation and Management Permit Application

- Draft dated 15 January 2020

CONSERVATION AND MANAGEMENT PERMIT APPLICATION

**Multi-Purpose Machine Gun (MPMG) Range
Camp Edwards
Sandwich, Massachusetts**

2020



CONSERVATION AND MANAGEMENT PERMIT APPLICATION
Multi-Purpose Machine Gun (MPMG) Range
Camp Edwards
Sandwich, Massachusetts

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List of Appendices [only Appendix A included in this draft]

Appendix A	Fire Management Element Photographs
Appendix B	Site Plans (11 x 17 format)
Appendix C	Environmental Performance Standards (2017)
Appendix D	Nover-Armstrong MESA letter dated 23 September 2019 regarding Tango Range
Appendix E	Turtle Protection Plan (being drafted – placeholder)
Map Pocket	CD Containing Site Plans and CMP Application [
Map Pocket	Full Sized Plan [not included in this draft version]

Acronyms and Abbreviations

ACUB	Army Compatible Use Buffer	MassGIS.....	Massachusetts GIS
ANG	Army National Guard	MassWildlife	Massachusetts Division of Fisheries and Wildlife
ASP	Ammunition Supply Point	MEPA	Massachusetts Environmental Policy Act
ARF	Automatic Record Fire	MG	Managed Grassland
Camp Edwards...	Camp Edwards Training Area	MILCON	Military Construction
CMP	Conservation and Management Permit	MMR	Massachusetts Military Reservation
Crane WMA	Frances Crane Wildlife Management Area	NHESP	Natural Heritage and Endangered Species Program
DCR	Department of Conservation and Recreation	NLEB	Northern Long-Eared Bat
DFG.....	Massachusetts Department of Fish and Game	OANGB	Otis Air National Guard Base
DoD	Department of Defense	PPOF.....	Pitch Pine Oak Forest
E	Endangered	PPSO.....	Pitch Pine Scrub Oak
EEA.....	Executive Office of Energy and Environmental Affairs	The Reserve.....	Upper Cape Water Supply Reserve
EO	Executive Order	ROCA	Range Operations Control Area
EPS	Environmental Performance Standards	SAR	Small Arms Range
ESA.....	Federal Endangered Species Act	SC.....	Special Concern
FCRA	Forest Canopy Reserve Areas	SDZs	Surface Danger Zones
FY.....	Fiscal Year	SMRC.....	Special Military Reservation Commission
INRMP	Integrated Natural Resources Management Plan	SOS	Scrub Oak Shrubland
ITAM	Integrated Training Area Management	SRA	Sustainable Range Awareness
JBCC.....	Joint Base Cape Cod	T.....	Threatened
LCTA.....	Land Condition Trend Analysis	TAG	The Adjutant General
LRAM	Land Rehabilitation and Maintenance	TRI.....	Training Requirements Integration
MA ANG.....	Massachusetts Air National Guard	USEPA	U.S. Environmental Protection Agency
MAARNG.....	Massachusetts Army National Guard	USFWS	U.S. Fish and Wildlife Service
MACOM	Major Army Commands	USCG	U.S. Coast Guard
		WL	Watch List

**CONSERVATION AND MANAGEMENT PERMIT APPLICATION AND PLAN
MASSACHUSETTS ARMY NATIONAL GUARD
CAMP EDWARDS
Sandwich, Massachusetts**

Summary Table and Definitions

Terms	Acres	Description
Joint Base Cape Cod (JBCC)	20,554	Full scale, joint-use base home to five military commands training for missions at home and overseas, conducting airborne search and rescue missions, and intelligence command and control.
Camp Edwards	15,000	
Camp Edwards Northern Training Area	14,410	Major training area for National Guard soldiers in the northeast where they practice maneuvering exercises, bivouacking, and use of small arms ranges.
Upper Cape Water Supply Reserve	13,352	
Cantonment Area	5,000	The southern developed area of the JBCC with roads, barracks, office and classroom buildings, training support areas, and housing. Numerous Federal, State, and county entities are located here as well as the airfield.
Impact Area	2,200	
Central Impact Area	330	
KD Range	38.5	Existing inactive range where the MPMG Range is proposed comprised of 36.0 acres of Managed Grasslands (previous mitigation for rare species impacts from another project) and 2.5 acres of ROCA.
MPMG Range Footprint	199.0	MPMG Range including 800 meter and 1,500 meter lanes and the ROCA.
MPMG Range-Specific Firebreak Footprint	10.0	Firebreaks to be constructed associated with the MPMG Range; including new roads and expansion of existing roads.
Total Project Footprint	209.0	MPMG Range Footprint plus MPMG Range-Specific Firebreak Footprint
Range Operations Control Area (ROCA) Footprint	2.5	Contains the Range Control Tower, Ammunition Storage Building, Covered Bleachers, other support features and disturbed areas (included in MPMG Range Footprint).
MPMG Range Take Footprint	206.5	Total Project Footprint minus the ROCA acreage
MPMG Range Managed Grassland Take Footprint	36.0	Existing 36.0 acres of Managed Grassland at KD Range
MPMG Range Pine Barrens Take Footprint	170.5	MPMG Range Take Footprint minus MPMG Range Managed Grassland Take Footprint

CONSERVATION AND MANAGEMENT PERMIT APPLICATION
MULTI-PURPOSE MACHINE GUN (MPMG) RANGE
MASSACHUSETTS ARMY NATIONAL GUARD
CAMP EDWARDS
Sandwich, Massachusetts

1.0 Introduction

This Conservation and Management Permit (CMP) Application (Application) is being submitted to the Massachusetts Natural Heritage and Endangered Species Program (NHESP) by the Massachusetts Army National Guard (MAARNG) in order to obtain a Conservation and Management Permit (NHESP Tracking #18-37434) for impacts to State-listed rare species in connection with the proposed construction and operation of a Multi-Purpose Machine Gun (MPMG) Range at Camp Edwards located in Sandwich, Massachusetts (see **Figures 1-1**). This Application is being made in accordance with the Massachusetts Endangered Species Act (MESA; MGL c. 131A) and implementing regulations (321 CMR 10.00).

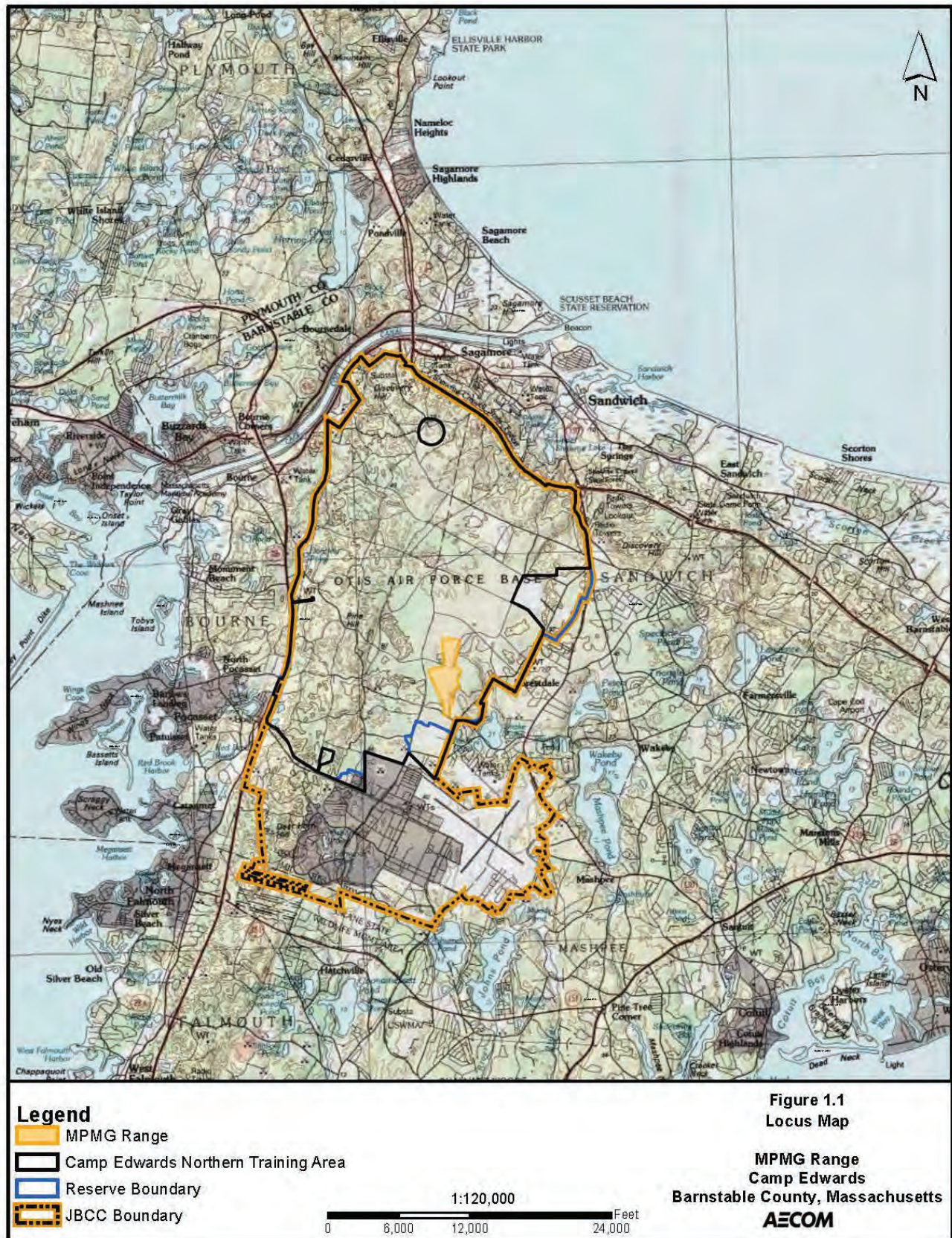
1.1 Project Site

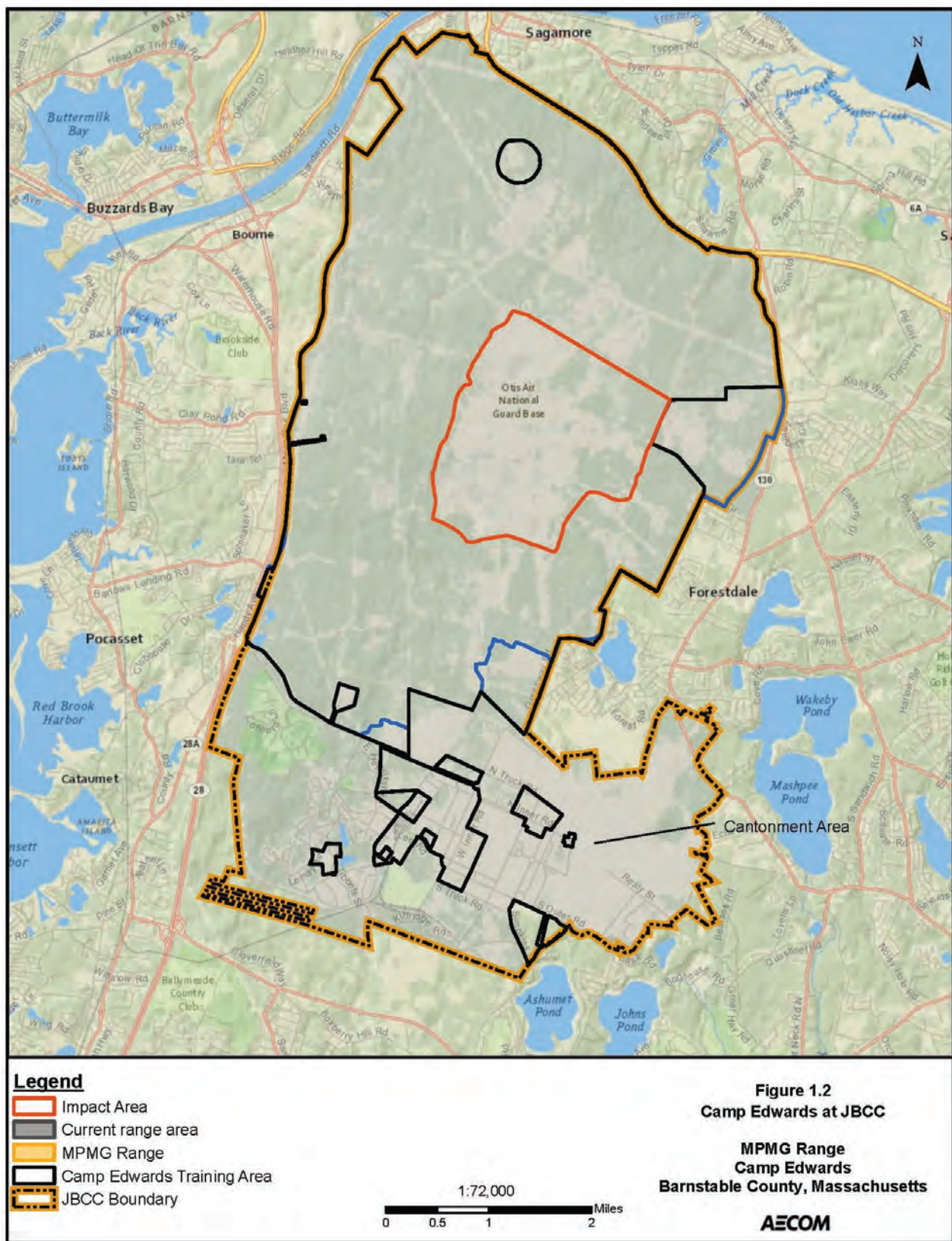
Camp Edwards encompasses approximately 15,000 acres of the approximately 20,554-acre Joint Base Cape Cod (JBCC) (see **Figures 1-1 and 1-2**) formerly called the Massachusetts Military Reservation or MMR. Within the JBCC are five military commands including: the MAARNG at Camp Edwards; the Massachusetts Air National Guard (MA ANG) at Otis Air National Guard Base; the U.S. Air Force (USAF) at Cape Cod Air Force Station; and the U.S. Coast Guard (USCG) at Air Station Cape Cod. Although the JBCC is situated within four towns, Bourne, Sandwich, Falmouth, and Mashpee, Camp Edwards lies only within the boundaries of Bourne and Sandwich.

The land that currently comprises Camp Edwards is owned by the Commonwealth of Massachusetts and is in custody of Massachusetts Department of Fish and Game, Division of Fisheries and Wildlife (MassWildlife), which has leased the property to the Department of the Army. In turn, the Army licensed the land to the MAARNG for training. The current lease held by the Army expires in the year 2051. The proposed MPMG Range will be constructed on State-owned land leased to the Federal government.

JBCC is divided into two major sections. The southern section is comprised of approximately 5,000 acres of Cantonment Area, which is the industrialized portion of the JBCC where administrative buildings, barracks, vehicle and equipment maintenance shops, housing, and runways are located. The northern training area encompasses approximately 14,410 acres and is a largely wooded area with rolling topography, trails, and paved roads and includes training areas and ranges where small arms firing and maneuver training occur. The Impact Area is a 2,200-acre area that has a formal off-limits designation due to unexploded ordnance safety regulations. It includes the 330 acre-Central Impact Area which was the primary target area for artillery, mortar, and other firing activities from the early 1900s to 1997.

In the northern portion of Camp Edwards, 13,352 acres has been identified as the Upper Cape Water Supply Reserve (the Reserve) created by Chapter 47, Acts of 2002. Chapter 47 also transferred the care, custody, and control of the Reserve from the Special Military Reservation Commission (SMRC) to the MassWildlife. The Reserve is designated public conservation land dedicated to three primary purposes:





- Water supply and wildlife habitat protection,
- Development and construction of public water supply systems, and
- Use and training of the military forces of the Commonwealth; provided that, such military use and training is compatible with the natural resource purposes of water supply and wildlife habitat protection.

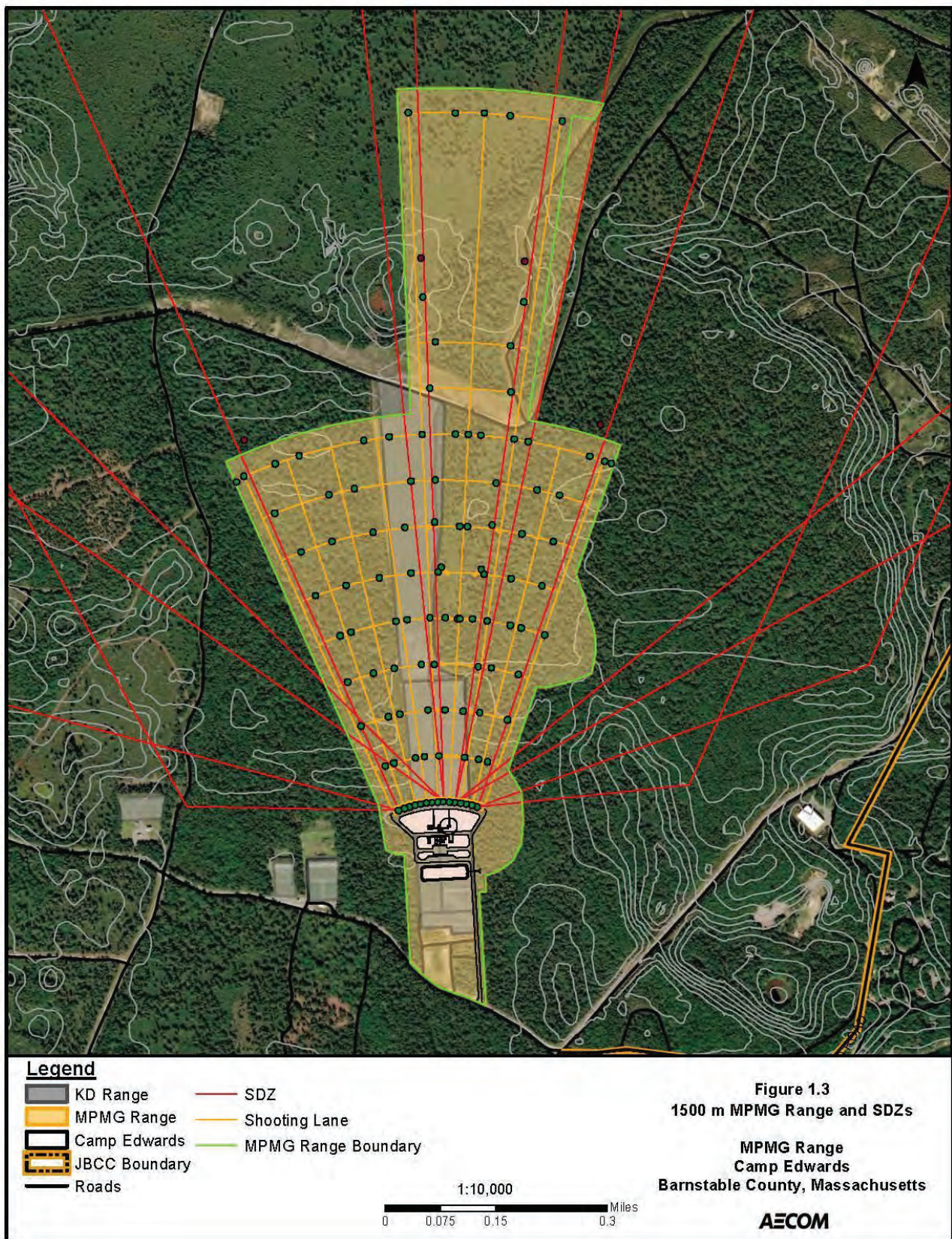
1.2 Project Description

The MPMG Range is proposed to be constructed at the existing location of a combined Known Distance (KD) Range (38.5 acres) (see **Figure 1-3**), which was previously used for past ranges and training including disturbed areas that due to inactivity of the range are comprised of grassland habitat and immature pitch pine in the northern portion of the eastern side of the KD Range. The proposed MPMG Range improvements would require approximately 160.5 acres of additional land to accommodate the range footprint and Range Operations Control Area (ROCA) which includes a Range Control Tower, Ammunition Storage Building, Covered Bleachers, and other support features. The total footprint of the MPMG Range is 199.0 acres. See **Section 3.0** for a full description of the proposed range.

An additional 10.0 acres of strategic firebreaks are proposed to be constructed along the exterior of the MPMG Range which increases the Total MPMG Range Footprint to 209.0 acres. This work will be performed as part of the firebreak project involving the construction and maintenance of firebreaks throughout Camp Edwards to reduce the risk of a large wildfire and assist in managing the fighting of fires. Firebreak and fuels management involves the alteration of fuels to reduce the likelihood of a fire starting or to reduce its effects if one does start. These techniques may improve access for fire apparatus, increase water resources available on-site, adjust target placement, and provide buffer or safety zones. Range use at Camp Edwards introduces significant wildfire hazard into unmanaged and high risk fuels conditions through the use of tracers and ammunition. Tracers are forms of ammunition that include a small pyrotechnic charge which makes the trajectory of the ammunition visible in the day time and night time.

Surface Danger Zones (SDZs) are required for all ranges, but are administrative areas closures. The MPMG Range SDZ area is 5,197 acres. No work is proposed within the SDZs but these are maintained and controlled for the safety of personnel on Camp Edwards. The SDZ is a safety zone representing the area of potential hazard (accounting for straight fire and ricochet) based on the projectiles fired and weapon system used at the range. The SDZ has specific dimensions for the expected caliber or the weapon being fired, so that all projectile fragments are contained in this area. The existing KD Range is not presently used for live fire training but is used for other training operations like unmanned aerial vehicle (UAV) flying. The MPMG Range is a programmed Fiscal Year (FY) 2020 Military Construction (MILCON) project.

The Preferred Alternative will be constructed in two phases as shown on **Table 1-1**. Phase 1 will be the Reduced-Scale Alternative, that is, eight lanes constructed at 800 meters in length. Phase 2 will add the extension of two lanes to a length of 1,500 meters to accommodate 0.50 caliber training. The acreages and estimated rare species impacts are provided below by phase. The Project is being phased to correspond with the MILCON (Military Construction) funding. Both phases are included for approval in this CMP Application. When Phase 2 is constructed, the MAARNG will work with NHESP to reduce impacts from grading and access roads to the scrub oak shrubland as the 0.50 caliber lanes would extend into this habitat near to the frost bottom.



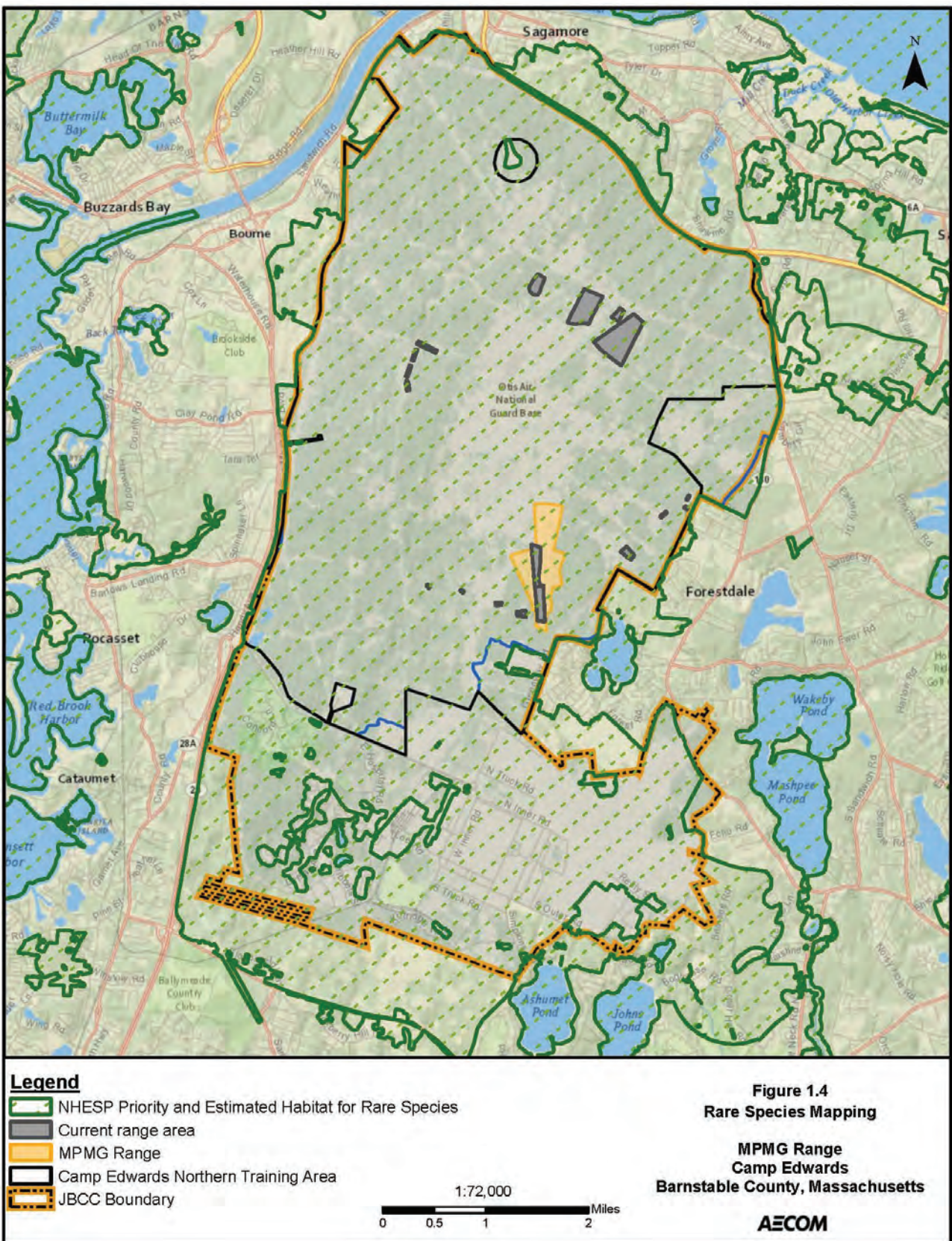


Table 1-1: MPMG Range Phased Construction

Phase	Alternative	800 Meter Lanes	1,500 Meter Lanes	Total Acreage *	Rare Species Impacts
Phase 1	Reduced-Scale Alternative	8	0	133.0	94.5
Phase 2	Construction of 1,500 Meter Lanes	0	2	76.0	76.0
TOTAL	Preferred Alternative (Project)	8	2	209.0	170.5

* With approximately 5.0 acres of firebreaks included in each phase

1.3 Goals and Objectives

While this Application focuses on the MPMG Range, in order to properly analyze impacts to rare species at Camp Edwards, other projects proposed in the JBCC, (including possible associated impacts and mitigation), proposed, will be discussed. This Application is intended to provide a framework for JBCC-wide rare species mitigation measures focusing on MAARNG activities. MAARNG proposes sufficient mitigation proactively to support existing and conceptual MAARNG projects in the near future (1 to 8 years) assuming that a “take” of rare species would be likely to occur as approximately 98 percent of the JBCC and Camp Edwards are mapped by NHESP as both Priority and Estimated Habitats of Rare Species (see **Figure 1.4**). This CMP Application is intended to proactively establish a framework and implement actions to achieve net benefit for State-listed species and streamline review processes for all stakeholders for all MAARNG projects at Camp Edwards.

Other projects that may be proposed include the following: Gym Expansion (see **Section 4.1**), Transient Troop Headquarters (TTHQ) (see **Section 4.2**), Tango Range Expansion (see **Section 4.3**), Sierra Range Expansion (see **Section 4.4**), and Infantry Squad Battle Course (ISBC) (see **Section 4.5**). The MPMG Range, the TTHQ, and the Tango Range Expansion are considered the primary projects that are more likely to be constructed first.

Accordingly, in order to provide a long-term net benefit to the impacted species, the MAARNG proposes to use a combination of land transfers (i.e., “land protection”) and establishment of a mitigation bank comprised of approximately 3,400 acres for pine barrens habitat, approximately 1,180 acres for forest cover retention, 150 acres of intensive management, and a reserve of approximately 250 acres for potential sandplain grassland creation. The combination of parcel transfers and habitat management or conversion within mitigation bank focal areas will provide for net benefit of all impacted State-listed species while also establishing a framework for proactively mitigating impacts of future projects. The management areas are described in **Section 4.0**. This combination of mitigation strategies will allow MAARNG to establish a robust mitigation bank and overall strategy for success to facilitate implementation of long-term planning efforts including modernization of the range complex and infrastructure, thereby maximizing positive impacts. Monitoring of select species and management effects will inform success of the planning included here. The details of the MPMG Range impact analysis is described in **Section 3.0**. Impacts from other projects are described in **Section 4.0** and proposed mitigation are further described in **Section 5.0**.

The MAARNG and other agencies at the JBCC have been working with NHESP to obtain approvals to transfer excess land at the JBCC to MassWildlife as a primary mitigation measure for rare species impacts. This occurred recently relative to the Capped Landfill Solar Array project located in the Cantonment Area. Based on previous and ongoing discussions and coordination efforts with MassWildlife, MassWildlife will provide mitigation credit for excess parcels already transferred to the Commonwealth (MassWildlife), parcels to be transferred, and possible parcels to be transferred in the future. MassWildlife has agreed that land previously transferred for mitigation by Massachusetts Air National Guard (MAANG), MAARNG, and

SMRC, specifically, may be used for credit for different projects in the same habitat type if the original project was cancelled.

The MAARNG is also proposing continued management and maintenance of rare species habitat such as pine barrens (through fire and forestry management strategies) and grasslands (through active creation and management) associated with several State-listed rare species including moths, birds, and turtles. Description of each species is provided in **Section 2.0**.

The intent of this Application, although specific to the MPMG Range, is to provide a variety of mitigation strategies for existing and proposed projects and through mitigation banking and implementation of habitat improvements and management. In addition, the information in this Application is intended to be used as a baseline for future mitigation efforts including the identification of mitigation parcels that may be used for existing and upcoming projects. Future projects at JBCC may include, but not be limited to: Gym Expansion, Transient Troop Headquarters, Infantry Squad Battle Course, Firebreak Installation, and Sierra and Tango Range expansions (see **Section 3.0** for more detail on these other projects). The impact determination noted below by NHESP has been made specific to the MPMG Range project and not the other projects identified in this document and is beyond the scope of this CMP.

1.4 Massachusetts Endangered Species Act

NHESP has determined that, as a result of the construction and operation of the MPMG Range, there will be a "take" of several State-listed lepidopterans (moths and butterfly) species identified on the Site, and that there could potentially be a "take" of Eastern Box Turtle (*Terrapene carolina*), Eastern Whip-poor-will (*Caprimulgus vociferus*), and sandplain grassland bird species.

Under MESA, projects or activities which occur within mapped Priority Habitat require review by NHESP to determine whether a take will occur as a result of the project or activity. A take is defined by MESA (in reference to animals) means to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, disrupt the nesting, breeding, feeding or migratory activity or attempt to engage in any such conduct, or to assist such conduct. In reference to plants, means to collect, pick, kill, transplant, cut or process or attempt to engage or to assist in any such conduct. Disruption of nesting, breeding, feeding or migratory activity may result from, but is not limited to, the modification, degradation or destruction of habitat. If it is determined that the take of a State-listed species will occur as a result of the project or activity, then the take may be permitted for conservation and management purposes if there will be a long-term net benefit to the conservation of the impacted species.

The Cape Cod ecoregion where the MPMG Range would be located has the highest number and one of the highest densities of State-listed rare plant and animal species within the 13 ecoregions in Massachusetts. The State-listing includes Endangered (E), Threatened (T), Special Concern (SC), and Watch-List (WL) species. Camp Edwards is home to 39 State-listed species including 32 species of wildlife shown in **Table 2-3** and the seven species of plants shown in **Table 2-1**.

Pursuant to MESA, a CMP may be issued by NHESP for a project provided that an applicant has provided the following three items:

1. Adequately assesses alternatives to both temporary and permanent impacts to State-listed species.

MAARNG has adequately assessed alternatives to both temporary and permanent impacts to State-listed species as described in **Sections 3.0** for the MPMG Range and **Section 4.0** for other proposed projects with a summary of alternatives analysis, avoidance, and minimization summarized at **Section 5.4**;

2. Demonstrates that the activities will result in an insignificant impact to the local populations of the affected species.

An insignificant portion of the local population would be impacted by the proposed MPMG Range with comprehensive mitigation as described in **Section 5.0**.

3. Carries out a Conservation and Management Plan that provides a long-term net benefit to the conservation of the State-listed species affected by the proposed Project which on or off-site permanent habitat protection, management or restoration of State-listed species habitat, and/or conservation research designed to benefit the species affected by a given project.

MAARNG agrees to carry out a Conservation and Management Plan that provides a long-term net benefit to the conservation of State-listed species. MAARNG proposes various options for "net benefit" as described in **Section 5.0**.

Under 321 CMR 10.23, in determining the appropriate nature and scope of mitigation necessary to achieve the long-term net benefit performance standard, the following areal habitat mitigation ratios are required based on the category of State-listed species as identified in the MESA Regulations at 321 CMR 10.23(7)(a):

- **Endangered Species:** 3:1 (i.e., protection of three times the amount of areal habitat of the affected Endangered Species that is impacted by the Project or Activity);
- **Threatened Species:** 2:1 (i.e., protection of two times the amount of areal habitat of the affected Threatened Species that is impacted by the Project or Activity);
- **Special Concern Species:** 1.5:1 (i.e., protection of one and a half times the amount of areal habitat of the affected Species of Special Concern that is impacted by the Project or Activity).

In accordance with 321 CMR 10.23(7)(b), NHESP reserves the right to require, on a permit-by-permit basis, an areal habitat mitigation ratio or an alternative mitigation approach that differs from the ratios noted above. As impacts resulting from the proposed MPMG Range will only impact Threatened and Special Concern species, the MAARNG is proposing land preservation at the required 2:1 ratio for this Project. As discussed at the Site inspection held on 3 August 2019 with NHESP representatives, MAARNG has offered to double the acreage needed to ensure net benefit and that the long-term or perpetual component of mitigation will be addressed through the INRMP. That is, management of any habitat will be performed at a 4:1 ratio for impacts to Threatened species. The outline of these ratios as they relate to the MPMG Range Project are described more fully in **Section 3.4**.

1.5 Conservation and Management Permit

This Application describes the Camp Edwards existing conditions (**Section 2.0**), proposed MPMG Range conditions (**Section 3.0**), other projects and associated impact analysis (**Section 4.0**), and mitigation measures proposed (**Section 5.0**) and Fire Management (**Section 6.0**). **Section 5.0** is comprised of the Conservation and Management Plan (CMP Plan) associated with this CMP Application.

In accordance with NHESP guidelines for a CMP, in order to meet the MESA permitting standards outlined in **Section 1.4**, the MAARNG proposes the following measures to minimize rare species impacts and proposes other mitigation measures that will provide a long-term net benefit to the impacted species and species-specific mitigation as described in **Section 5.0** of this report:

- Land Preservation
 - o Land Preservation by Transfer of Parcels to MassWildlife
 - o Land Preservation with Management (Parcel H – Unit K)

- o Pine Barrens Forest Canopy Reserve Areas (FCRA)
- Management of existing habitat with Mitigation Focal Areas
 - o Pine Barrens Mitigation Focal Areas
 - o Grasslands Mitigation Focal Areas
- Monitoring and research of rare species
- Avoidance and minimization
- Cost of management

Detailed information on rare species impact minimization and net benefit mitigation consistent with that listed above is submitted as part of this Application in support of the issuance of a CMP. The mitigation measures detailed in **Section 5.0** outlines an approach to the MPMG Range project and other projects that ties specific species habitat mitigation commitments to each project with flexibility built in to determine the best mitigation for that project depending on habitat impacted. The CMP Plan also outlines the long-term habitat management plan and addresses mechanisms to ensure long-term implementation.

In accordance with the guidelines for preparing CMP applications, site photographs have been included in **Appendix A**, reduced scale site plans are provided in **Appendix B**. A compact disc (CD) has been included with copies of this Application, figures, and appendices in a map pocket at the back of this document. A full scale plan of the existing range conditions is included in a second map pocket. As MassWildlife owns the property where the projects are proposed and due to the complexity of the land ownership at Camp Edwards, a copy of the property deed(s) is not included with this Application.

1.6 Rare Species Mapping

According to the Massachusetts GIS (MassGIS) Online Mapping Tool “Oliver” and mapping conducted by the NHESP, the Site is located within Priority Habitat (PH 490) and Estimated Habitat (EH 435) as shown on **Figure 1-4**. The natural vegetative communities have been mapped by MAARNG for the JBCC as shown on **Figure 2-1**. The mapping of these communities include the various pine barren cover types and the managed or cultural grasslands have been used to determine the impacts from the MPMG Range and other projects proposed as described in **Sections 3.0** and **4.0**. Camp Edwards contains a unique diversity of natural vegetative communities that support State-listed rare species. The predominant communities include: Pitch pine oak forest (PPOF) woodlands, Pitch pine scrub oak (PPSO), Scrub oak shrubland (SOS), and Cultural or managed sandplain grasslands (MG) as described in **Section 2.0**.

1.7 Other Regulatory Requirements

In addition to MESA, projects and activities proposed at Camp Edwards require review under the Massachusetts Environmental Policy Act (MEPA), and are subject to the Federal Endangered Species Act, Camp Edwards Environmental Performance Standards, and other MAARNG natural resources programs as described below.

1.7.1 Massachusetts Environmental Policy Act

The Project requires filing with the Massachusetts Environmental Policy Act (MEPA) with the Executive Office of Energy and Environmental Affairs (EOEEA) as the Project exceeds the following MEPA thresholds and requires one State permit (the CMP):

- 301 CMR 11.03(1)(a)1. (Land) Direct alteration of 50 or more acres of land.
- 301 CMR 11.03(2)(b)2. (Rare Species) Greater than two acres of disturbance in designated priority habitat that results in a take of State-listed Endangered or Threatened species or Species of Special Concern.

- 301 CMR 11.01(2)(a)2. The MAARNG is an Agency of the Commonwealth. As such, MEPA jurisdiction is broad as the Project will be undertaken by an Agency of the Commonwealth in accordance with 301 CMR 11.01(2)(a)1. In addition, Camp Edwards is located on State-owned land leased to the Federal government and licensed back to the MAARNG.

Certain project and activities at Camp Edwards are subject to a Special Review Procedure (SRP) created and jointly executed by EOEEA and MAARNG so that the process under MEPA could be used more efficiently for the long-term use of Camp Edwards. A Notice of Project Change (NPC) is being submitted in accordance with the requirements of the Certificate on the Final Area-Wide Environmental Impact Report (EIR) for the MMR Master Plan issued by MEPA on 16 July 2001.

As part of the MMR Master Plan, Camp Edwards was set aside for permanent protection of water supplies, wildlife habitat, and open space, while allowing compatible military training. The MMR Master Plan was submitted to MEPA as a NPC in 1997 and subsequently work at MMR was designated as a “major and complicated” project. The SRP was further detailed in the Certificate on the NPC and the Major and Complicated Procedure issued on 10 July 1997.

For MAARNG projects at Camp Edwards, the SRP includes “lowered thresholds” for MEPA reviews (in addition to the stand-alone MEPA thresholds at 301 CMR 11.03) including impervious areas (more than 0.5 acres), vegetative clearing (more than two acres), and any new building or structure (more than 500 s.f.) The Project, as proposed, does not exceed the lowered threshold for impervious area as approximately 0.9 acres of impervious areas presently exists at the KD Range and the proposed MPMG Range will have approximately 0.8 acres of impervious areas, a reduction of 0.1 acres. The Project, as proposed, does exceed the lowered threshold for vegetative clearing (approximately 170.5 acres of clearing is proposed), and new buildings and structures of more than 500 s.f. (six structures are proposed, five of which are greater than 500 s.f., totaling approximately 3,595 s.f. of new construction). All Project activities are proposed within mapped Priority Habitat of Rare Species. In addition to the lowered thresholds, the SRP allows proposed actions to be reviewed using NPCs to be submitted under EOEEA #5834 and also provides expedited time frames.

1.7.2 Federal Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) administers the Federal Endangered Species Act (ESA) of 1973, as amended. The ESA protects listed species against killing, harming, harassing, or any action that may damage their habitat. An endangered species is in danger of extinction throughout all or a significant portion of its range, and a threatened species is likely to become an endangered species within the foreseeable future. Only one Federally-listed species, has been observed at the JBCC. The northern long-eared bat (*Myotis septentrionalis*) is listed as Threatened by the USFWS under the ESA. The MAARNG continues to work closely with the USFWS regarding the survey and monitoring of bats at Camp Edwards.

The New England cottontail (*Sylvilagus transitionalis*) which occurs on Camp Edwards was previously a candidate for listing under the ESA but due to successful conservation efforts, this species has not been listed. The MAARNG Natural Resource Office continues to work with partner agencies to implement the recovery plan to avoid Federal listing through habitat management and monitoring.

1.7.3 Environmental Performance Standards

The Environmental Performance Standards (EPS) are a list of requirements, or standards for performance, that guide both military and civilian users in the protection of Camp Edwards' natural and cultural resources and the groundwater beneath the Upper Cape Water Supply Reserve Area (the Reserve). during conduct of compatible military training and civilian use activities, such as hunting. These standards apply to the Reserve. The EPS are based in large part on already existing Federal, State, and Department of Defense

(DoD) regulations. In some cases, the protections offered by the EPS are more stringent than those offered by other regulations. Section 3 of the EPS provides the following Rare Species Performance Standards:

- 3.1 As the NHESP of MassWildlife has identified the entire MMR, (now JBCC), as State Priority Habitat for State-listed species, all activities and uses must comply with the MESA and its regulations.
- 3.2 Where activities and uses are not specifically regulated under the Camp Edwards Training Area Range and Environmental Regulations, including these EPS, the Environmental and Readiness Center (E&RC) must review the activities for conformance with the Integrated Natural Resource Management Plan (INRMP), and shall consult with the NHESP regarding potential impacts to State-listed species.
- 3.3 All activities impacting rare species habitat must be designed to preserve or enhance that habitat as determined by the E&RC in consultation with the NHESP
- 3.4 Users are prohibited from interfering with State and Federal-listed species.
- 3.5 Users will report all sightings of recognized listed species (e.g., box turtles), within any area of the JBCC.

The EPS provide for the protection and management of the vegetation of the Camp Edwards Training Area for focus on the following:

- Preservation of the habitat for Federal- and State-listed rare species and other wildlife
- Preservation of the wetland resource areas
- Activities compatible with the need to manage and preserve the vegetative resources
- Realistic field training need
- Identification and restoration of areas impacted by training activities.

The EPS provide for the Adaptive Ecosystem Management approach to management of the Camp Edwards properties including:

- Management of the groundwater for drinking water resources
- Conservation of endangered species
- Management of endangered species habitat for continuation of the species
- Ensuring compatible military training activities
- Allowing for compatible civilian use
- Identification and restoration of areas impacted by training activities

Additional performance standards are included in the EPS for Habitat Management, Wildlife Management, Fire Management, and Range Performance Standards. All the standards and guidance provided in the EPS are incorporated into the Application and the mitigation measures included as part of the CMP Plan in **Section 5.0** and a copy is included in **Appendix C**.

1.7.4 Environmental Management Commission

The Environmental Management Commission (EMC) was created by Chapter 47 of the Acts of 2002 and Executive Order (EO) 443. The purpose of the EMC is to provide permanent protection of the drinking water supply and wildlife habitat of the Upper Cape Water Supply Reserve (the Reserve), created as public conservation land by Chapter 47 of the Acts of 2002, by oversight, monitoring and evaluation of all military and other activities on the reserve to ensure they are consistent with this purpose. The EMC oversees compliance with and enforcement of the EPS.

The MAARNG has presented information regarding the proposed MPMG Range location and design to the EMC and its advisory councils, the Science Advisory Council (SAC) and the Community Advisory Council (CAC). The CAC assists the EMC by providing advice on issues related to the protection of the water supply and wildlife habitat on the reserve; and the SAC assists the EMC by providing scientific and technical advice relating to the protection of the drinking water supply and wildlife habitat on the Reserve. Finally, the EMC has participated in meetings with the MAARNG and MassWildlife to establish a mitigation bank and overall strategy to facilitate implementation of long-term planning efforts including modernization of the Camp Edwards range complex and infrastructure. EMC approval of the Project will be required.

1.7.5 Natural Resources Management Programs

MAARNG has a combined Natural Resources Conservation Program and Integrated Training Area Management (ITAM) Program which is responsible for maintaining MAARNG land to help the Army meet its training requirements while ensuring healthy and sustainable habitats and ecosystems. The E&RC Natural Resource Office is responsible for the land management within Camp Edwards. A major objective of the ITAM Program is to ensure sustainability of MAARNG training with the natural resources of Camp Edwards by achieving the following goals:

- Integrate environmental planning procedures into all operations;
- Protect natural and cultural resources;
- Ensure compliance with existing statutory regulations;
- Monitor and research land condition and natural resources, and
- Actively implement habitat and landscape management for the benefit of native plants and animals, surrounding communities, and soldier training.

The ITAM portion of the program relies on its four components including the following:

- Training Requirements Integration (TRI);
- Range and Training Land Assessment (RTL);
- Land Rehabilitation and Maintenance (LRAM); and
- Sustainable Range Awareness (SRA).

These components combine to provide the means to understand how the Army's training requirements impact land management practices, what the impact of training is on the land, how to mitigate and repair the impact, and communicate the ITAM Program message to soldiers and the public. Together, the ITAM Program and natural resource management ensures sustainable use of training lands as well as taking into consideration the surrounding environment and public concern. It is critical and required by Army regulation that land conservation result in no net loss of soldier training at Camp Edwards and that land management ensures the highest quality training to support a ready force. The ITAM Program integrates the training mission with landscape conservation to ensure mutual benefit for all stakeholders, which requires intensive planning, monitoring, and land management action.

1.8 Camp Edwards Mitigation Standards

MESA requires high level of Priority Habitat mitigation to provide net benefit to State-listed species. The number and breadth of impacted State-listed species results in a mitigation plan to provide for overall positive benefit for pine barrens and grassland associates of both open and closed forest conditions. The MAARNG has developed the following mitigation standards or actions for management at Camp Edwards which can be applied to proposed projects. In order to develop a Camp Edwards-wide approach to mitigation, percentages and associated acreages have been provided as a guide where appropriate.

- Standard #1 Mechanical Forestry (Pine Barrens)
- Standard #2 Prescribed Burns (Pine Barrens)
- Standard #3 Continued Management and Management (Pine Barrens)
- Standard #4 Manage Grasslands
- Standard #5 Monitoring and Research

Mitigation parcels are described in detail in **Section 5.0**. When determining mitigation for rare species impacts, the initial step is to determine if land preservation is possible. At Camp Edwards, land preservation can take three different forms: land transfer, land transfer with management of grasslands (under Standard #4), and Forest Canopy Reserve Areas. Management in pine barrens would be performed in accordance with Standards #1 through #3 as described below. Monitoring and research would be performed in all parcels except for those transferred as noted in **Table 1-1** below.

Standards #1 through #3 are specific to the pine barrens guild. All standards are proposed to be implemented over an eight year period starting in federal FY 2019, relative to the MPMG Range. Eight years is proposed for the primary mitigation effort so that a finite timeframe is established for mitigation implementations and expectations. At the end of the eight years, the primary mitigation effort can be reviewed to determine effectiveness on the rare species at Camp Edwards. Mitigation efforts using Standards #1, #2, and #4 were initiated in FY 2019 and are quantified in **Section 5.5**. Timelines may be adjusted through annual coordination if mutual agreement is reached. It is also intended that this mitigation framework will continue beyond the eight years as long as it is found to be providing the expected benefit to State-listed species and other resources.

Accordingly, in order to provide a long-term net benefit to the impacted species, the MAARNG proposes to use a combination of land transfers (i.e., “land protection”) and establishment of a “Mitigation Bank” comprised of approximately 3,400 acres for pine barrens habitat, approximately 1,180 acres for forest cover retention, 150 acres of intensive management, and a reserve of approximately 250 acres for potential sandplain grassland creation. The combination of parcel transfers and habitat management or conversion within mitigation bank focal areas will provide for net benefit of all impacted State-listed species while also establishing a framework for proactively mitigating impacts of future projects.

Table 1-2: Mitigation Parcels and Mitigation Standards

Mitigation Parcel/ Standards	Land Preservation	#1 Mechanical Forestry Pine Barrens	#2 Prescribed Fire Pine Barrens	#3 Continued Management Pine Barrens	#4 Grassland Management	#5 Monitoring and Research
Land Preservation: Transfer of Parcels						
Tracts 1-4	y					
Tract 5	y					
Land Preservation: Land Transfer with Management of Grasslands						
Parcel H - Unit K	y				y	y
Land Preservation: Forest Canopy Reserve Area						
Primary FCRA	y					y
Secondary FCRA	y					y
Management: Pine Barrens Mitigation Focal Area						
Northern Unit		y	y	y		y
Western unit		y	y	y		y
Southern Unit		y	y	y		y
MPMG Zone		y	y	y		y

When determining acres of mitigation, there are two concepts to take into consideration. “Mitigation acres” refers to those acres of land preservation required based on acres of take multiplied by the rare species ratio as described in **Section 1.4**.

“Acres being mitigated” refers to those acres where management of the habitat will occur to create and/or manage high-quality habitat for rare species. As describe in **Section 1.4**, MAARNG is proposing a habitat management ratio of 4:1, double what is required for land protection.

1.8.1 Standard #1: Mechanical Forestry (Pine Barrens)

In any management year, an estimated 30% (minimum of 20%, maximum of 40%) of pine barrens habitat mitigation acres required for a specific project, will be in the form of mechanical timber harvesting by thinning stands and significantly increasing solar exposure to the shrub layer and encourage scrub oak and heath understory and resulting in the enhancement of moth habitat. A range is provided as in any year, factors could affect the amount of mitigation work performed including but not limited to weather conditions, funding, monitoring of species, etc. According to Mello (2017), the majority of State-listed moths at Camp Edwards require open canopy SOS (less than 50% pine canopy cover) and requiring/tolerating frequent fire (see Standard #2). This work will primarily benefit the following State-listed species:

- State-listed species lepidoptera
- Eastern Whip-poor-will
- Northern harrier (*Circus cyaneus*)
- Broad Tinker’s Weed (*Triosteum perfoliatum*)

Specifications for this standard include increasing tree stem spacing to approximately 20 feet or more, on average, for a stand. This may include actions such as creating and maintaining shaded fuel breaks at the MPMG Range or large shrub savanna restorations at Wheelock Overlook, one of the Pine Barrens Mitigation Focal Areas discussed in **Section 5.2.2**. A shrub savanna, for purposes of this CMP, is comprised of sparse tree canopy shrubland. This standard can be applied to any of the four Pine Barrens Focal Mitigation Areas.

1.8.2 Standard #2: Prescribed Fire (Pine Barrens)

In any management year, an estimated 70% (minimum of 60%, maximum of 80%) of pine barrens habitat mitigation acres required for a specific project, will be in the form of prescribed fire to improve pine barrens habitat by reinvigorating understory (forbs, shrubs), reduce fuels, increase solar exposure, etc. Standard #2 is critical to supporting pine barrens species of flora and fauna. Prescribed fires (or burns) as mitigation and/or management includes standard wildland fire tactics and the creation of fire breaks (typically mowed understory) as further described in **Section 6.0**. Prescribed firebreaks are mowed lines that are either allowed to fully regenerate or receive occasional re-mowing (e.g., every two years) depending upon the burn unit and planned burns. Areas where Standard #2 will be implemented include Pine Barren Focal Areas and burn units that have not been burned within the preceding 10 years. See **Section 6.0** for locations of burn units and fire management descriptions.

Prescribed burns will be implemented as able throughout the year to achieve a mosaic of fire effects and habitat. Burns will be planned and implemented to improve open pine barrens conditions for dependent species, including improvement of frost bottom functioning where relevant. Continued management within the Pine Barrens Mitigation Focal Areas is anticipated over the long-term to maintain mitigation benefit. A total of 832 acres over the next eight years is anticipated as direct mitigation for the MPMG range habitat impacts. This standard can be applied to any of the four Pine Barrens Focal Mitigation Areas.

1.8.3 Standard #3: Continued Management and Maintenance (Pine Barrens)

Standard #3 provides for the continued management within Pine Barrens Mitigation Focal Areas (see **Section 5.2.2**) to ensure the mitigation benefit is carried forward and to address any concerns about habitat maintenance. Areas will be managed either with mechanical forestry or prescribed burns to be used as maintenance (e.g., re-entry burns, burning harvested sites) or improvement of new locations with forestry or fire with equivalent benefit. Continued management and maintenance acres may be applied at previously managed sites in Focal Areas (e.g., maintenance) or new locations within these Focal Areas to expand on managed areas and overall habitat benefit.

1.8.4 Standard #4: Manage Grasslands

Standard #4 allows for managing existing grasslands and the continued conversion of the former parade field (Parcel H - Unit K) back to sandplain grassland habitat over eight years. This work would include a combination of targeted herbicide treatment of invading woody plants, mowing, tree harvesting, and prescribed fire. Typically, less than 30% of available grassland habitat will be impacted within a six-month period with any of the methods noted here. Both habitat effects and species monitoring have demonstrated the best results are achieved through a combination of restoration techniques within the six-month period as opposed to broader use of a single method. The priority and focus of grassland mitigation will be to manage the 150-acre transferred parcel for MassWildlife with agreed-upon standards and annual coordination for a period of eight years. MAARNG proposes to manage this area at approximately 27 acres each year for eight years.

Mitigation credit would not be applied by MassWildlife for the transfer/protection of 150 acres until the habitat was fully converted to MG. However, the conversion and management over the eight-year period will mitigate the primary projects in this Plan (MPMG Range, TTHQ) and will provide capacity for additional projects that may arise in the future (e.g., solar).

The primary projects requiring grassland mitigation are the MPMG Range (36 acres at 1:1) and TTHQ (18 acres at 4:1 = 72 acres) for a total required mitigation of 108 acres. The proposed management of the 150-acre Parcel H – Unit K for conversion and long-term maintenance provides significant net benefit compared to the unoccupied (MPMG Range, TTB L2¹) or minimally occupied (TTHQ, 1300 area) habitat. Surveys have documented indicator plants suggesting the core of the 150 acres was never plowed so a longer term conversion and maintenance is proposed to minimize soil disturbance and maintain occupancy by current rare species (e.g., Grasshopper Sparrow, Frosted Elfin). A minimum of 20 acres per year will be managed with a target of 27 acres per year at this parcel. Some years, as in 2019, significantly more management may be accomplished (e.g., 127 acres) while both avoiding the 30% threshold target and not precluding annual conversion or maintenance. The annual target of 27 acres per year of management over 8 years (for a total of 216 acres) would fully mitigate for not only the MPMG Range but also for the TTHQ.

As an emergency backup for robust planning, we have identified grassland mitigation sites for potential conversion from pine barrens to sandplain grasslands (see **Section 5.2.3**) similar to what has been done at Crane WMA (see **Figure 5-1**). However, maximum conservation benefit can be realized through significant improvement within the existing grasslands rather than isolated clearings to the west. Botanical surveys within PU found multiple indicator species showing plowing and other soil disturbance never occurred within the wooded areas within PU. Proposed grassland mitigation focus on maximum net benefit which will come from converting all of PU to sandplain grassland condition. The grassland mitigation focus areas will only be used as part of this mitigation strategy in the event that unforeseen circumstances rule out the above-

¹ Tactical Training Base (TTB) Helicopter Landing Zone (LZ)

described plans for PU. This conversion of the grassland focal areas (purple) would require extraction of trees and shrubs, harrowing, and extensive seeding.

1.8.5 Standard #5: Monitoring and Research

Standard #5 allows for monitoring and research of rare species (and other species) as mitigation pursuant to MESA which requires a baseline level of monitoring of State-listed species to evaluate the impacts of both the mitigation actions and the range development/use. Monitoring plans are still in development by MAARNG, but include continued long-term grassland bird monitoring, box turtle monitoring, and lepidopteran surveys. See **Section 2.13** for more monitoring and research information that has been completed, is ongoing, and is proposed.

1.9 MAARNG Mission and History of Camp Edwards

Camp Edwards is the primary military training facility for Army National Guard (ARNG) soldiers throughout New England and serves as the primary pre-mobilization training site for the MAARNG and Reserve Component units in the northeast U.S. The training range requirements for Camp Edwards have increased dramatically due to State and Federal mission statements. Camp Edwards' primary mission is to prepare Soldiers for combat missions overseas as well as missions to serve and protect the homeland stateside. The Federal Mission is "...to provide well-equipped, well-trained Soldiers to support National Security Objectives and interests." The State Mission is to provide the Governor of Massachusetts with trained, equipped, and organized units to assist civil authorities in the preservation of life and property.

The MPMG Range is a programmed FY 2020 Military Construction (MILCON) project and is part of the Camp Edwards Range Complex Master Plan. There are no National Guard equivalent ranges anywhere within reasonable commuting distance. The three closest MPMG ranges include Camp Ethan Allen in Jericho, Vermont located over 270 miles away, Fort Dix in Ocean County, New Jersey located over 300 miles away, and Fort Drum located in Jefferson County, New York located over 370 miles away. The following MAARNG Units would utilize the proposed MPMG Range: 164 Transportation Battalion, 126 Support Battalion, 1st Battalion 181st Infantry Regiment, 101st Engineer Battalion, 1st Battalion 101st Field Artillery Regiment, 3rd Battalion, 126th Aviation Regiment, 1st Battalion, 182nd Infantry Regiment, 211th MP Battalion, 1st Battalion 150th Aviation Regiment and their supporting companies. A total of 103,864 man-days of training occurred at Camp Edwards for military personnel in TY (Training Year) 2018. The MAARNG has approximately 5,880 soldiers who train on average one weekend per month and one two-week cycle during a training year.

Records indicate that the earliest general usage for the small arms ranges (SARs) at JBCC was in the World War II period starting around 1940. A variety of small arms used at these ranges included pistols, rifles, shotguns, sub-machine guns and machine guns including small arms ammunition ranging from 5.56 ball rounds to .50 caliber machine gun rounds. A number of the small arms ranges have undergone multiple uses since World War II, including conversion between use as pistol ranges and use as rifle and/or machine gun ranges. Except for a period from the 1980s to the present, historical information concerning the numbers of rounds of specific types of ammunition used at each range is largely unavailable.

From 1994 to 2005, Camp Edwards training records indicate that the SARs were not being used to their design capacities. Use of the ranges had declined significantly since 1997 when lead ammunition was no longer allowed. A comparison of current range configurations with standard Army range designs found in TC 25-8 revealed that many of the Camp Edwards SARs are non-standard ranges, meaning they do not meet the requirements for SARs set out in the TC. Typically, the Camp Edwards SARs do not have the required number of targets nor the types of targets required to meet the standard range designs. Also, the Camp Edwards ranges typically do not provide the required distances between firing points and targets to meet the

most stringent qualification standards. As such, the MAARNG implemented the SAR-IP upgrades to ranges. To date, six ranges have been updated.

The U.S. Environmental Protection Agency (USEPA) banned live fire at Camp Edwards in 1997 due to concerns about contaminated water supplies from lead ammunition through the issuance of Administrative Order 1 (AO1) and 2 (AO2). Since that time, the MAARNG has worked with State and Federal agencies to resume the use of live fire through the SAR Improvement Project and pursuant to AR 350-19 (The Army Sustainable Range Program). The SAR Improvement Project allows MAARNG to continue with the resumption and improvement of small arms weapons training at Camp Edwards to military standards in a manner that protects both human health and the environment (particularly groundwater). The MPMG Range was envisioned as one of those improvement projects at the KD Range.

2.0 Existing Conditions

This section of the Application describes existing site conditions, current and abutting land uses, natural communities and guilds, State-listed species, previous natural resource surveys which have been performed at Camp Edwards that have helped to describe the natural communities and identify rare species.

2.1 Existing Site Conditions

Camp Edwards contains a unique diversity of natural vegetative communities that support State-listed rare species (see **Figure 2-1**). The predominant communities include:

- Pitch pine oak forest (PPOF) woodlands
- Pitch pine scrub oak (PPSO)
- Scrub oak shrubland (SOS)
- Cultural or managed sandplain grasslands (MG)

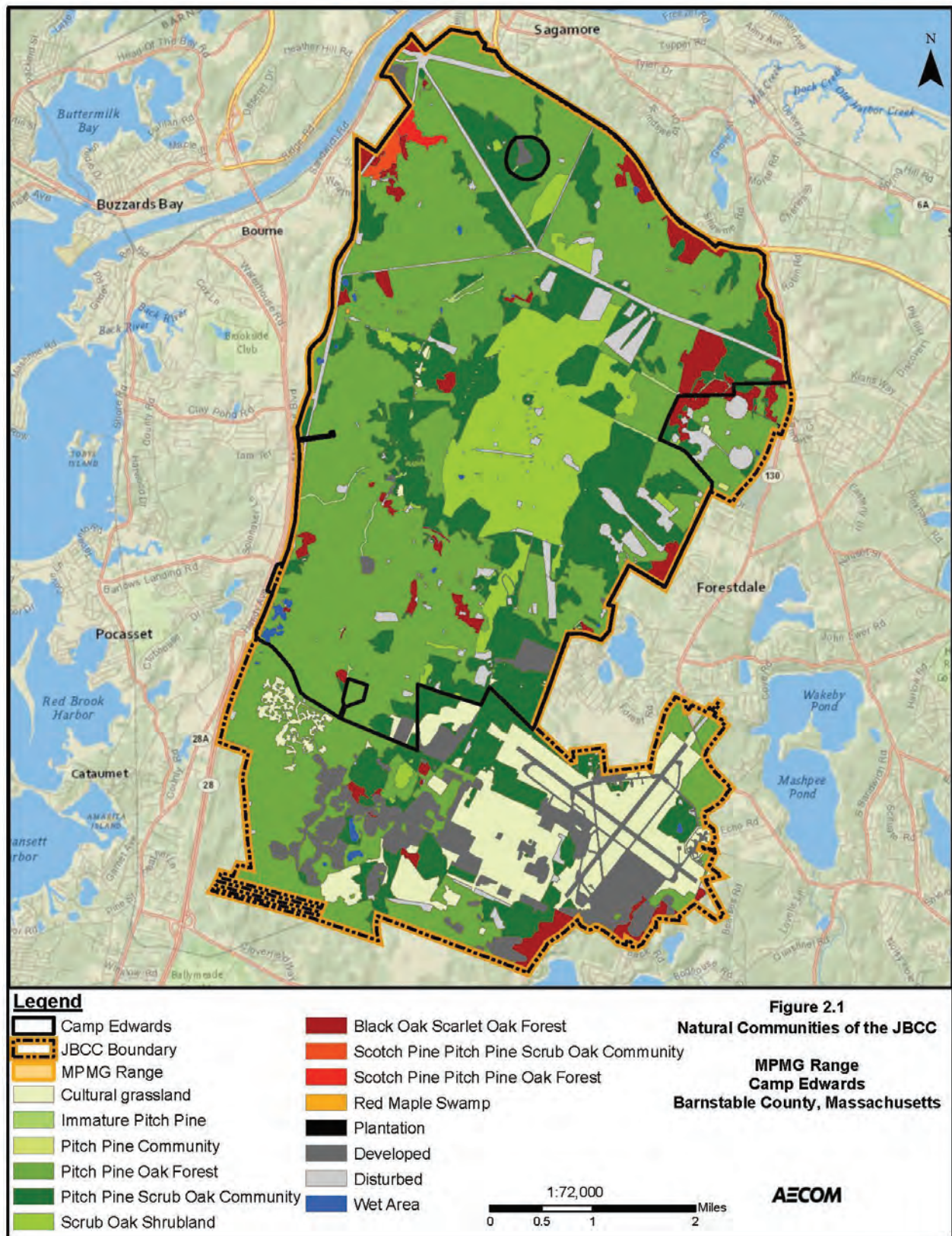
These communities are described in **Section 2.3**. Native grassland communities comprise a relatively small portion of Camp Edwards but provide important habitat for State-listed rare species and are managed to support an Atlantic coastal sandplain grassland community. Few wetland communities exist on Camp Edwards and are all classified as palustrine. Rare species inhabiting Camp Edwards are found in four broad vegetation groups:

- Species that require large unfragmented sections of forest, such as the Eastern Box Turtle
- Species that are pine and scrub oak barrens specialists, such as most of the rare moths
- Species that occur in wetland areas, such as Torrey's beak Sedge (*Rhynchospora torreyana*)
- Species that require grasslands, such as the Upland Sandpiper (*Bartramia longicauda*)

2.2 Current and Abutting Land Use

Camp Edwards is one of the largest undeveloped tracts of land over 10,000 acres, along the coast, from Maine to New Jersey comprised of large tracks of woodlands surrounded by highways, residential communities, and business development. The Shawme-Crowell State Forest, used for recreational purposes, borders the northern boundary of Camp Edwards and the Frances Crane Wildlife Management Area (Crane WMA) borders the JBCC along the southern boundary, also used for recreation and wildlife habitat.

Although the upper portion of Cape Cod was sparsely populated in the 1930s when Camp Edwards was first established, the residential population has exhibited one of the fastest rates of growth in the U.S. Approximately 70 percent of the perimeter of Camp Edwards is surrounded by residential development. In these areas, residential development is within one half mile of the boundary of Camp Edwards and often directly adjacent to the fences. The Cantonment Area in the southern portion of Camp Edwards adjoins the remainder of the JBCC, which includes OANGB, the Veteran's Administration Cemetery, USCG Housing, and the USCG Golf Course. The Coast Guard transmitter station is adjacent to Camp Edwards at its eastern border. The USAF PAVE PAWS Radar station is located within the northern portion of Camp Edwards.



The only parts of Camp Edwards that are not directly bordered by development are at the northern and southern ends of the perimeter. The far northern end of Camp Edwards is adjacent to the Cape Cod Canal. Although no development currently exists in this area, the land is highly sought after for residential homes. The northeastern corner of Camp Edwards abuts Shawme-Crowell State Forest. Although the state forest is only 742 acres in size, it is the most highly used state forest in southeastern Massachusetts.

2.3 Natural Communities

The following are descriptions of the natural communities of Camp Edwards as per the Classification of Natural Communities (Swain and Kearsely 2001) that are located in and adjacent to the MPMG Range and at the other projects locations

- Pitch Pine-Oak Forest/Woodland (PPOF)
- Pitch Pine-Scrub Oak Community (PPSO)
- Scrub Oak Shrubland/Frost Bottoms (SOS)
- Cultural or Managed Grasslands (MG)
- Wetlands

2.3.1 Pitch Pine-Oak Forest/Woodland (PPOF)

The pitch pine-oak forest woodland (PPOF) of Camp Edwards varies with degree of maturity. The structure of the forest ranges from a low canopy with a dense shrub layer to a taller canopy with a sparser shrub layer. In general, the plant community is in a mid-successional state where trees and shrubs are increasing in number, while forbs and grasses are becoming less abundant. The woodlands in the northern area of Camp Edwards tend to have a higher and denser canopy than the other forest communities. This may be due to less historic disturbance, resulting in a more mature forest.

The pitch pine-oak forest woodland of Camp Edwards has a low canopy of pitch pine (*Pinus rigida*) and tree oaks (black oak (*Quercus velutina*), scarlet oak (*Q. coccinea*), and white oak (*Q. alba*) and a moderately continuous shrub layer of blueberry (*Vaccinium* spp.), black huckleberry (*Gaylussacia baccata*), sheep laurel (*Kalmia angustifolia*), and scrub oak (*Q. ilicifolia*). The sparse forb layer consists of bracken fern (*Pteridium aquilinum*), wintergreen (*Gaultheria procumbens*), and Pennsylvania sedge (*Carex pensylvanica*). The low forest canopy, about 10-15 m tall, indicates a relatively young forest of no more than 100 years old and site-wide forest assessments in 1997 and 2003 indicate nearly all of this community dates to the mid-1950s or newer, which is consistent with historic photos and aerial imagery. PPOF near the MPMG Range and other project sites has a high percentage of scrub oak in the understory and is functionally lumped in with PPSO.

2.3.2 Pitch Pine-Scrub Oak Community (PPSO)

In areas of significant past disturbance and/or much of the moraine, the overstory community is almost entirely pitch pine with an understory of sometimes very dense scrub oak which creates the pitch pine-scrub oak (PPSO) community. Other tree species that are present but not common to the community are scotch pine (*Pinus sylvestris*), white oak, and black/scarlet oak. Scotch pine was likely introduced to Camp Edwards in the late 1920s and the early 1930s as plantations in Shawme-Crowell State Forest. The prevalent shrub species of this community are black huckleberry (*Gaylussacia baccata*) and blueberry which are commonly interspersed among the more dominant scrub oak. The structure of the pitch pine-scrub oak communities varies greatly with age. Younger stands are short, dense thickets of immature pitch pine associated with significant recent disturbance. White oak is increasing significantly in understory where fire has been excluded and threatens to convert the community.

A smaller portion of the PPSO community is comprised of immature pitch pine, is relatively low in plant diversity, and often occurs along roads, old firebreaks, or other previously disturbed areas. As the pitch pine

maturing, the forest has a more closed canopy, which ultimately outcompetes scrub oak and nearly all other species for sunlight. However, in areas where pitch pine has been cleared, scrub oak often grows in extremely dense patches. In the pitch pine-scrub oak community trees, and shrubs in general, are growing at a rate greater than in any other plant community, indicating a somewhat young, but rapidly maturing forest. The diversity of the pitch pine-scrub oak community, 51 plant species, is about average for the plant communities of Camp Edwards. However, pitch pine and scrub oak are the dominant and most productive species in the community. This is an extremely fire prone plant community and presents an extreme wildlife hazard as it matures and scrub oak meets canopy.

2.3.3 Scrub Oak Shrubland (SOS)

Much of Upper Cape Cod has been dominated by pitch pine and scrub oak shrublands or barrens (SOS) since the period of colonial settlement. The area has been maintained in an early successional state as a result of intensive timber harvesting and successive catastrophic fires. Fire and frost effects typically suppress the growth of pitch pine and other tree species while promoting the growth of scrub oak creating frost bottoms. Fire scarring causes scrub oak acorns to germinate more readily and terminal buds to die, resulting in the growth of lateral branches. Frequent late spring frosts result in chronic dieback of developing leaves, slow growth rates, and reduced stem height which promotes shrub growth. Eventually, large herds of sheep were grazed throughout the Upper Cape, which limited tree growth and promoted the establishment of the scrub oak barren habitats.

The SOS covers 2,107 acres, or 15 percent of Camp Edwards, mostly within the Impact Area. This plant community represents one of the earliest states of vegetative succession on Camp Edwards and consists primarily of scrub oak with essentially no pitch pine. Other common plants in the scrub oak barrens include black huckleberry, blueberry, cat brier (*Smilax glauca*), and wintergreen. The majority of SOS at Camp Edwards is at significant risk of loss due to forest (pitch pine) encroachment due to lack of fire from artillery and historic sources. Efforts to provide this habitat outside the Impact Area are underway.

2.3.4 Cultural or Managed Grasslands (MG)

Cultural or Managed Grasslands (MG) are human created and maintained open communities dominated by grasses. Mowing is the typical maintenance, however on Camp Edwards; fire has played and is playing a more important role. Only 175 acres of MG are located on Camp Edwards in portions of the Cantonment Area. The remainder of the grasslands of the JBCC are managed by other military services. MG were historically cleared for use as parade grounds, barracks areas, and airfield during World War II. The existing MG and management area is shown in **Figure 2-2**.

The cultural grasslands are one of the least diverse plant communities on Camp Edwards, with only 37 identified species during a floristic inventory. The community is dominated by grass species including little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), hairgrass (*Deschampsia flexuosa*), redtop (*Agrostis gigantea*), poverty grass (*Danthonia spicata*), and Pennsylvania sedge (*Carex pensylvanica*). The only common tree species is immature pitch pine and red cedar. Sweetfern (*Comptonia peregrina*) was found in dense thickets less than a meter in height, whereas bayberry (*Myrica pensylvanica*), blueberry, and scrub oak were present, but less common. Many nonnative species such as honeysuckle (*Lonicera* spp.), Asiatic bittersweet (*Celastrus orbiculata*), autumn olive (*Elaeagnus umbellata*), and spotted knapweed (*Centaurea maculosa*) occur in the cultural grasslands of Camp Edwards and the JBCC. However, intensive management effort is focused on increasing plant diversity and reducing invasive plants. Best effect has been found in concentrating a combination of herbicide, fire, and mowing within an individual unit as opposed to broader treatments with a single method.

2.3.5 Wetlands

The ponds and wetlands at Camp Edwards, which comprise only 55 acres, or less than one percent, are the most diverse plant community on the installation. A total of 67 plant species were documented in the wetlands. There are six different types of wetlands based on the “Classification of Natural Communities in Massachusetts”. They are Ponds, Coastal Plain Pond Shore, Kettlehole Level Bogs, Red Maple Swamps, Highbush Blueberry Thickets, and Woodland Vernal Pools. In addition, there are other types of bogs which are unique and not found in large acreages such as a Sphagnum Moss (*Sphagnum* spp.) Bogs comprised primarily of sphagnum moss and cranberry (*Vaccinium macrocarpon*) and Woodland Vernal Pools, and Highbush Blueberry Thickets that lack standing water for much of the year.

The MPMG Range and the majority of the other proposed projects do not include any wetlands within the project footprint. Additional details on these wetland resource area can be found in the 2009 INRMP. Range and other project designs will specifically avoid impacting wetlands and will comply with the Massachusetts Wetlands Protection Act and town bylaws.

2.3.6 Invasive Species

Although not a cover type, invasive species deserve a mention as they may impact mitigation efforts. As mentioned above, many nonnative and invasive species such as honeysuckle (*Lonicera* spp.), Asiatic bittersweet (*Celastrus orbiculata*), barberry (*Berberis thunbergii*), autumn olive, and spotted knapweed occur in the grassland area. There are ongoing management efforts to remove these exotic, invasive plant species. Some exotic and invasive plant species benefit from disturbance which tend to out-compete native species and proliferate in disturbed systems. One example of such a proliferation is that of knapweed (*Centaurea maculosa*) in the Cantonment Area which quickly establishes and out-competes native species in disturbed areas. It should be noted however, that the knapweed is slowly displaced by native bluestem grasses over a period of several years. Areas surrounding the existing KD Range, especially adjacent to parking and firing lines have particular abundance of some nonnative invasive plants including barberry, honeysuckle, and bittersweet.

2.4 Guilds

In addition to the vegetative communities described above, “guilds” have been identified at Camp Edwards to use for mitigation efforts. A guild is a grouping of species that may utilize similar natural resources such as vegetation cover types. For Camp Edwards, there are four vegetative guilds and three guilds based on a specific State-listed species (i.e., Eastern Box Turtle, Eastern Whip-poor-will, and Northern Harrier). In order to determine the mitigation ratios for projects impacts (as described in **Section 1.4**), we assigned the highest level of protection for species within that natural community or guild as shown in **Table 2-1** according to those species known to exist within these communities at Camp Edwards.

Table 2-1: Natural Communities and Guilds at Camp Edwards

Guild Associations	Natural Communities	Mitigation Level
Pine Barrens Guild	PPOF, PPSO, SOS	Threatened (2:1)
Grassland Bird Guild	MG	Threatened (3:1)
Frost Bottom Plant Guild	SOS Frost Bottoms	Endangered (3:1)
Wetlands	Wetlands	Endangered (3:1)
Eastern Whip-poor-will	PPOF, PPSO, SOS	Species of Special Concern (1.5:1)
Eastern Box Turtle	PPOF, PPSO, SOS	Species of Special Concern (1.5:1)
Northern Harrier	MG	Threatened (2:1)
Bats	PPOF, PPSO, SOS	Endangered (3:1)

2.5 State-Listed Species

Based on existing records and extensive surveys, State-listed plant and wildlife species at Camp Edwards are summarized in the following tables. **Table 2-2** includes the State-listed plants that have been identified at Camp Edwards. **Table 2-3** includes a summary of all State-listed species identified at Camp Edwards by rank. **Table 2-4** includes the State-listed wildlife observed at Camp Edwards. Based on surveys and observations made at Camp Edwards, earlier successional habitats (e.g., frost bottoms, SOS, sandplain grassland) are being lost to forest encroachment – especially within the Impact Area and other unexploded ordnance (UXO) hazard areas where the MAARNG is unable to implement management projects. The primary driver behind declines in some of the State-listed moths at Camp Edwards is a lack of fire in SOS and the dramatic incursion of pitch pines into shrublands and frost bottoms after the secession of artillery fires in the Impact Area.

Table 2-2: State-Listed Plant Species at or Near Camp Edwards

Scientific Name	Common Name	State Status	Federal Status	Habitat
<i>Eleocharis ovata</i>	Ovate Spike-sedge	E	-	Wetlands
<i>Juncus debilis</i>	Weak Rush	E	-	Wetlands
<i>Malaxis bayardii</i>	Bayard's Green Adder's Mouth	E	-	PPSO, MG
<i>Ophioglossum pusillum</i>	Adder's Tongue Fern	T	-	Wetlands
<i>Rhynchospora torreyana</i>	Torrey's Beak Sedge	E	-	SOS Frost Bottoms
<i>Scleria pauciflora</i>	Papillose Nut Sedge	E	-	PPSO, MG, Powerlines
<i>Triosteum perfoliatum</i>	Broad Tinker's Weed	E	-	SOS Frost Bottoms

Source: NHESP letter dated 16 August 2019

E = Endangered, T = Threatened, SC = Special Concern

Table 2-3: Summary of State-Listed Rare Species Documented at Camp Edwards

Taxon	Special Concern	Threatened	Endangered	Total
Birds	1	3	1	5
Reptiles/amphibians	1	1	0	2
Odonates	0	1	0	1
Moths and Butterflies	12	6	0	18
Beetles	1	0	0	1
Crustacea	0	0	1	1
Mammals		0	4	0
Subtotal	15	11	6	32
Plants	0	1	6	7
Total	15	12	12	39

Table 2-4: State-Listed Rare Species at Camp Edwards

Scientific Name	Common Name	State Status	Federal Status
Birds			
<i>Ammodramus savannarum</i>	Grasshopper sparrow	T	-
<i>Bartramia longicauda</i>	Upland sandpiper	E	-
<i>Caprimulgus vociferus</i>	Eastern Whip-poor-will	SC	
<i>Circus cyaneus</i>	Northern harrier	T	-
<i>Poocetes gramineus</i>	Vesper sparrow	T	-
Reptiles and Amphibians			
<i>Scaphiopus holbrookii</i>	Eastern spadefoot	T	-
<i>Terrapene carolina</i>	Eastern box turtle	SC	-
Odonates			
<i>Enallagma recurvatum</i>	Pine Barrens bluet	T	-
Moths and Butterflies			
<i>Abagrotis nefascia</i>	Coastal heathland cutworm	SC	-
<i>Acronicta albarufa</i>	Barrens daggermoth	T	-
<i>Callophrys irus</i>	Frosted elfin	SC	-
<i>Catocala herodias gerhardi</i>	Gerhard's underwing moth	SC	-
<i>Chaetagnaea cerata</i>	Waxed sawfly moth	SC	-
<i>Cicinnus melsheimeri</i>	Melsheimer's sack bearer	T	-
<i>Cingilia catenaria</i>	Chain dot geometer	SC	-
<i>Cynia inopinatus</i>	Unexpected cynia	T	-
<i>Euchlaena madusaria</i>	Sandplain euchlaena	SC	-
<i>Dargida rubripennis</i>	The Pink streak	T	-
<i>Hemaris gracilis</i>	Slender Clearwing Sphinx	SC	-
<i>Hemileuca maia</i>	Barrens buckmoth	SC	-
<i>Lycia ypsilon</i>	Pine barrens lycia	T	-
<i>Metarranthia pilosaria</i>	Coastal swamp metarranthia	SC	-
<i>Papaipema sulphurata</i>	Water-willow stem borer	T	-
<i>Psectraglaea carnosaria</i>	Pink sawfly moth	SC	-
<i>Speranza exonerata</i>	Pine barrens speranza	SC	-
<i>Zale lunifera</i>	Pine barrens zale	SC	-
Beetles			
<i>Cicindela purpurea</i>	Purple tiger beetle	SC	-
Crustacea			
<i>Eulimnadia agassizii</i>	Agassiz's clam shrimp	E	-
Mammals			
<i>Myotis septentrionalis</i> *	Northern long-eared bat	E	T
<i>Myotis leibii</i> *	Small-footed myotis	E	-
<i>Myotis lucifugus</i> *	Little brown bat	E	-
<i>Perimyotis subflavus</i> *	Tri-colored bat	E	-

Source: NHESP letter dated 16 August 2019 * From surveys performed at Camp Edwards
E = Endangered, T = Threatened, SC = Special Concern

2.6 State-listed Bird Species

2.6.1 Grasshopper Sparrow

The Grasshopper Sparrow (*Ammodramus savannarum*) is listed as Threatened by NHESP. On Camp Edwards, this bird is associated with MG. Grassland bird surveys have occurred annually since at least 1994, supplemented by targeted research projects including mist-netting, color-banding, and geolocators to evaluate Grasshopper Sparrow migration and habitat use. Grasshoppers Sparrows have responded positively to the increased level of management and resultant habitat at JBCC and Crane WMA.

2.6.2 Upland Sandpiper

The Upland Sandpiper (*Bartramia longicauda*) is listed as Endangered by NHESP. On Camp Edwards, this bird is associated with MG. Grassland bird surveys have occurred annually since at least 1994, supplemented by targeted research projects including netting and use of satellite and GPS tags to research Upland Sandpiper migration and habitat use. Upland Sandpipers are remaining relatively stable at JBCC, though apparently increasing on the airfield and capped landfill.

2.6.3 Eastern Whip-poor-will

The Eastern Whip-poor-will (*Caprimulgus vociferous*) is listed as species of Special Concern by NHESP. On Camp Edwards, this bird is associated with PPSO, SOS, and PPOF. Intensive telemetry studies were conducted to evaluate habitat use, nesting, and home ranges of whip-poor-wills at Camp Edwards from 2005 through 2009. Whip-poor-wills were primarily found to prefer habitat edges nearer training roads, bivouacs, and similar sites. Whip-poor-will monitoring has been occurring at Camp Edwards since the late '1990s and has been annual since 2010 with significantly increased effort since 2014. Whip-poor-wills are generally stable throughout Camp Edwards, but based on challenging survey conditions results fluctuate year to year. Next year, 2020, will be the final year of an intensive migratory study of whip-poor-wills in a partnership between MAARNG, MassWildlife, and Worcester Polytechnic Institute, though annual monitoring will continue.

2.6.4 Northern Harrier

The Northern Harrier (*Circus cyaneus*) is listed as a Threatened species by NHESP. Northern Harriers establish nesting and feeding territories in wet meadows, grasslands, abandoned field, and coastal and inland marshes, mostly along the coast. In Massachusetts most Harriers that do not migrate south spend the winter in coastal marshes and the offshore islands. After the young have fledged, they may hunt together with their parents through the remainder of the summer, until they disperse on their own or are driven off. In Massachusetts Harrier's diet primarily consists of voles and there is a direct correlation between the breeding success of the Harrier and the number of voles found in their territory. On Camp Edwards, this bird is associated with SOS.

2.6.5 Vesper Sparrow

The Vesper Sparrow (*Pooecetes gramineus*) is listed as Threatened by NHESP. On Camp Edwards, this bird is associated with MG. Despite active management and monitoring Vesper Sparrows have declined to the point where they have not been detected the last few years during annual grassland bird and site-wide bird monitoring at Camp Edwards and JBCC.

2.7 State-listed Reptiles and Amphibians

2.7.1 Eastern Spadefoot

The Eastern Spadefoot Toad (*Scaphiopus holbrookii*) is listed as Threatened by NHESP. These toads require dry sandy loams characteristic of pine barrens and can burrow up to eight feet deep during cold temperatures or if weather conditions are dry. On Camp Edwards, this toad has never been encountered despite intensive surveys (including acoustic surveys) in vernal pools, road puddles, and wetlands. There has been one observation at the National Cemetery.

2.7.2 Eastern Box Turtle

The Eastern Box Turtle (*Terrapene carolina*) is listed as a Species of Special Concern by NHESP. Box turtles are habitat generalists, but PPOF and PPSO woodlands are generally considered to be their optimum habitat. On Camp Edwards, this turtle is associated with all cover types. The eastern box turtle has been observed in nearly every natural community on Camp Edwards, including grasslands, forests, and disturbed areas (e.g., bivouacs, powerline easements, lawns). The species is common to the forests and scrub oak barrens. These turtles are not considered habitat limited and may be limited by roads and road mortality.

Eastern Box Turtles have been sighted over the past 20 years on Camp Edwards and have occurred throughout the entire installation. As of the 2009 INRMP, approximately 170 individuals have been recorded, 46 of which were marked. Each individual that was marked was also measured (i.e., carapace length and width), weighed, sexed, and aged. As a result of the relatively high incidence of eastern box turtle sightings, the Natural Resource Office attached transmitters to 10 individuals to monitor their movements and habitat use each year for five years. Preliminary analysis of the data indicates that, in general, Eastern Box Turtles are ubiquitous within the ecosystem of Camp Edwards. Home ranges of Eastern Box Turtles vary in size from 3.2-84.4 acres (mean=20.4 acres) and do not vary much between years.

Management efforts are focused on maintaining large un-fragmented tracts of land on Camp Edwards and when possible increasing the size of these tracts. Also, through a proactive fire management program habitat diversities will be maintained which appears to be essential to maintaining healthy populations of eastern box turtles. A major threat to the Eastern Box Turtle is habitat loss due to fragmentation. Therefore, the impact of land clearing relative to the MPMG Range project and other projects is analyzed closely.

A proactive educational plan has been implemented at Camp Edwards beginning in 1998 to educate Camp Edwards land users to the importance of this species and so that notification is made to the Camp Edwards Natural Resource Office when Eastern Box Turtles are found on site. Wanted posters asking to report all eastern box turtle sightings have been placed throughout Camp Edwards. All reports are filed with the NHESP at the end of the field season. Approximately 90% of the sightings of Eastern Box Turtles on Camp Edwards are from soldiers and personnel training or working on the installation. Increased awareness of the species on Camp Edwards will contribute to the survival of the species. Only two eastern box turtle road kills were documented between 1994 and 2006. The relatively frequent sightings and few road kills of eastern box turtles on the roads of Camp Edwards suggests that soldiers and other personnel are aware of the turtles and their status as a State-listed rare species, and avoid them. However, in August 2019, there were three road mortalities during a period of high training activity and extremely dusty road conditions. One 2019 road mortality was in a puddle, an issue MAARNG has been working to address through education and signage with users of Camp Edwards while still providing habitat for the clam shrimp (see **Section 2.11**).

There are still concerns for Eastern Box Turtles at Camp Edwards and throughout the region. There has been an increase over the last few years of box turtles found with apparent predator damage (e.g., broken shells) as well as various infections, lesions, and parasites. It is uncertain what is leading to this apparent

increase, though MAARNG has been reporting and communicating with MassWildlife. Presumably this is due to combined stressors from climate change and other anthropogenic shifts (meso-predators, habitat degradation), which the landmass of Camp Edwards is insufficient to protect against. It would be hoped that more widespread habitat management will help ecosystem balance and provide resilience against such impacts. However, restoring forest and pine barrens conditions introduces new risks to Eastern Box Turtles. While Eastern Box Turtles are adapted to wildland fire they likely are not adapted to the current levels of fuel loading seen through most of their range. Forests and barrens are consistently overgrown throughout the region due to a lack of fire and even prescribed restoration burns have significant fire intensity. Discussions are ongoing relative to minimizing box turtle impacts while ensuring continued and necessary increases to the scale of barrens and forest restoration and habitat management.

Recent efforts with the Eastern Box Turtle have mostly been opportunistic. More juveniles have been discovered in the last two years than normal which have been tracked in coordination with MassWildlife. Efforts for the MPMG Range have begun with dogs.

2.8 State-listed Odonates

The Pine Barrens Bluet (*Enallagma recurvatum*) is listed as Threatened by NHESP and is the only State-listed dragonfly or damselfly observed at Camp Edwards. This species appear to be restricted to coastal plain ponds including shallow sandy shores with vegetation. As there are no wetland resource areas in or near to the MPMG Range, it is unlikely that this species will be impacted by the proposed work.

2.9 State-listed Lepidoptera

There are presently 18 species of State-listed lepidoptera (17 moths and one butterfly) identified at JBCC as shown in **Table 2-3** and are likely to be found within Camp Edwards.² According to Mello, the habitats at Camp Edwards appear to be supporting a high diversity of State-listed species although five species which are affiliated with early successional vegetation species have declined in population. Because early successional habitats are essential for nearly all of the State-listed species, management practices that involve prescribed burns are essential. In addition, as only a small percentage of the landscape is burned at any given time, this management strategy is unlikely to cause the extirpation of any of the noted species.

Prescribed burn return intervals are necessary to avoid extreme hazard conditions adjacent to the MPMG Range and are being studied at this time and it will likely be necessary to have less than a 5-year return interval. Monitoring of moth and butterfly species will guide adaptive management for the use of fire. Information obtained from monitoring will allow the MAARNG to react accordingly, if reasonable. Adaptive management will also allow the MAARNG to mitigate unanticipated negative effects. All monitoring will be reported to the State annual including actions taken, action proposed, monitoring of resources, and assessment of management and treatment regimes.

2.9.1 Coastal Heathland Cutworm

The Coastal Heathland Cutworm (*Abagrotis nefascia*) is listed as a Species of Special Concern by NHESP. This species utilizes xeric and open coastal habitats on sandy soil, including sandplain grasslands, dunes and bluffs, coastal heathlands or other maritime shrublands, and occasionally open pitch pine/scrub oak barrens. The larvae of this species overwinter partially grown, and resume feeding in spring. Host plants in Massachusetts are undocumented, but probably consist of a variety of low-growing shrubs. On Camp Edwards, this moth is associated with PPSO and SOS.

² Mello, Mark J. January 2018. Two-year survey of Lepidoptera and other insects of conservation concern focusing on species listed in the Massachusetts Endangered Species Act at Camp Edwards, MA Army National Guard.

2.9.2 Barrens Dagger Moth

The Barrens Dagger Moth (*Acronicta albarufa*) is listed as a Threatened species by NHESP. This species is associated with xeric, open PPSO barrens and scrub oak thickets on sandy soil. In Massachusetts the moth flies from mid-June through mid-August. Larvae feed from summer into early fall, and pupae overwinter. In Massachusetts the primary host plant is scrub oak (*Quercus ilicifolia*). On Camp Edwards, this moth is associated with PPSO and SOS and is a scrub oak feeding species occurring in xeric, open canopy scrub oak barrens including those that have been recently burned.

2.9.3 Frosted Elfin

The Frosted Elfin (*Callophrys irus*) is listed as a Species of Special Concern by NHESP. This species utilizes xeric and open, disturbed habitats on sandy and occasionally rocky soil, especially heath/grassy openings in pitch pine-scrub oak barrens. This species also utilizes similar anthropogenic habitats such as utility line rights-of-way, railways, old sand/gravel pits, and airports. The adult flies from mid-April through mid-June. Larvae feed on either wild indigo (*Baptisia tinctoria*) or lupine (*Lupinus perennis*) in May and June, and pupate by early July. On Camp Edwards, this butterfly is associated with MG and *Baptisia tinctoria*. Albanese (2008) identified that this butterfly needs moderate, clumped tree cover, putting it in a transition zone between pine barrens and MG.

2.9.4 Gerhard's Underwing

The Gerhard's Underwing (*Catocala herodias gerhardi*) is listed as a Species of Special Concern by NHESP. This species utilizes scrub oak barrens with an open pitch pine overstory including a range of pine barrens habitats from early successional scrub oak thickets to mid successional pitch pine woodlands (Mello Codes 1 to 4). The larvae of this species feed primarily on scrub oak. Larvae pupate in June and emerge as moths in July and August. Eggs overwinter on the scrub oak hatching in early spring. On Camp Edwards, this moth is associated with PPSO and SOS and is found in both open and partially closed habitats with scrub oak understory.

2.9.5 Waxed Sallow Moth

The Waxed Sallow Moth (*Chaetagnaea cerata*) is listed as a species of Special Concern by NHESP. This species inhabits PPSO barrens, heathlands on sandplains, and forests with heath understories. Adults fly mainly in October and eggs overwinter hatching in the spring. Larvae feed on huckleberry and lowbush blueberries and possibly scrub oak.

2.9.6 Melsheimer's Sack Bearer

The Melsheimer's Sack Bearer (*Cincinnati melsheimeri*) is listed as a Threatened species by NHESP. This species utilizes PPSO, especially SOS thickets. It may also be found in shrubby grasslands and heathlands with a component of scrub oak. Adult moths fly in June and early July, with the peak flight in late June. Larvae feed on scrub oak from summer through fall. The larvae construct a portable, protective shelter ("sack") out of leaves and silk and overwinter and pupate in the spring. On Camp Edwards, this moth is associated with PPSO and SOS found in open to partial canopy habitats dominated by scrub oak. As the eggs, larvae, and pupae are on vegetation most of the year, it may be more susceptible to fire than other scrub oak-feeding species.

2.9.7 Chain Dot Geometer

The Chain Dot Geometer (*Cingilia catenaria*) is listed as a Species of Special Concern by NHESP. This species inhabits coastal plain shrublands, including sandplain grasslands and heathlands, dunes, bluffs, and

maritime shrublands and occasional open pitch pine/scrub oak barrens. Adult moths fly in September and early October, with the peak flight in late September. Eggs overwinter and hatch in the spring. Larvae feed from late June through early August on a variety of shrubs including huckleberry, blueberry, bayberry, and sweet gale (*Myrica gale*). On Camp Edwards, this moth is associated with PPSO, SOS, and MG, and is considered a fire-affiliated species.

2.9.8 Unexpected Cynia

Unexpected Cynia (*Cynia inopinatus*) is listed as Threatened by NHESP. This species was recorded for the first time at JBCC during 2017. The larvae feed and lay eggs on butterfly weed (*Asclepias tuberosa*) which occurs sporadically both at JBCC and Crane WMA. Adult moths fly in late spring and summer. On Camp Edwards, this moth is associated with MG and heathlands.

2.9.9 Sandplain Euchlaena

The Sandplain Euchlaena (*Euchlaena madusaria*) is listed as a Species of Special Concern by NHESP. This species' larval hostplant is scrub oak and possibly blueberry. Individuals have been documented at Camp Edwards in oak-dominated understory in open to pitch pine-dominated canopy habitats. Adult moths fly in late spring and again in August. On Camp Edwards, this species was observed within scrub oak-dominated understory in open to pitch pine dominated canopy habitats.

2.9.10 The Pink Streak

The Pink Streak (*Dargida rubripennis*) is listed as Threatened by NHESP. The species inhabits sandplain grasslands at Camp Edwards and was found on the larval host plant, switch grass (*Panicum virgatum*). The pupa overwinter beneath the surface of the soil.

2.9.11 Slender Clearwing Sphinx

The Slender Clearwing Sphinx (*Hemaris gracilis*) is listed as a Species of Special Concern by NHESP. This species inhabits PPSO barrens and heathlands on sandplains or rocky summits and ridges, as well as acidic bogs and swamps. Adult moths fly in May and June. The adults are diurnal and hover to nectar at flowers, especially blueberry. Larvae feed on lowbush blueberry (*Vaccinium pallidum*), and probably other blueberry species, from June until pupation in July. Pupae overwinter. On Camp Edwards, this moth is associated with disturbed lands within utility rights-of-way.

2.9.12 Barrens Buckmoth

The Pine Barrens Buckmoth (*Hemileuca maia*) is listed as a Species of Special Concern by NHESP. This species utilizes early successional SOS thickets. The larvae of this species feed on oak species with a preference for scrub oak. Larvae pupate in July and August in the soil emerging as moths in October. Eggs overwinter on the scrub oak hatching in May and June. On Camp Edwards, this moth is associated with PPSO and SOS.

2.9.13 Pine Barrens Lycia

The Pine Barrens Lycia (*Lycia ypsilon*) is listed as a Threatened species by NHESP. This species utilizes open, shrubby areas within SOS barrens. The male moths fly in May. Females ascend shrub and tree trunks and emit pheromone, waiting for males to find them by scent. Pupae overwinter and larvae are fully grown by July. On Camp Edwards, this moth is associated with PPSO and SOS and is restricted to open canopy scrub oak habitat including that maintained by fire.

2.9.14 Coastal Swamp Metarranthis

The Coastal Swamp Metarranthis (*Metarranthis pilosaria*) is listed as a Species of Special Concern by NHESP. This species utilizes acidic peatlands located in pine barrens habitat and ericaceous coastal heathlands. Although this species primarily inhabits ericaceous wetlands, it also utilizes blueberry thicket patches within early successional scrub oak thickets. The larvae of this species feed on various ericaceous plants. Larvae pupate in September, overwinter, and emerge as moths in June and July. Eggs hatch in early summer. On Camp Edwards, this moth is associated with PPSO and SOS. As it is generally found in higher numbers in wetlands, the presence of this moth in xeric heathland and shrubland habitats may possibly represent an alternate use of sub-optimal habitat.

2.9.15 Water-willow Stem Borer

The Water-willow Stem Borer (*Papaipema sulphurata*) is listed as Threatened by NHESP. This species inhabits shallow portions of coastal plain wetlands. The larvae of this species feed in the stems of water-willow (*Decodon verticillatus*), and the adults are seldom found far from wetlands containing this hostplant. Water-willow is found in only a few wetlands at Camp Edwards. Adult moths fly in September and early October.

2.9.16 Pink Sallow Moth

The Pink Sallow Moth (*Psectraglaea carnosae*) is listed as a Species of Special Concern by NHESP. This species inhabits PPSO, heathlands with ericaceous plants. Adult moths fly in late September and October. Eggs overwinter and hatch in the spring. Larvae feed on lowbush blueberries and *Prunus* species.

2.9.17 Pine Barrens Speranza

The Pine Barrens Speranza (*Speranza exonerata*) is listed as a Species of Special Concern by NHESP. This species utilizes PPSO barrens on sandplains and rocky summits and ridges. The moths fly from mid-June through mid-July, with stragglers into late July. Eggs overwinter and hatch in early spring. Larvae feed on catkins and new leaves of scrub oak and completing development and pupating by early June. On Camp Edwards, this moth is associated with PPSO and SOS and is considered an obligate on open scrub oak habitat maintained by fire.

2.9.18 Pine Barrens Zale

The Pine Barrens Zale (*Zale lunifera*) is listed as a Species of Special Concern by NHESP. This species utilizes early successional scrub oak thickets and mid successional PPSO woodlands. The larvae of this species feed on scrub oak. Larvae pupate in July and August, overwinter, and emerge as moths in late May and early June. On Camp Edwards, this moth is associated with PPSO and SOS and found in both open and pitch pine canopy habitats dominated by scrub oak.

2.10 State-listed Beetles

The Purple Tiger Beetle (*Cincindela purpurea*) is listed as a Species of Special Concern and is the only State-listed beetle identified at or near Camp Edwards. This species inhabits areas with sandplain soils with patchy vegetation like sandplain grasslands and heathlands and in PPSO. Adults emerge in late summer and early autumn. Tiger beetles were surveyed in 2017 and no Purple Tiger Beetles were encountered.

2.11 State-listed Crustaceans

The Agassiz's Clam Shrimp (*Eulimnadia agassizii*) is listed as Endangered by NHESP. This species has been found in ephemeral pools including pools in dirt roads at Camp Edwards and appears primarily in the late spring and early summer following large storm events. Adults begin to die as the shallow pools dry up. Eggs can remain dormant in this condition until conditions resume, even years later.

Extensive work has been done at Camp Edwards over the last four years to document the species occurrence and natural history on and off site. Indications are that the species is much more widespread and stable than previously known. It is extremely challenging to survey being both ephemeral and seemingly going through boom and bust cycles. While vernal pools are intensively monitored in New England, the spring amphibian monitoring is unlikely to observe late season invertebrates.

2.12 State-listed Mammals

The only State-listed mammals at Camp Edwards are bats. There are potentially four species of State-listed bats documented in or near the Project area. However, none of them have suitable roosting habitat within the Project area which is dominated by very dense pine-shrub habitat. Intensive acoustic monitoring has suggested activity is limited to edge foraging. A combination of year-round acoustic monitoring and mist netting has found bat activity to be focused outside of the Project area in a limited area of high activity east of the Project area along the eastern boundary of Camp Edwards and predominantly in surrounding neighborhoods. Surveys in 2019 are ongoing.

Based on extensive coordination with the NHESP and the USFWS, impacts to bats (i.e., impacts to roosts and hibernacula) will not occur as a result of the MPMG Range Project, therefore, not take of any bat species will occur.

2.12.1 Northern Long-Eared Bat

The Northern Long-Eared Bat (NLEB) (*Myotis septentrionalis*) is listed as Endangered by NHESP and Threatened by the USFWS. The NLEB and its habitat were identified at Camp Edwards as two roost sites were confirmed. The NLEB have had their population's devastated by White Nose Syndrome throughout the eastern U.S. In the U.S. the bat's range includes much of the eastern and north central portions of the country. They hibernate in various sized caved or mines with constant temperatures and are found most often in small crevices or cracks though they have been using basements and crawl spaces in southern New England. During the summer months, NLEB, roots singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags. U.S. colonies have been reduced by greater than 90 percent due to White Nose Syndrome. Intensive survey efforts have been conducted at the Camp Edwards and will continue to identify the bat's habitat use to improve conservation efforts and minimize impacts at training areas. The NLEB has been confirmed through mist netting and telemetry studies which found that nearly all roost sites occurring in or on buildings and the majority of those being off-site (e.g., houses).

2.12.2 Small-footed Myotis

The small-footed myotis (*Myotis leibii*) is listed as Endangered by NHESP. This species can be found in buildings in warmer months and caves and mines in colder months. They can be found in higher elevations amongst hemlock, spruce and white cedar.

2.12.3 Little Brown Bat

The little brown bat (*Myotis lucifugus*) is listed as Endangered by NHESP. This species roots in caves, buildings, trees, under rocks, and woodpiles. They can be found foraging in the evening along roads and

trails in forest-dominated landscapes. Populations have been impacted by the White Nose Syndrome. Bat surveys in 2019 are expected to encounter low levels of Little Brown Bats.

2.12.4 Tri-colored Bat

The tri-colored bat (*Perimyotis subflavus*) is listed as Endangered by NHESP. This bat can be found in barns, buildings, caves, and trees. They typically occupy deciduous trees in the warmer months. Maternity colonies are found in dead needles of living pine trees. They avoid deep woods and open fields and prefer partly open country with large trees, over water courses, and at forest-field edges. Populations have been impacted by the White Nose Syndrome.

2.13 State-listed Rare Plants

The following State-listed plants have been identified by MAARNG and NHESP at Camp Edwards.

2.13.1 Ovate Spike-sedge

The Ovate Spike-sedge (*Eleocharis ovata*) is listed as Endangered by NHESP. The Ovate Spike-sedge is a low-growing, tufted, annual herb with straight, ascending, deep-green stems. The fruit of the Ovate Spike-sedge matures in mid to late summer and is olive to light brown to dark brown in color. The Ovate Spike-sedge can be found growing on sandy freshwater margins, including lake, pond and river shores. It is unlikely to be found within the MPMG Range due to the lack of wetland habitats present.

2.13.2 Weak Rush

The Weak Rush (*Juncus debilis*) is listed as Endangered by NHESP. The Weak Rush is a small, perennial herb that produces erect tufts of round stems, with round maroon or dark green leaves. The small, brownish flowers of this plant are produced in clusters near the tops of the stems and the fruit of this plant matures in mid to late summer. The Weak Rush has typically been found in open, unshaded habitat in seasonally wet, sandy, peaty or mucky substrate along the coastal plain, especially in boggy depressions that are inundated in spring but may dry out later in the season. It is unlikely to be found within the MPMG Range due to the lack of wetland habitats present. An effort to relocate the one known/reported population in 2016 was unsuccessful.

2.13.3 Bayard's Green Adder's Mouth

Bayard's Green Adder's-mouth (*Malaxis bayardii*) is listed as Endangered by NHESP. The Bayard's Green Adder's-mouth is a small, pale green orchid that can be found in dry open woodlands, pine barrens, and similar habitats. This orchid has up to 70 tiny flowers which are visible in July and August, and typically one bright green stem leaf. Bayard's Green Adder's-mouth inhabits open to partially shaded sites of disturbance-dependent habitats, such as grassland sandplains, PPSO, and dry open woodland edges that contain dry sandy soil or clay soil. It has not been identified at Camp Edwards, but could occur based on nearby observations and suitable habitat.

2.13.4 Adder's Tongue Fern

Adder's Tongue Fern (*Ophioglossum pusillum*) is listed as Threatened by NHESP. Adder's Tongue Fern is a small, terrestrial fern, consisting of a single green stalk bearing a simple leaf and a fertile spike. This fern is typically present in June and generally is associated with wet habitats. However, at Camp Edwards, this species is closely tied to dry frost bottom kettle holes and is typically found with *Triosteum perfoliatum*. The two northern lanes will be on the edge of the large kettle hole with suitable habitat, but unsurveyed as it is in

the Impact Area. It is unlikely to be found within the MPMG Range due to the lack of wetland habitats present.

2.13.5 Torrey's Beak Sedge

Torrey's Beak-sedge (*Rhynchospora torreyana*) is listed as Endangered by NHESP. Torrey's Beak-sedge is a tufted perennial sedge with slender leaves and a chestnut-colored inflorescence with several stems arising from clumps of very slender basal leaves. The dark brown fruits are small and generally present from August to early October. Torrey's Beak-sedge typically grows along the seasonally wet, sandy to peaty soils of low-nutrient, acidic wetlands that are primarily located along coastal plain pond shores. It prefers full sun and does not compete well with shrubs; therefore, fluctuating water levels are important for the persistence of this species at a site. It is unlikely to be found within the MPMG Range due to the lack of wetland habitats present. However, at JBCC, the only known location of this species (not on Camp Edwards) is a frost bottom kettle hole. While not found during intensive annual surveys on Camp Edwards the two northern lanes of the MPMG Range are adjacent to a large frost bottom that is unsurveyed as it is in the Impact Area.

2.13.6 Papillose Nut Sedge

Papillose Nut-sedge (*Scleria pauciflora*) is listed as Endangered by NHESP. Papillose Nut-sedge is a slender, perennial species in the Sedge family which has stems that arise from short, branched, knotty rhizomes with fibrous roots. The plant forms small clumps which develop into numerous bluish-green leaves and flowering culms which appear in June. The fruits of this plant are small, white and mature in mid to late summer. Papillose Nut-sedge inhabits the dry to moist sandy soils of maritime grasslands, pine and oak barrens, disturbed forest openings, and powerline rights-of-way. While not yet identified on Camp Edwards, it is found adjacent to JBCC and suitable habitat does occur on site.

2.13.7 Broad Tinker's Weed

Broad Tinker's-weed (*Triosteum perfoliatum*) is listed as Endangered by NHESP. Broad Tinker's-weed is a coarse herb which grows up to four feet tall. Purplish brown or greenish flowers grow in groups of one to four from each axil and the slight fleshy fruit is greenish orange to orange-red and visible from midsummer to fall. Broad Tinker's-weed is generally found in dry, open woods or thickets, usually avoiding dense shade. At Camp Edwards, it is closely tied to frost bottom kettle holes. The northern lanes of the MPMG Range will be adjacent to a frost bottom that is unsurveyed as it is in the Impact Area.

2.14 Previous Natural Resources Surveys

The following is a partial list of Camp Edwards specific natural resources surveys which have been performed to date with additional surveys proposed being for 2019 and beyond. In the past, researchers affiliated with state universities, non-profit organizations, as well as State and Federal environmental agencies have conducted surveys and research projects on Camp Edwards, either as contractors or independently. Based on all the studies performed to date, MAARNG has developed a comprehensive list of flora and fauna including state-listed species. All monitoring associated with this CMP Plan will be reported to the State annually including actions taken, action proposed, monitoring of resources, and assessment of management and treatment regimes. Accomplishments are presented in the State of the Reservation Report annually. Proposed monitoring and research is discussed in **Section 5.3**.

Table 2-5: Completed Surveys at Camp Edwards

Taxon	Species	Study/Survey	Location	Comments
Birds	Eastern Whip-poor-will	Monitoring and Surveys		2010 to present
Birds	Eastern Whip-poor-will	Nesting telemetry study		2002-2009
Birds	Grassland Birds			Vermont Center for EcoStudies, 2015-2017
Birds	Grassland Birds	point counts		1985 to present
Birds	Bird Surveys	bird monitoring point counts	Training Area and Grassland and Site-wide	1994 to present
Birds	Owls			2015-2016
Reptiles and Amphibians	Eastern Box Turtle	home range studies and monitoring		1999-2009
Reptiles and Amphibians	Eastern Box Turtle	Initial dog assisted surveys in MPMG Range and mitigation areas		2019
Reptiles and Amphibians	Snakes	Amphibian and vernal pool monitoring		Annual
Reptiles and Amphibians	State watch-list snake	fungal disease study		partner on Legacy project
Reptiles and Amphibians	Eastern spadefoot	surveys (Capture, tagging, etc.)		
Reptiles and Amphibians	Eastern spadefoot	Acoustic call classifier		partner with Mass Audubon
Reptiles and Amphibians	Eastern spadefoot	Passive acoustic survey of potential sites 216-2018		
Reptiles and Amphibians	Dragonflies and damselflies	Drift fence surveys		2002-2010 (pitfall traps)
Odonates	Dragonflies and damselflies			1995 to 2014
Moths and Butterflies	Frosted Elfin	Survey	Cantonment Area	2017 to present
Moths and Butterflies	Moths and Butterflies	Two year study	Camp Edwards	Mello, 2017
Moths and Butterflies	Diurnal species	Opportunistic surveys of diurnal moths and butterflies		2010-present
Beetles	Southern Pine beetle	trapping		MA Southern Pine Beetle Response Plan
Crustacea	Agassiz's Clam Shrimp	intensive surveys and monitoring	On-site	2015-2019
Crustacea	Agassiz's Clam Shrimp	regional surveys	Off-site	2018
Mammals	Bats	Intensive acoustic monitoring	site wide	2014 to present
Mammals	Bats	database for acoustic data		
Mammals	Bats	mist netting		1999, 2000, 2001, 2015, 2016
Mammals	New England Cottontails	Trapping and telemetry	on and off site	2009-2018
Mammals	New England Cottontails	research and monitoring		2006 to present
Mammals	New England Cottontails	pellet sampling for DNA analysis	Regional and site specific	
Mammals	New England Cottontails	Diet analysis of pellets		
State-listed Plants	Rare plants	Annual Survey		
State-listed Plants		Vegetation Management Plan	Frost Bottoms	Invasive species treatment
Invasive plants		habitat management/restoration areas	In-house	
Invasive Plants		Invasive plant surveys and mapping		
Watch-listed Plants	butterfly milkweed, wild lupine, etc.	Seed collection, establishment of satellite populations		
Watch-listed Plants		growing watchlist plant species from CE		
Bees	General			Bristol Agricultural High School
Bees	<i>Anthophora walshii</i>			2013, 2014
Bumblebees				2019
				2017

DRAFT

3.0 Proposed Multipurpose Machine Gun (MPMG) Range

3.1 Project Description

The MPMG Range is proposed to be constructed partially within the existing KD Range (see **Figure 3-1**), which was previously used for past ranges and training and encompasses approximately 38.5 acres. The proposed MPMG Range improvements would require approximately 160.5 acres of additional land to accommodate the MPMG Range Footprint of 199.0 acres, and the ROCA which includes a Range Control Tower, Ammunition Storage Building, Covered Bleachers, and other support features. The core elements of the MPMG Range project includes the construction of an eight lane MPMG Range with six lanes 800 meters long with a width of 25 meters at the firing line and a width of 100 meters at a distance of 800 meters. The two middle lanes (Lanes 5 and 6) will extend an additional 700 meters to a distance of 1,500 meters long to accommodate .50 caliber rifles with a width of 330 meters at the northernmost end. The entire project has an approximate 199.0 acre construction and maintenance footprint. An additional 10.0 acres of firebreaks are proposed specific to the MPMG Range, therefore, the Total Project Footprint is 209.0 acres. Site photographs are provided in **Appendix A** and in **Figure 3-1**.

The existing KD Range is comprised of 38.5 acres of which 36.0 acres is MG from previous mitigation for rare species impacts as described in **Section 3.2.3**, and 2.5 acres of which is comprised of the existing ROCA. See **Table 3-2** for summary of acreages.



Figure 3.1: Existing KD Range looking North

The proposed design already represents minimization from the standard MPMG Range design guide which calls for 10-800 meter lanes and 4-1,500 meter extended lanes. The Preferred Alternative has eight-800 meter lanes and two-1,500 meter lanes which is approximately 85 acres less in footprint than the standard design. A more detailed alternatives analysis is provided in **Section 3.5**.

The existing KD Range is not presently used for live fire training but is used for other training operations like drone flying. The MPMG Range is a programmed FY 2020 Military Construction (MILCON) project. The Project will be phased over the next few years with the 800 meter range being constructed first. Once funded, the additional 700m will be constructed for the two .50 caliber lanes to a length of 1,500 meters. Prior to construction, the area must be managed for UXO removal before any work can be done. Implementation of the firebreak construction is anticipated for 2021-2025.

3.1.1 Range Floor and Firing Lanes

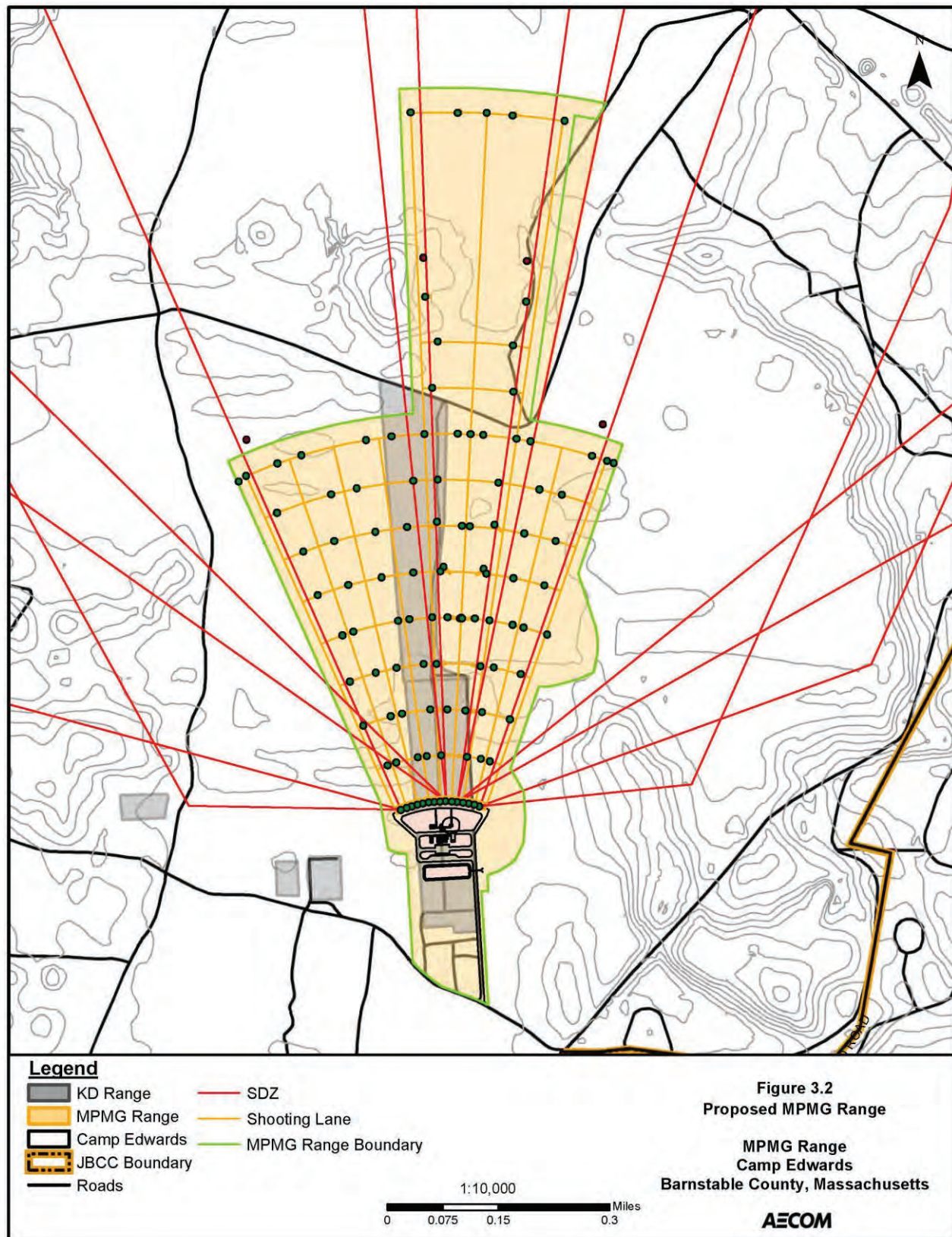
The firing line of the MPMG Range is proposed approximately 100 meters north of where the southernmost KD Range firing line is located. Stationary Infantry Targets (SITs) would be emplaced at approximately 100-meter intervals from the firing position at 100, 200, and 300 meters from the firing line. Moving Infantry Targets (MITs) would be emplaced in the center lanes between 100 and 600 meters. Widened Stationary Infantry Targets (WSITs) and Double Target Arms (DTAs) would be emplaced at between 400 and 800 meters. Individual Movement Techniques (IMTs) would be emplaced between 800 and 900 meters. Stationary Armor Targets (SATs) would be emplaced between 1,000 and 1,500 meters from the firing line within the two extended lanes. This range configuration is shown on **Figure 3-2**. Design plans are also provided in **Appendix B**.

3.1.2 Range Operations and Control Areas

The ROCA is the center for overall control and operation of the range, training exercises, administrative services, and support facilities. The ROCA includes the area for target control, range safety, and training evaluation, generally the Range Control Tower. There is an area for range maintenance, centered at the Operations and Storage Facility. There is an area for pre- and post-training instruction, centered at the Classroom or After-Action Review (AAR) and the Bleacher Enclosure. Ranges also have areas for non-training support including the Covered Mess Shelter. ROCA facilities that directly support the live-fire function of the range include the Ammunition Breakdown Building, the unit staging area, and the vehicle instrumentation dock.

3.1.3 Surface Danger Zones

SDZs are required for all ranges, but are administrative areas closures. The MPMG Range SDZ area is 5,197 acres. No work is proposed within the SDZs but these are maintained and controlled for the safety of personnel on Camp Edwards. The SDZ is a safety zone representing the area of potential hazard (accounting for straight fire and ricochet) based on the projectiles fired and weapon system used. The SDZ has specific dimensions for the expected caliber or the weapon being fired, so that all projectile fragments are contained in this area. The existing KD Range is not presently used for live fire training but is used for other training operations like UAV flying.



3.1.4 Firebreaks

An additional 10.0 acres of strategic firebreaks are proposed to be constructed along the exterior of the MPMG Range. This work will be performed as part of the firebreak project involving the construction and maintenance of firebreaks throughout Camp Edwards to reduce the risk of a large wildfire and assist in managing the fighting of fires. Firebreak and fuels management involves the alteration of fuels to reduce the likelihood of a fire starting or to reduce its effects if one does start. These techniques may improve access for fire apparatus, increase water resources available on-site, adjust target placement, and provide buffer or safety zones. Range use at Camp Edwards introduces significant wildfire hazard into unmanaged and high risk fuels conditions through the use of tracers and ammunition. Tracers are forms of ammunition that include a small pyrotechnic charge which makes the trajectory of the ammunition visible in the day time and night time.

The 10 acres of impact is primarily from the construction of new roadways or expansion of existing roadways. This equates to roughly 4.5 miles of roadway relative to the MPMG Range fire protection work. The 10 acres are included in the take calculations for the MPMG Range impacts. In addition, there will be 77 acres of new mowed roadway edge associated with the new or expanded roadways which will not be considered as a take by NHESP and is further described in **Section 6.1.2.**

3.1.5 Lighting

Temporary and permanent lighting proposed for the Project would be designed and installed so as not to interfere with State-listed species, specifically moths. This range would be available for limited night fire operations in accordance with existing Camp Edwards Range Regulations. Lighting would be designed to minimize the potential for lighting adjacent off-range areas and contained within the confines of the MPMG Range by directing light onto the range and minimize uplighting. Sodium lights or lights within the yellow/red range (3000 Kelvin) are proposed as moths are more attracted to lights in the blue range (i.e., mercury vapor lights) which will be avoided. Additional light impact reduction will be based on behavior controls in range use SOPs (e.g., lights off when range not in use). Control of the flood lighting would be via manual switching which is typically located at the control building and would not be used during live-fire exercises. Flood lighting would be used for pre- and post- live firing operations to assist with set up and breakdown activities. In addition to the flood lighting, the site will also require red night lighting that is used to provide low level lighting for night live-fire exercises when the Soldiers are using night vision equipment.

3.2 Existing Conditions

The habitat surrounding the KD Range and the MPMG Range Footprint can be described as being primarily PPOF with scrub oak understory, with pockets of PPSO, SOS, and MG as shown on **Figure 3-3** and summarized in **Table 3-1**; habitat that could support rare moths. The Eastern Box Turtle occurs throughout this area as does the Eastern Whip-poor-will. However, due to ordnance concerns from previous site uses the habitat has not been managed and is not in an overall good condition for any of the State-listed species based upon understory and overstory conditions.

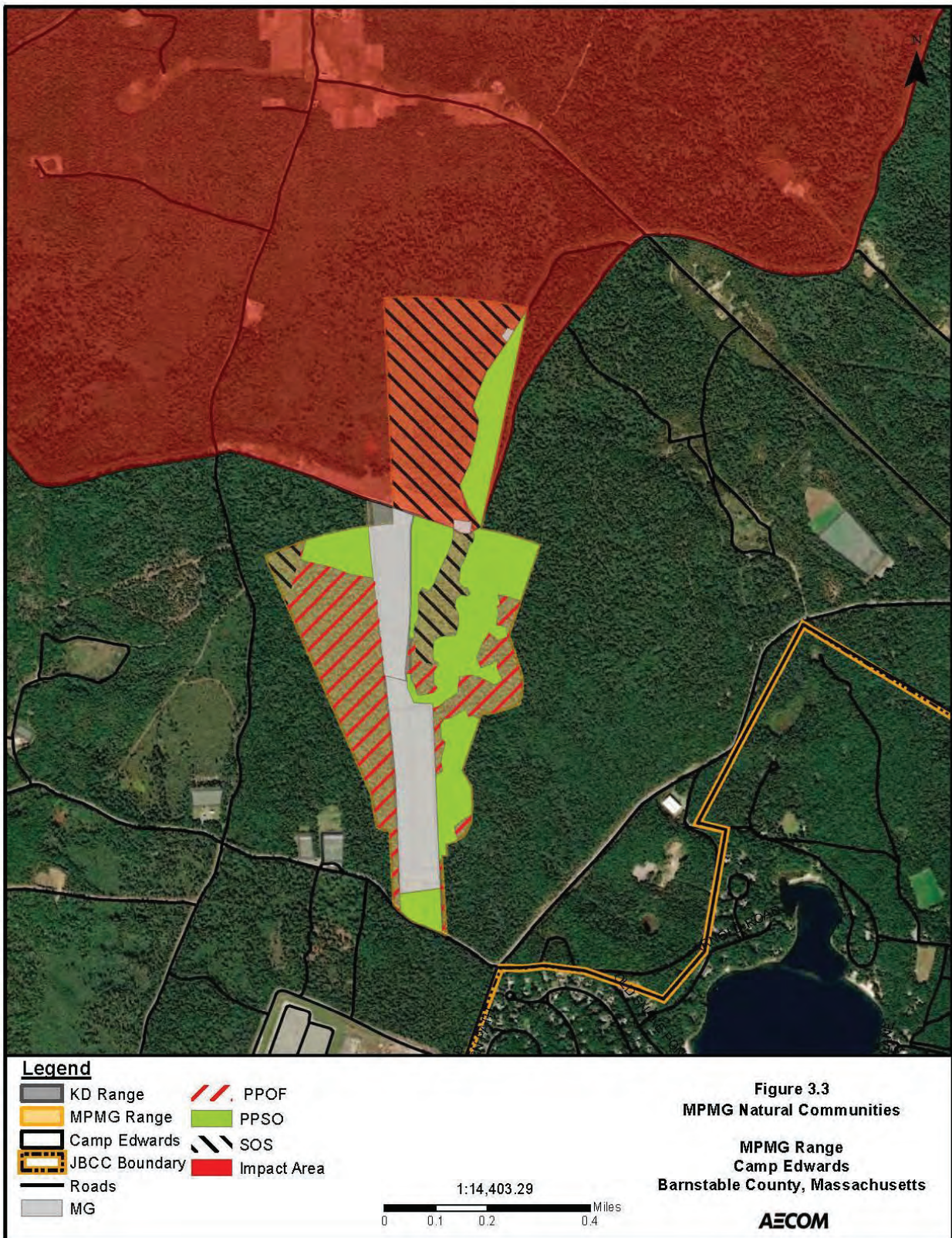


Table 3-1: Proposed MPMG Range Footprint by Cover Type

Cover Type	MPMG Range Footprint	MPMG Range-Specific Firebreak Footprint	Total Project Footprint
PPOF	47.0	4.0	51.0
PPSO	51.0	3.0	54.0
SOS	62.5	3.0	65.5
MG	36.0	--	36.0
ROCA	2.5	-	2.5
Total Acres	199.0	10.0	209.0

3.2.1 PPOF/PPSO

The PPOF and PPSO at the Site is densely overgrown with very high tree density and an extremely dense and tall understory shrub layer of heath and scrub oak. Use of site by Eastern Box Turtles and Eastern Whip-poor-will has been confirmed through surveys. The site is or could be (with management) suitable habitat for most of the State-listed moths, but is generally in an overgrown and currently unsuitable condition. NLEB have been recorded acoustically but mist netting at nearby locations was unsuccessful and acoustic results indicate low levels of foraging activity only. The Project will result in the removal of approximately 98.0 acres of moderate quality habitat (51.0 acres of PPOF, 54.0 acres of PPSO) habitat in the MPMG Range Footprint and 7.0 acres of firebreaks for a total impact of 105.0 acres within this habitat.

3.2.2 SOS

The SOS at the Site is being encroached upon by the growth of pitch pine. Without management, the SOS would continue to convert to a different cover type with the loss of the rare SOS habitat (**See Figure 3-4**). No management is presently being performed on the SOS in the Impact Area being lost due to UXO issues. As a result, there is no opportunity to manage this resource for ecosystem improvement and expansion opportunities. Use of the SOS in the Impact Area within the Project Footprint by rare species has not been surveyed due to UXO issues. It is presumed that this area is habitat for pine barrens moths, the Eastern Whip-poor-will, and the Eastern Box Turtle. The Project will result in the impact of approximately 62.5 acres of SOS for the MPMG Range and 3.0 acres of firebreaks for a total impact of 65.5 acres within this habitat.

3.2.3 MG

The MG at the Site is in overall poor condition. The existing 36.0 acres of MG is isolated from other MG habitat and therefore has limited impact ecologically. This cover type is presumed to have habitat value to the Eastern Whip-poor-will, and the Eastern Box Turtle. The NLEB has been documented foraging on the edges of this habitat. The Project will result in the impact of 36.0 acres of MG for the MPMG Range Footprint a total impact of 36.0 acres within this habitat.

3.2.4 Previous Mitigation at KD Range

Prior to and/or coincident with rare species impacts associated with the Former Guard Dog Site area (3600 area – Tactical Training Base (TTB) Helicopter Landing Zone (LZ), the MAARNG designated open areas as grassland mitigation at the KD Range (NHESP Tracking #07-22766). The loss of grassland habitat found in the 25-acre 3600 area was mitigated through the restoration of 36.0 acres on the KD Range which had been mowed occasionally, stimulating warm season grasses and forbs. However, the restored area has not

supported (nor did the TTB LZ area location) State-listed grassland birds. The original filing with NHESP indicated that this area may be used for future training needs and mitigation would be revisited as needed.



Figure 3.4: Pine Encroachment on Scrub Oak Depression (KD Range)

3.3 Proposed Project Impacts

The following section describes the Project impacts to State-listed species including rare moths and Eastern Box Turtle. In addition, this section describes avoidance and minimization efforts to reduce impacts to these and other species. Mitigation efforts are described in **Section 5.0**. The MPMG Range Footprint is 199.0 which includes the 38.5 acres of the KD Range. In addition to the MPMG Range, an additional 10.0 acres of range specific firebreaks are proposed for a Total Project Footprint of 209.0 acres. Of the 209.0 acres, approximately 2.5 acres of the southern part of the KD Range the houses the previously existing ROCA is not considered as rare species habitat. Based on the presence of PPOF, PPSO, SOS, and MG, it is presumed that all remaining acreage within the Total Project Footprint is considered as rare species habitat. In order to determine the mitigation to impacts of rare species for the MPMG Range Project, the following steps were taken. These steps will also be used for determining rare species impacts for future projects.

- Determine if project can be designed to avoid or minimize impacts to rare species habitat
- Determine vegetative communities impacts by acreage within project footprint
- Determine which State-listed species will be impacted based on vegetative community
- Apply mitigation ratios (as described in **Section 1.4**) under MESA based on State ranking to determine required mitigation acreage
- Assess mitigation methodologies to required mitigation acreage for habitat improvement
- Identify land preservation or mitigation parcels
- Identify other mitigation or minimization actions

Table 3-2 provides proposed impacts by of the MPMG Range including required and proposed mitigation.

Table 3-2: MPMG Range Impacts and Mitigation

Impacts	
199.0	MPMG Range Footprint
<u>10.0</u>	<u>MPMG Range-Specific Firebreak Footprint</u>
209.0	Total Project Footprint
209.0	Total Project Footprint
<u>2.5</u>	<u>ROCA Footprint</u>
206.5	MPMG Range Take Footprint
206.5	Total MPMG Range Take Footprint
<u>36.0</u>	<u>MPMG Range Managed Grassland Take Footprint</u>
170.5	MPMG Range Pine Barrens Take Footprint
Mitigation <i>(numbers have been rounded to nearest whole number)</i>	
171	MPMG Range Pine Barrens Take Footprint
<u>2:1</u>	<u>2:1 mitigation ratio for Pine Barrens</u>
341	Pine Barrens Mitigation Required
341	Pine Barrens Mitigation Required
<u>133</u>	<u>Land Preservation Tract 5</u>
208	Remaining Mitigation Acres Needed
208	Remaining Mitigation Acres Needed
<u>2:1</u>	<u>Double Mitigation Acres Needed proposed by MAARNG (total of 4:1 mitigation ratio)</u>
416	Acres to be Managed
125	30% of 416 (Standard #1 Mechanical Forestry)
<u>291</u>	<u>70% of 416 (Standard #2 Prescribed Burn)</u>
416	Acres to be managed (at 4:1 ratio)
416	Acres to be Managed (Standard #3 Continued Management and Maintenance)
<u>2:1</u>	<u>Additional Mitigation proposed</u>
832	Acres to be Managed (at 8:1 ratio)

Table 3-3: Sierra Range Expansion Impacts by Guild

Guild Associations	Mitigation Required Per MESA	Acres of Impact	Total Mitigation Acreage Required
Pine Barrens Guild	2:1 (Threatened)	171	342
Managed Grasslands	1:1 (previous mitigation)	36	36
Eastern Box Turtle	1.5:1 (Species of Special Concern)	207 ¹	310

¹ Pine Barrens Guild + Managed Grasslands

3.4 Proposed Project Mitigation

Impacts from the MPMG Range will be mitigated through a combination of mitigation methods which are described more fully in **Section 5.0**. Mitigation for the MPMG Range has already occurred during 2019 and additional actions will occur in subsequent years. The Project consists of significant mitigation measures related to impacts to the Site's rare species habitat. To address potential impacts to the Eastern Box Turtle, the Whip-poor-will, rare moth and grassland species, MAARNG proposes a number of mitigation strategies including land transfers, land preservation, and land management. The following table provide a summary of the different mitigation actions including acreages based on the five mitigation standards and land preservation actions.

The following table provides the proposed actions and mitigation standards which have been completed or are proposed to be completed as part of the MPMG Range mitigation. Acreages for completed actions show more than needed and account for mitigation credits that can be applied to other projects as described in **Section 4.0**. Also, annual projects may have lower or higher acreage in a certain year due to unforeseen circumstances like weather but are expected to balance out. As shown in **Table 3-3**, 310 acres of land preservation will be set aside either through land transfer (Tract 5) or protection of FCRA units. **Table 3-4** provides an estimated timeline for construction of the MPMG Range and associated mitigation actions.

Table 3-4: MPMG Range Mitigation

Mitigation Standard	Location	2019	2020	2021	Other years	Acres of Mitigation	
						Target	Provided
Land Preservation	Tract 5	133				310	310
Land Preservation	Primary Forest Canopy Reserve Area - Northern Unit (for Eastern Box Turtle)	177					
Total Land Preservation		310				310	310
#1 Mechanical Forestry	Pine Barrens Mitigation Focal Areas - Western Unit	50				125 (30% of 416)	125
#1 Mechanical Forestry	Pine Barrens Mitigation Focal Areas - Western Unit		40				
#1 Mechanical Forestry	Pine Barrens Mitigation Focal Areas (TBD)			35			
#2 Prescribed Burn	Pine Barrens Mitigation Focal Areas - Northern Unit	47				291 (70% of 416)	291
#2 Prescribed Burn	Pine Barrens Mitigation Focal Areas - Western Unit (Total burn = 399, remainder 145 for other projects)	244					
#3 Continued Management	Pine Barrens Mitigation Focal Areas		50	150	216	416	416
Total Pine Barrens Management		341	90	185	216	832	832
#4 Manage Grasslands	Grassland Mitigation Focal Area Parcel H – Unit K fire (Total burn = 42, remaining 6 for other projects)	36				36	36
#4 Manage Grasslands	Grassland Mitigation Focal Area Parcel H – Unit K herbicide						
#4 Manage Grasslands ¹	Grassland Mitigation Focal Area Parcel H – Unit K mowing (Total mow = 80, remaining 44 for other projects)		36				
Total Grasslands Management		36				36	36

¹ Parcel H – Unit K managed for other projects (see **Section 5.1.2**)

3.4.1 Fire Management of MPMG Zone

Fire management within the area around the MPMG Range will be initiated following firebreaks and UXO removal (as needed) (see **Section 6.0**). In addition, as part of the MPMG Range project, there are an additional 1,060 acres of very high priority PPSO and SOS that need to be managed to address severe fuel loading hazard and detrimental pitch pine encroachment impacting habitat quality and potential high hazard condition from MPMG Range development identified as the “MPMG Zone”. The overarching goal for this area is to maintain or improve PPSO and SOS conditions while reducing wildfire hazard from tracers and other ignition sources.

3.4.2 Construction Phase

Mitigation for temporary impacts to the Eastern Box Turtle will include the preparation of a Construction Plan which may include turtle monitors on-site, use of silt fencing to prevent turtles from entering the active portion of the site, monitoring of individual turtles with transmitters, and sweeps prior to construction to see if any turtles are in the area. If any individuals are found, transmitters may be placed on these individuals before they are removed from the site and placed in safer habitat. A more specific Eastern Box Turtle construction plan is in development in support of this CMP.

Table 3-5: MPMG Range Construction and Mitigation Schedule

Action Proposed	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Construction Phase										
Clear and construct primary range area (0-800 meters; ROCA)	x									
Clear UXO and mechanical removal of trees as needed		x	x	x	x	x				
Create shaded fuel breaks with mechanical forestry and UXO clearing			x	x	x					
Construct two lanes north from 800 to 1,500 meters			x	x	x	x				
Introduce fire into MPMG Zone				x						
Mitigation Phase										
Parcel H – Unit K Grassland improvement	x	x	x	x	x	x	x	x		
Frequent prescribed burns in MPMG Zone (2-3 year return interval)			x	x	x	x	x			
Maintenance burns on 3-year interval in MPMG Zone								x	x	x

Best Management Practices will be implemented during the construction phase of the Project in order to minimize impacts to rare species, primarily the Eastern Box Turtle. Components of the construction phase elements include, but are not limited to, employee and construction phase education. Turtle surveys were conducted in 2019 which identified individual turtles and places transmitters on them for future tracking during construction. Once construction begins, oversight with radio-telemetry and additional surveys in advance of tree clearing and ground clearing would occur. It is anticipated that a construction plan will be required as part of the CMP. The following bullets are general BMPs that may be incorporated into this plan.

- Avoidance measures such as turtle sweeps prior to each work day with or without dogs.

- Identify location of individuals that have been outfitted with transmitters.
- Relocate individuals if found within the construction area, depending on the season.
- If hibernating turtles are found, avoid construction in this area until a later date if possible.
- Perform post-construction monitoring including the development of a Turtle Protection Plan see **Appendix E**, presently being drafted).
- Create bare patches and early succession vegetation and ephemeral puddles if possible
- Due to the size of the construction area, use of silt fence to prevent movement of turtles is impractical. Nonetheless, there may be specific area where this can be used (i.e., construction of the ROCA).

3.4.3 Range Floor Management

Once constructed, the range floor would be lightly seeded with a temporary cover crop and a mix of native grasses and forbs. The range floor is presently mowed on an as needed basis. The range floor expansion would be maintained with monthly mowing within the primary range footprint during the training season.

Management of the MPMG Range floor will be the same as other active range floors once constructed. All ranges are managed under specific range plans and Operations, Maintenance, and Monitoring Plan (OMMPs) including BMPs. Regular mowing of the range floor will continue from April through September and will likely be on a monthly basis. The mowing will be performed to minimize flashy fuels (e.g., tall grass), minimize line of site issues, and minimize wildlife impacts by keeping out most nesting birds. The regular mowing will improve the ability of the mowers to observe animals that do occur through visual observations and movement in order to avoid wildlife (e.g., killdeer nests, box turtles). The mowing will also provide a matrix of diverse forbs and low native grasses (e.g., *Pityopsis falcata* and *Deschampsia flexuosa*).

3.5 Alternatives Analysis

The proposed MPMG Range design already represents minimization from the standard MPMG Range design guide which calls for 10-800 meter lanes and 4-1,500 meter extended lanes. The Preferred Alternative as described in this section has eight-800 meter lanes and two-1,500 meter lanes which is approximately 85 acres less in footprint than the standard design. A brief discussion of alternatives no longer under consideration including the reasons for no longer considering these alternatives is also provided.

3.5.1 Alternatives Development (Screening Criteria)

The MAARNG developed and applied the following 13 criteria to screen and evaluate possible alternatives for the Project. The MAARNG identified that a suitable site would meet the following requirements:

1. **Sufficient Land Area:** The proposed range should be located within a MAARNG-controlled training area in Massachusetts of sufficient size to accommodate the proposed range and its associated SDZs.
2. **Reduce Travel Times:** The proposed range should avoid excessive travel times and costs for MAARNG units by minimizing travel in and out of state to meet mission and training requirements.
3. **Minimize Conflicts with Other Existing Ranges and Training Areas:** The proposed range should be sited so as to minimize conflicts with other, existing ranges and other training uses, thereby allowing multiple training ranges and facilities to be utilized concurrently and maximizing training efficiency.
4. **Maximize Co-Location with Existing Impact Areas:** The proposed range should be sited in a way that maximizes the use of existing impact areas. Such a layout would avoid the creation of new

impact areas, avoid consuming additional training land, and reduce the area of potential hazard across Camp Edwards.

5. **Proximity to Existing Utilities:** The proposed range should be sited in close proximity to existing utility services (i.e., electric, telecommunications) in order to minimize construction costs and the need for new or extended utilities.
6. **Proximity to Existing Roads:** The proposed range should be sited in close proximity to existing access roads in order to minimize construction costs and the need for new roads.
7. **Minimize Environmental Concerns:** The proposed range should be sited in an area and layout that would minimize potential effects to existing onsite environmental concerns, including cultural resources and rare species.
8. **Minimize Need for New Ground Disturbance:** The proposed range should be sited in previously disturbed areas to minimize the need for new ground disturbance. This would minimize the potential for new and additional impacts to onsite soils, water, biological, and cultural resources.
9. **Central Location to Minimize Offsite Impacts:** The proposed range should be sited in a central location within a MAARNG-controlled training area in order to minimize potential impacts (i.e., dust, noise, lighting) to off-site areas, including residents and sensitive receptors.
10. **Meet Training Requirements:** The proposed range should allow the MAARNG units to meet all required training provided by a MPMG Range.
11. **Meet ARRM Requirements:** The proposed range should meet current ARRM data requirements regarding the number and types of ranges needed to meet MAARNG training requirements.
12. **Compliance with Regulatory and Planning Requirements:** The proposed range should be in compliance with applicable regulations and planning documents developed.
13. **No Net Loss of Training Capacity:** The proposed range should be constructed to ensure no net loss in the capacity of the MAARNG or Camp Edwards to support the military missions and conduct training operations.

Through application of the first two screening criteria and the evaluation process provided in this section, it became readily apparent to the MAARNG that locating the MPMG Range at Camp Edwards was the only alternative capable of meeting these screening criteria. Therefore, the subsequent 11 screening criteria were used to identify the Project location within Camp Edwards. Where possible, similar training facilities were co-located or grouped to increase usage of common areas and infrastructure components and to further reduce overall development needs and costs. Numerous range and facility layouts and sites within Camp Edwards were investigated and eliminated from further consideration due to conflicts with other training uses, location of existing utilities, lack of overall land area, existing environmental constraints surrounding residential areas, or other limiting factors.

3.5.2 Evaluated Alternatives

The selection standards described above were applied to available alternatives to determine which alternative(s) would fulfill the purpose and need for action including the No Action Alternative to assess any environmental consequences that may occur if the Project is not implemented. The No Action Alternative also provides a baseline against which the Project can be compared. The following discussion provides a description of the Preferred Alternative (Project), the Reduced-Scale Alternative, and the No Action Alternative. Alternatives eliminated from further consideration are described in **Section 3.3**.

The following table summarizes the primary alternatives and associated rare species impacts. The footprints of these alternatives are shown on **Figure 3.1**.

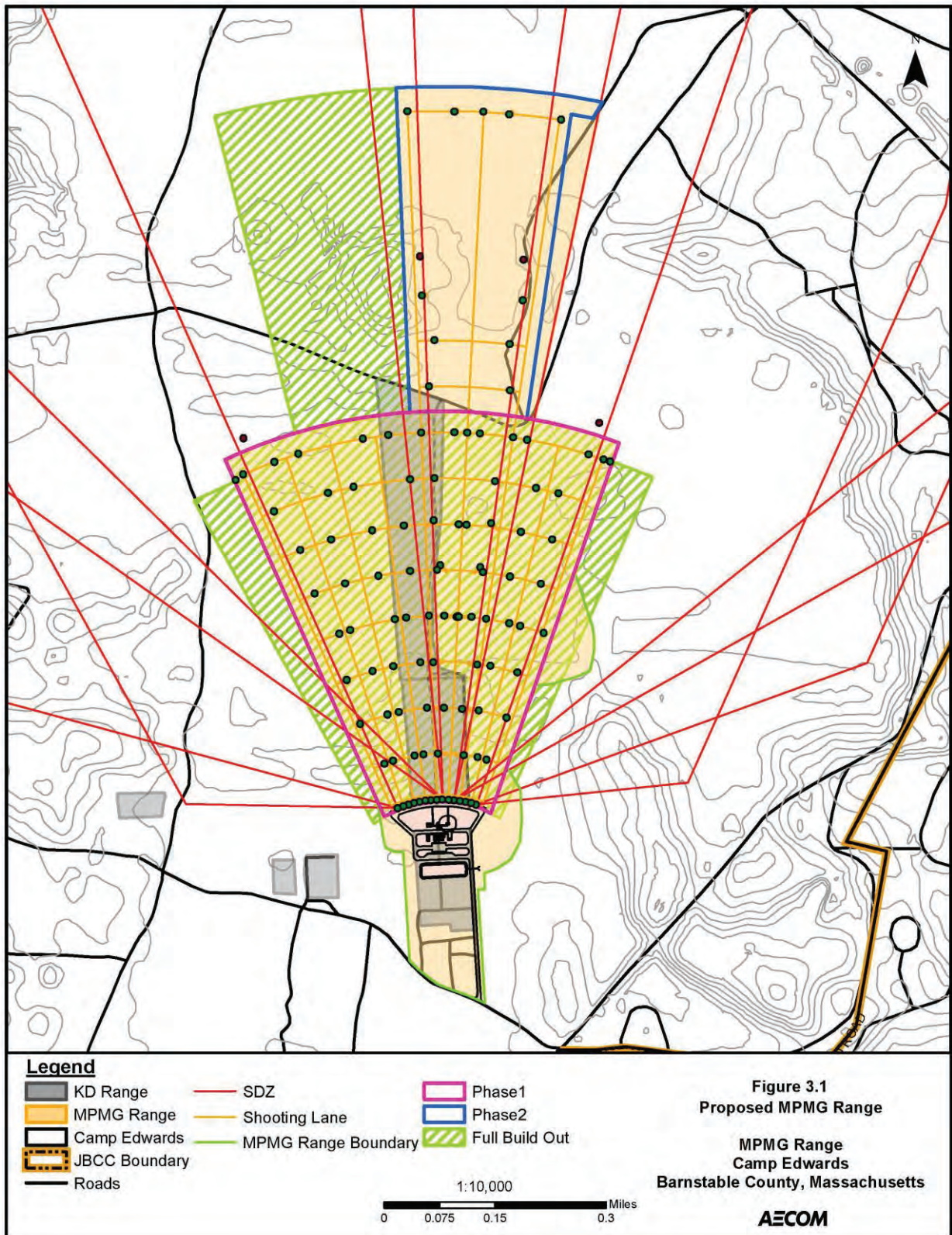


Table 3-6: Impacts by Alternative

Alternative	800 meter lanes	1500 meter lanes	MPMG Range (acres)	Firebreak (acres)	Total Footprint (acres)	Tree clearing (acres)
Full Standard Build	10	4	294	12	306	267.5
Preferred Alternative	8	2	199	10	209	170.5
Reduced-Scale Alternative	8	0	128	10	138	99.5

** Without action, there will be an incremental loss of scrub oak shrubland habitat as described in **Section 4.6.1.3**.

3.5.3 Preferred Alternative

Under the Preferred Alternative (Project), the MPMG Range would be constructed and operated by constructing the MPMG Range at the KD Range with the construction of an eight lane MPMG Range with six lanes 800 meters long with a width of 25 meters at the firing line and a width of 100 meters at a distance of 800 meters. The two middle lanes (Lanes 5 and 6) will extend an additional 700 meters to a distance of 1,500 meters long to accommodate .50 caliber rifles. The construction of the Project will fulfill the assigned mission and training requirements to have a machine gun range available within Massachusetts. The firing line would be located approximately 200 meters north of the existing firing line.

This design already represents minimization from the standard MPMG Range design guide which calls for 10-800 meter lanes and 4-1,500 meter extended lanes. The Preferred Alternative has eight-800 meter lanes and two-1,500 meter lanes which is approximately 85 acres less in footprint than the standard design.

Due to the presence of the Impact Area which is not accessible for habitat management and fire management, the scrub oak shrublands (SOS) have become overgrown. The primary driver behind declines in some of the State-listed moths at Camp Edwards is a lack of fire in SOS and the dramatic incursion of pitch pines into shrublands and frost bottoms after the secession of artillery fires in the Impact Area. The extension of the two 1500m lanes into this habitat will allow for management and enhancement of the SOS which is a globally rare habitat.

This is the MAARNG's Preferred Alternative because it best meets the screening criteria set forth in **Section 3.1**. It effectively provides the best combination of land and resources to sustain quality military training and to maintain and improve MAARNG's readiness posture. This alternative provides many advantages:

- Located within an existing MAARNG facility, and therefore, no land acquisition costs.
- Eliminates the need for MAARNG units to travel out of state to meet mission and training requirements.
- Provides ample space/acreage for the required facilities.
- Located on previously disturbed land.
- Located near existing infrastructure and available utility connections.
- Places noise-producing facilities further away from noise-sensitive areas within and adjacent to Camp Edwards.

3.5.4 Reduced-Scale Alternative

The Reduced-Scale Alternative would implement the Project without the two extended .50 caliber use middle lanes. All lanes would be constructed to a distance of 800 meters. This alternative would allow for

the same usage as the Preferred Alternative with the exception of the M2 machine gun and the M82 sniper rifle which utilize .50 caliber ammunition, thus reducing training capabilities of this range. This alternative would have a footprint of about 128 acres reducing the amount tree clearing by 71 acres. Nonetheless, this alternative would not allow the management of the SOS frost bottom located north of the KD Range maintaining the dramatic incursion of the pitch pines into this significant habitat.

3.5.5 No Action Alternative

Under this alternative, the Project would not be implemented and the existing training activities and operations would continue at the installation. Units would travel to either New York, New Jersey, or Vermont to qualify on the nearest MPMG Range. This alternative would limit the capability of the MAARNG to carry out its assigned mission to provide adequate training facilities, and would not meet the purpose of or need for the Project. The No Action Alternative reflects the status quo and serves as a benchmark against which the effects of the Project (i.e., Preferred Alternative) can be evaluated.

Under the No Action Alternative, Camp Edwards full training potential would continue to be limited and the facilities necessary to accommodate the MAARNG's mission and training requirements would continue to be unavailable in the state. Required training would continue to be conducted by the MAARNG at out-of-state installations where the necessary ranges and training facilities are available. This would continue to cause MAARNG units to risk not meeting readiness requirements, and to use excessive training time for travel, potentially resulting in a decreased ability to meet training proficiency standards.

3.5.6 Alternatives Eliminated from Further Consideration

Alternatives that were eliminated from detailed study are identified along with a brief discussion of the reasons for eliminating them. For purposes of analysis, an alternative was considered "unreasonable" if it would not enable the MAARNG to meet the purpose of and need for the Project. The MAARNG considered the following alternatives:

- Southern Location
- New Training Site Alternative
- New Undisturbed Range Site Alternative
- Different Existing Range Alternative
- Standard-Size MPMG Range

These alternatives were eliminated from further consideration because they did not meet one or more of the screening criteria included in **Section 3.1**.

3.5.6.1 Southern Location Alternative

This alternative would implement the Project at a more southerly location which would shift the entire MPMG Range south approximately 100 meters. The firing line of this alternative would be located approximately 100 meters north of the existing firing line at the KD Range. The construction would fulfill the assigned missions but would result in greater impacts, specifically with noise. This alternative does not meet Screening Criteria #7, #9, and #10.

3.5.6.2 New Training Site Alternative

Acquire a completely new training site for the construction and operation of the proposed MPMG Range, off-site of Camp Edwards. This alternative was examined but eliminated due to the fact that, as a primary component of Base Realignment and Closure (BRAC), the DoD is eliminating and/or consolidating many installations throughout the U.S. and other sufficient land area is not available. As sufficient land area is

available at Camp Edwards to accommodate the required range and training facilities, the MAARNG determined that, in accordance with DoD directives and vision, establishment of a new training site in-state but off-site of Camp Edwards was neither feasible nor necessary. This alternative does not meet Screening Criteria #7 and #8.

3.5.6.3 New Undisturbed Range Alternative

Construct and operate the proposed MPMG Range on a previously undisturbed portion of Camp Edwards. This alternative was examined but eliminated due to the fact that it would likely impact more rare species habitat resulting in more fragmentation of the rare habitats present at Camp Edwards than siting the range at the already cleared KD Range. This alternative does not meet Screening Criteria #3, #4, #7, and #8.

3.5.6.4 Different Existing Range Alternative

Construct and operate the proposed MPMG Range on either the A (Alpha) Range or the existing S (Sierra) Range (or a different range at Camp Edwards). During the range siting process, additional range configurations were evaluated, but were eliminated due to various land constraints and existing usage at other ranges. Given the large amount of land this range requires (including the SDZs) and the available land at Camp Edwards that was already altered but did not have existing uses, siting options were limited for this range. Alpha Range was previously a .50 caliber machine gun range but guns were required to have a restraint bar to prevent the barrel from moving too far to the side. Substantial funding was spent upgrading this range in 2011-2012 to a Modified Record Fire (MRF) Range. In order for this alternative to work, the MRF range would have to be dismantled and constructed elsewhere on the base resulting in additional substantial costs. This alternative does not meet Screening Criteria #3, #7, and #12.

3.5.6.5 Standard-Size MPMG Range Alternative

Construct and operate a standard ten-lane MPMG Range with four extended 1,500 meter lanes in accordance with TC 25-8. Given the existing site and environmental conditions, a reduced-size MPMG Range with only eight lanes is proposed as approved by MILCON. Under the full-build alternative, additional impacts to rare species habitat would be unavoidable. In addition, a larger range would increase noise impacts on adjacent sensitive receptors. This alternative would have an increased footprint by 85 acres to approximately 284 acres. The SDZs for this alternative would reach a wider area and would be located partially off-base. This alternative does not meet Screening Criteria #1, #3, #7, #8, and #12.

3.6 Summary

Pursuant to MESA, a CMP may be issued by NHESP for a project provided that an applicant has provided the following three items:

1. Demonstrates that the activities will result in an insignificant impact to the local populations of the affected species.

The entire MPMG Range Project represents approximately one percent of the land area within Camp Edwards. Impacts to rare species for this Project alone would be insignificant relative to the entire installation as the impacted habitat and species occurrence are not disproportionate at the Project site. Nonetheless, as there are direct impacts to rare species and indirect effects as a result of the operation of the MPMG Range, there is the possibility for greater impacts (i.e., wildland fire). Mitigation will allow MAARNG to manage the resources and operation of the MPMG Range in a way that would result in an insignificant impact to the location populations of the State-listed species. Implementation of this CMP Plan will provide net benefit across much more area of Camp

Edwards and will combine with ongoing site-wide management through the INRMP and additional habitat improvement beyond mitigation to support the MPMG Range use.

2. Adequately assesses alternatives to both temporary and permanent impacts to State-listed species.

Temporary impacts may occur during the construction phase and the times when the MPMG Range will be active. Construction impacts will be mitigated as described above. The majority of wildlife on DoD installations has been found to readily acclimate to military activities and noise, including birds and bats. Long-term use of the range is unlikely to negatively impact or exclude rare species from surrounding habitat as has been seen at active ranges at Camp Edwards (e.g., I Range, S Range). The most likely negative impact is wildlife, which should have reduced likelihood and severity under proposed management.

To minimize potential impacts associated with vegetation removal, land clearing activities would be scheduled to occur, to the extent feasible, outside the breeding season or late in the breeding season, under guidance from the E&RC. Potential long-term, less-than-significant adverse effects to migratory birds could occur during land management operations (e.g., periodic mowing) and training activities. Proposed training activities at the range could have the potential to injure or kill birds or other species, but the likelihood of this occurring during operational activities is considered highly unlikely. Research shows wildlife desensitizes to range use. Eastern Whip-poor-wills on Camp Edwards have been found consistently surrounding I Range and S Range, both of which get much use and traffic. Other temporary potential stressors, may be the use of heavy machinery, vegetation removal, and increased noise. In the event that proposed training activities start a fire on the range with every effort and range design/management to facilitate suppression, the fire would be extinguished in accordance with existing range management rules before it reaches adjacent natural areas.

This range would be available for limited night fire operations in accordance with existing Camp Edwards Range Regulations and permanent light proposed for the Project would be designed and installed so as not to interfere with State-listed species, specifically moths. Lighting would be designed to minimize the potential for lighting adjacent off-range areas and contained within the confines of the MPMG Range as described above.

3. Carries out a Conservation and Management Plan that provides a long-term net benefit to the conservation of the State-listed species affected by the proposed Project which on or off-site permanent habitat protection, management or restoration of State-listed species habitat, and/or conservation research designed to benefit the species affected by a given project.

Section 5.0 of this Application provides the CMP Plan that outlines all of the efforts the MAARNG will be doing to reduce impacts to rare species. This CMP Plan includes specific discussions regarding land transfers, mitigation focal areas, monitoring and research, avoidance and minimization, management efforts, management methods, and associated costs and funding. Additional, these efforts are just a focused component of Site-wide conservation management focused on net benefit and long-term sustainability of rare species and the overall ecosystem. The INRMP and site-wide conservation are closely coordinated with partners and informed by monitoring, and both planned and implemented for long-term sustainability, ecosystem health and net benefit of rare and common flora and fauna.

Specific to the MPMG Range, we have provided calculations of rare species impacts and addressed the mitigation of these impacts through land preservation and management of the habitat found elsewhere at Camp Edwards. As noted, the MAARNG is proposing a 4:1 ratio of

habitat mitigation acreage to impact acreage combined with an additional 4:1 ratio of longer term management/maintenance for an overall ratio of 8:1 for impacts not offset by real estate transfer. MAARNG believes that this CMP Plan and Mitigation Bank outline in this CMP Application provide the long-term net benefit required.

It should be noted that this CMP Plan is more protective of Eastern Whip-poor-wills and Northern Harriers as these two species are also included in the mitigation acreage for the pine barrens impacts although these species tend to utilize other habitats such as grasslands.

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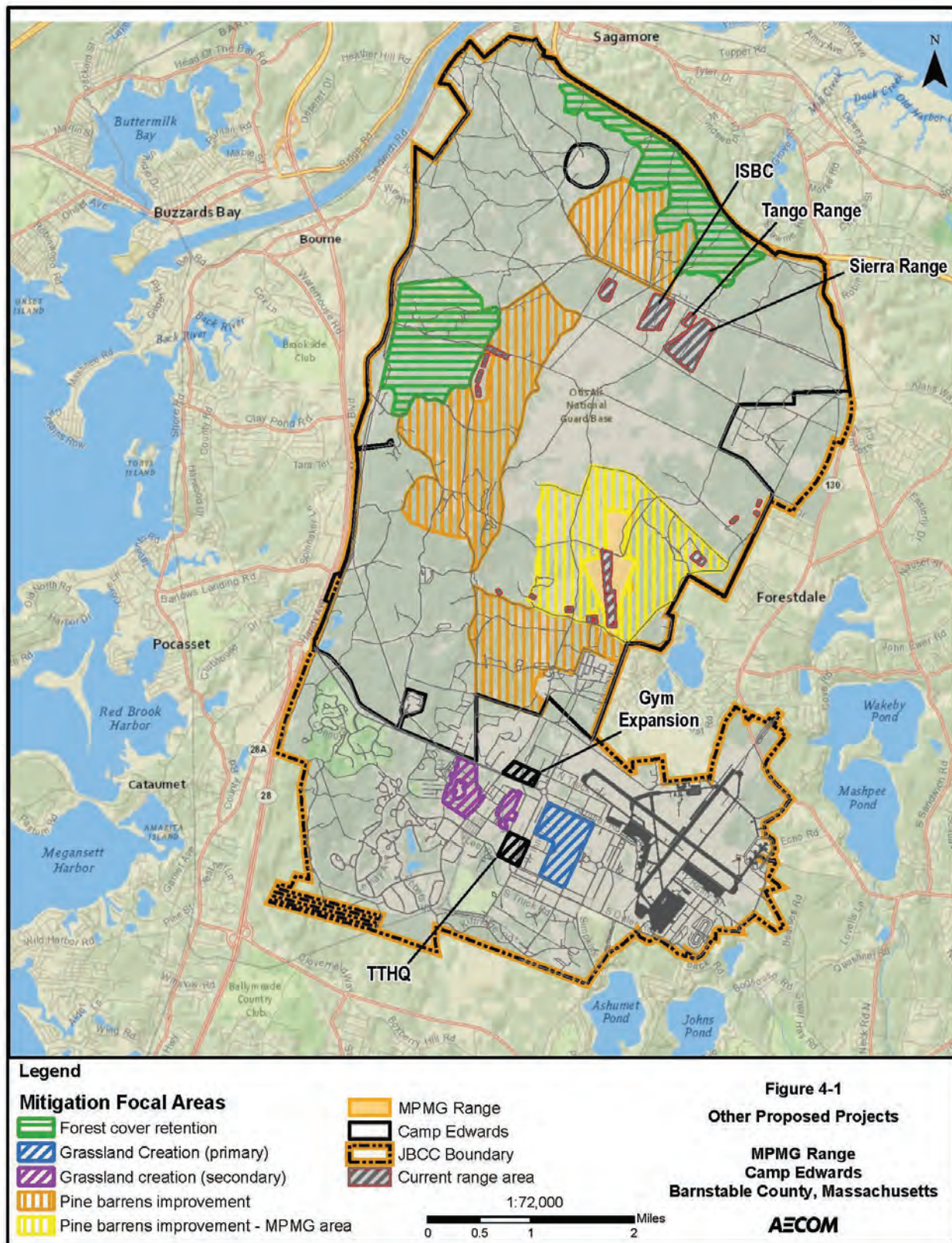
4.0 Proposed Projects at Camp Edwards

The following is a summary description of other projects proposed within Camp Edwards. This CMP Application provides detailed analyses for the MPMG Range project and also includes descriptions that, when actually proposed, will be evaluated for their compatibility with the descriptions included here and mitigation actions within the established mitigation framework for rare species impacts. Barring significant differences, separate filings for MESA and review will not be necessary. At this time, this information on the other projects is being provided as baseline for generally assessing rare species impacts and outlining potential mitigation solutions. Although the MPMG Range is a MAARNG project, the current need is to provide this level of planning to provide joint coverage for the MAARNG and the MAANG (i.e., Army and Air National Guard JBCC components).

There are many variables for these other projects, from site selection through project design and long-term maintenance. One goal of this comprehensive document is to ensure sufficient mitigation is available to cover all projects. In other words, this document is an attempt to identify and mitigate the overall development and habitat impacts at Camp Edwards through a mitigation banking strategy which will proactively implement habitat management and mitigation. It is anticipated that there will be significant ecosystem benefit to be achieved through this early planning effort and implementation and holistic net benefit strategies more fully described in **Section 5.0**. As such, project designs have not been completed, and impacts are liberally estimated to ensure sufficient mitigation implementation and design. Each project is described in this sections with locations shown on **Figure 4-1**.

This section describes the other proposed projects, the natural communities located within the boundaries of the projects, and impact analyses. The information included below is based on very early planning and not actual project designs. Potential impacts and acreages are intentionally liberal to ensure sufficient mitigation planning and implementation. As these projects are developed they will be linked to this CMP and evaluated for consistency. Projects included in this section are:

- Gym Expansion (see **Section 4.1**),
- Transient Troop Headquarters (TTHQ) (see **Section 4.2**),
- Tango Range Expansion (see **Section 4.3**),
- Sierra Range Expansion (see **Section 4.4**), and
- Infantry Squad Battle Course (ISBC) (see **Section 4.5**).



4.1 Gym Expansion

The Gym Expansion project involves the expansion of the existing parking area and construction of an outdoor running track, latrines, equipment shed, and maintenance of a landscape athletic field area. The existing gym site is currently occupied by an existing gymnasium, associated parking, and a baseball field as shown in **Figure 4-2**. The developed areas are surrounded by low quality PPSO and the playing field is maintained as lawn. The conceptual design incorporates expansion of existing facilities to address significant deficit of parking and infrastructure for Army training and physical fitness standards. Planned components include two to three acre parking expansion and three to five acre clearing for the additional facilities (i.e., running track, latrines, equipment shed, and athletic field). **Table 4-1** outlines the existing conditions and proposed impacts. The project will result in the loss of eight acres of PPSO. Seven acres of PPSO will remain on this site and the fields will continued to be maintained as lawn. As the PPSO is low quality and is likely only supporting the Eastern Box Turtle (which has not been confirmed at this site), the mitigation ratio used is 2:1 for mitigation acreage required. This site is not significant to Eastern Whip-poor-wills and the Eastern Box Turtle has not been found. However, it is marginally suitable for both and will be mitigated for both. **Table 4-2** provides details on proposed mitigation.

Table 4-1: Gym Expansion Impacts

Guild Associations	Mitigation Required Per MESA	Acres of Impact	Total Mitigation Acreage Required
Pine Barrens Guild	2:1 (Threatened)	8	16
Eastern Box Turtle	1.5:1 (Species of Special Concern)	8	12

Table 4-2: Gym Expansion Mitigation

Mitigation Standard	Location	Acres of Mitigation	Comments
Land Preservation	Tracts 1-4	16	2:1 ratio
Total Land Preservation		16	



Figure 4.2: Gym Expansion – Existing Conditions (looking NW)



Figure 4.3: Gym Expansion – Existing Conditions

4.2 Transient Troop Headquarters

The Transient Troop Headquarters (TTHQ) project involves the construction of three facilities to support non-stationed units of battalion size during annual training and similar events. Each facility contains three to five buildings and associated parking. Site selection has not yet been established though planning but includes the potential option of using the 1300 area which is presently managed as grasslands (see **Figure 4-4**). These grasslands are generally poor quality habitat but improving through management and occupied by Grasshopper Sparrows. The total project development will require conversion of 18 acres of managed grasslands to facility/infrastructure (e.g., building, parking area, and landscaping). The remaining area is already comprised of buildings or other disturbances. The first phase is anticipated to be planned in 2020/2021 for one facility and parking with a footprint of approximately six acres. **Figure 4-4** shows the potential full build out of the Transient Troop Headquarters. **Table 4-3** outlines the existing conditions and proposed impacts. The project will result in the loss of 18 acres of (low to moderate quality) MG. Two acres of MG will remain on site although the fragmentation of these two acres may reduce the value of this habitat and be counted as a Take. **Table 4-4** provides details on proposed mitigation.

Table 4-3: Transient Troop Headquarters Impacts

Guild Associations	Mitigation Required Per MESA	Acres of Impact	Total Mitigation Acreage Required
Grassland Guild	2:1 (Threatened)	18	36
Total		18	36

Table 4-4: Transient Troop Headquarters Mitigation

Mitigation Standard	Location	Acres of Mitigation	Comments
#4 Grassland Management	Grassland Mitigation Focal Area Parcel H – Unit K burn (Total burn=42, 36 to MPMG Range, remainder of 6)	6	completed in 2019
#4 Grassland Management	Grassland Mitigation Focal Area Parcel H – Unit K mowing (Total mow=80, 36 to MPMG Range, remainder of 44)	44	completed in 2019 FY 2020
#4 Grassland Management	Grassland Mitigation Focal Area Parcel H – Unit K continued management	108	18 acres treatment per year for remaining six years
Total		144	8:1 provided



4.3 Sierra Range Expansion

The Sierra Range Expansion project involves the expansion of the existing 300m range floor from 10 to 16 lanes to meet Army TC 25-8 standard for 300m Automatic Record Fire (ARF) Ranges including the expansion of the backstop (bullet capture) berm to the east (see **Figure 4-5**). The proposed expansion area was previously the former N Range which was abandoned in the 1950s and vegetation in this area has now succeeded into PPSO habitat. Once constructed, the range floor would be planted with a cover crop and light native grasses and forbs. The range floor is presently mowed at least twice a year during training season (spring through fall) and the range floor expansion would be maintained the same. The project footprint is comprised of 11 acres of PPSO which will be converted to range grasses and forbs for the additional lanes and maintenance buffers. The Sierra Range Expansion has been designed to avoid wetland impacts. Some work may be proposed within the 100-foot jurisdictional buffer zone to wetlands but will not have any direct or indirect impact on the wetlands. An Order of Conditions may be required for this work. **Table 4-5** outlines proposed impacts. **Table 4-6** provides details on proposed mitigation.

Table 4-5: Sierra Range Expansion Impacts by Guild

Guild Associations	Mitigation Required Per MESA	Acres of Impact	Total Mitigation Acreage Required
Pine Barrens Guild	2:1 (Threatened)	11	22
Eastern Box Turtle	1.5:1 (Species of Special Concern)	11	17 *

* number is rounded up

Table 4-6: Sierra Range Expansion Mitigation

Mitigation Standard	Location	Acres of Mitigation	Comments
Land Preservation	Forest Cover Retention Area (for Eastern Box Turtle)	17	1.5:1 ratio
Total Land Preservation		17	
#1 Mechanical Forestry	Pine Barrens Mitigation Focal Areas (154 acres available, remainder 110 for other projects)	13	30% of 44 (4:1); 2019
#2 Prescribed Burn	Pine Barrens Mitigation Focal Areas	31	70% of 44 (4:1), 2019
#3 Continued Management	Pine Barrens Mitigation Focal Areas	44	4:1 ratio; 2020-2022
Total Management		88	8:1 provided



Existing Sierra Range with additional six lanes proposed within red border. Mitigation area shown with yellow border.



Existing Sierra Range looking north with additional six lanes proposed within red border.



Existing Sierra Range looking northeast with 55-acre mitigation area following prescribed burn (2017) within yellow border.

Figure 4.5: Sierra Range Expansion Photographs

4.4 Tango Range Expansion

The Tango Range Expansion project proposes modernization and conversion of the Tango Range to serve as a “25-meter zero range” attached to the Sierra Automatic Record Fire 300m range (see **Figure 4-6**). This is proposed due to significant training needs and will allow units to zero and familiarize their weapons adjacent to the qualification range. Presently troops travel over seven miles away for this training. This project proposes clearing of PPSO. This work is recognized by NHESP to be a take by the MAARNG under MESA. This information was provided to NHESP in a MESA review letter dated 23 September 2019, prepared by BETA Group, Nover-Armstrong which is included as **Appendix D**.

This expansion will include increasing the firing range from 8 lanes to 32 lanes. Because the Tango Range is a 25m “zero” range, the design includes narrow (13± feet wide) firing lanes. The existing firing line and target line will be moved 126± feet to the north and the containment berm will be moved approximately 115 feet to the north. This shift will allow for concurrent use of the Tango Range and the Sierra Range (located to the east of Tango Range). Both the firing line berm and containment berm will be graded to drain water to the east and west of the range.

The project was designed to minimize clearing of mapped habitat, while still achieving the goals of the project. In total, the project will result in clearing 68,394 square feet (<1.6 acres) of PPSO habitat for the purposes of expanding the firing range, which includes material staging and laydown areas. For the purposes of this assessment, we have rounded the impact number up to 2.0 acres as shown in the table below.

To mitigate impacts to the state listed rare Lepidoptera (an order of insects that includes butterflies and moths) mapped within the site, the MAARNG is proposing to install downward facing, yellow-spectrum, low-wattage lights to replace the existing lights currently in use on the observation tower. No additional lighting, beyond what currently exists, is proposed for this range. Range lighting use will be limited to an as needed basis (e.g., night firing) to minimize impacts to moths and other vertebrate and invertebrate species. Long-term range maintenance will be consistent with the site’s current condition and will involve vegetation mowing once or twice per month depending on vegetation growth. **Table 4-7** outlines proposed impacts. **Table 4-8** provides details on proposed mitigation.

Table 4-7: Tango Range Expansion Impacts

Guild Associations	Mitigation Required Per MESA	Acres of Impact	Total Mitigation Acreage Required
Pine Barrens Guild	2:1 (Threatened)	2	4
Eastern Box Turtle	1.5:1 (Species of Special Concern)	2	3

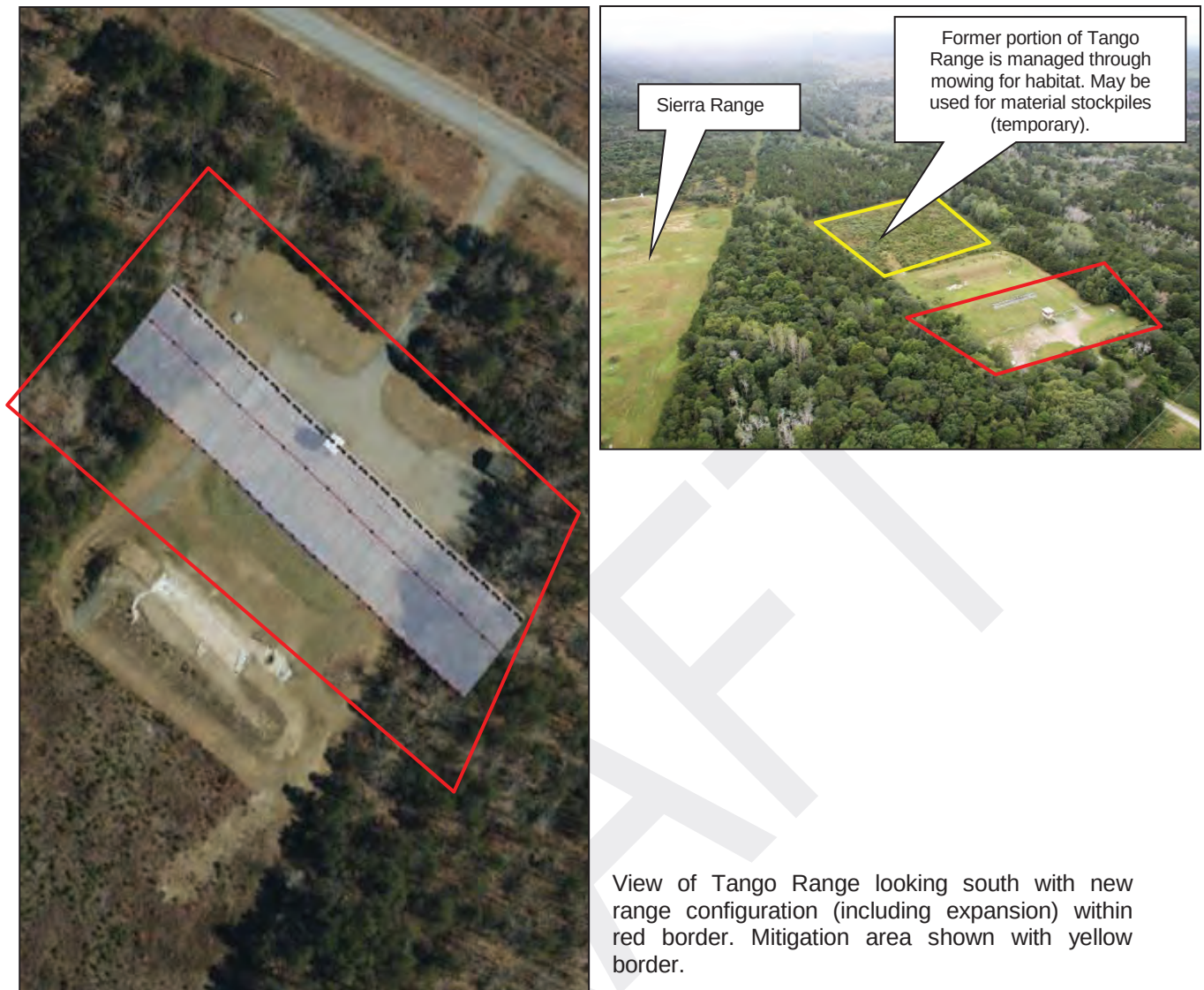
Table 4-8: Tango Range Expansion Mitigation

Mitigation Standard	Location	Acres of Mitigation	Comments
Land Preservation	Primary Forest Canopy Retention Area (for Eastern Box Turtle)	3	1:5:1 ratio
Total Land Preservation		3	
#1 Mechanical Forestry	Pine Barrens Mitigation Focal Area – Western Unit	2.5	30% of 8 (4:1); 2019
#2 Prescribed Burn	Pine Barrens Mitigation Focal Area – Western Unit (Total Burn = 399)	5.5	70% of 8 (4:1); 2019
#3 Continued Management	Pine Barrens Mitigation Focal Area – Western Unit	8	4:1 ratio
Total Management		16	8:1 provided

The Tango Range Expansion project will use the established mitigation bank to achieve net benefit through the following actions:

- **Standard #1 Mechanical Forestry:** 30% of impacts mitigated through mechanical forestry = 2.5 acres. Mitigation of 8.0 acres has already occurred.
- **Standard #2 Prescribed Burn:** 70% of impacts mitigated through prescribed fire = 5.5 acres. Mitigation has been provided from the 2019 burn of 399 acres.
- **Standard #3 Continued Management:** Continued management and maintenance through prescribed burns for 32.0 acres (years 3-9)
- **Standard #4 Manage Grasslands:** Regular mowing of the range floor will continue from April through September and will likely be on a monthly basis. Range floor will continued to be managed as grasslands.
- **Standard #5 Monitoring and Research:** Monitoring will be performed for the Eastern Box Turtle and pine barren moths including the following:
 - o Construction phase BMPs to include Eastern Box Turtle searches and either exclusion barriers or radio-telemetry tracking of individuals. A plan is presently in development to support BMPs.
 - o Extended monitoring of transmitters (if used for specific projects)
 - o Development of focal and statistically robust moth monitoring plan (contract and coordination with MassWildlife)
 - o Implementation of moth monitoring plan to include Tango Range Expansion and associated mitigation
 - o Continued monitoring of Eastern Whip-poor-will, support of MassWildlife Eastern Whip-poor-will research, and site-wide avian point count surveys.

Based on the above standards, a net benefit for the pine barrens habitat take will be achieved through 32.0 acres of mechanical forestry to restore PPSO with open canopy condition, 32.0 acres of initial prescribed burning, and 32.0 acres of prescribed burning as continued management of grasslands. Note that the acreages required were all exceeded during 2019 through mitigation projects, planned, funded, and explicitly associated with this overall mitigation strategy. This strategy includes the Wheelock Overlook harvest and prescribed burning in burn unit RAW2, which is approximately one mile from the proposed Tango Range Expansion project.



Existing Tango Range with new range configuration within red border. Expansion of berm and areas to be widened and maintained are not shown in this sketch.

Figure 4.6: Tango Range Expansion Photographs

4.5 Infantry Squad Battle Course

The Infantry Squad Battle Course (ISBC) involves the redevelopment and modernization of the existing ISBC area (formerly the Infantry Battle Course (IBC) Range) as the current design does not fully meet training requirements (see **Figure 4-7**). This area was mowed until 1997. In 2016, a wildfire (lightning strike) occurred at this site. The new range design would retain much of the vegetation cover which is a mosaic of PPSO and SOS. The project is designed to provide a live-fire range for squad move-and-shoot maneuvers with the intent to emplace targetry while maintaining woodland/shrubland natural setting to provide realistic maneuvers, concealment, and challenges. The development of this project will include five to six primary engagement (target) locations, eight-foot access dirt roads to targetry, and regular mowing and maintenance immediately surrounding targets. Understory mowing of movement corridors and engagement areas will be completed every other year. **Table 4-9** outlines proposed impacts. **Table 4-10** provides details on proposed mitigation. Although the design has not been completed, impacts are conservatively estimated at 40 acres of PPSO and 30 acres of SOS. Mowing of maintained areas should be less frequent than other ranges, but likely once or twice per training season to maintain equipment, infrastructure, and minimize wildlife impacts.

Table 4-9: ISBC Impacts

Guild Associations	Mitigation Required Per MESA	Acres of Impact	Total Mitigation Acreage Required
Pine Barrens Guild	2:1 (Threatened)	65	130
Eastern Box Turtle	1.5:1 (Species of Special Concern)	65	98 *

Table 4-10: ISBC Mitigation

Mitigation Standard	Location	Acres of Mitigation	Comments
Land Preservation	Primary Forest Canopy Retention Area (for Eastern Box Turtle)	98	1.5:1 ratio
Total Land Preservation		98	
#1 Mechanical Forestry	Pine Barrens Mitigation Focal Areas	78	30% of 260 (4:1); 2021, 2022
#2 Prescribed Burn	Pine Barrens Mitigation Focal Areas	182	70% of 260 (4:1); 2021, 2022
#3 Continued Management	Pine Barrens Mitigation Focal Areas	260	other years
Total Management		520	8:1 provided

* number is rounded up



ISBC aerial views (top two photos) and view looking south-southwest from above range tower.

Figure 4.7: Infantry Squad Battle Course Photographs

4.6 Capped Landfill Solar Array

The Capped Landfill Solar Array project involved the proposed construction of a 6 MW solar array on the capped L-F landfill within JBCC which would have altered existing high value MG habitat (see **Figure 4-7**). This project is not currently a central focus of this mitigation plan but is still a key consideration in evaluating and planning mitigation for the joint Air and Army National Guard. Even though the project is currently classified as terminated, the MAANG may coordinate a new solar array project and consider some portion of the capped landfill in site selection in the future. It is anticipated that additional site alternatives will be considered to reduce potential environmental impact (especially to State-listed fauna) for future solar energy development at JBCC. It is also anticipated that design constraints (e.g., acreage) will be considered to reduce impact and mitigation requirements. For example, conversion of existing habitat to a grassland in a “core” habitat area would improve conservation benefits rather than expanding into isolated patches. Nonetheless, this solar project is noted here as Tract 5 (132 acres) was transferred in 2017 from the SMRC to MassWildlife as mitigation for this project as was Parcel H – Unit K (completed in 2019). Please see **Section 5.0** for more details on the mitigation tracts and mitigation options.

Overall mutual benefit can be found, to include cost reduction and rare species management through clearing lower quality forest for solar development. The landfill is currently the best location in the region for Upland Sandpiper nesting, which would require extremely expensive mitigation. It will be much less expensive to clear low quality pine-oak forest for direct placement of solar rather than attempting to provide Upland Sandpiper habitat.



Figure 4.8: Capped Landfill Solar Array

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5.0 Conservation and Management Plan

Under MESA, impacts to rare species may be permitted if a project has long-term net benefits to the affected rare species. In consultation with NHESP, MAARNG has developed this CMP Plan to provide a long-term net benefit to the conservation of the State-listed species that may be impacted from the construction and operation of the MPMG Range. Implementation of this Plan will provide net benefit across much more area of Camp Edwards and will combine with ongoing site-wide management through the INRMP and additional habitat improvement beyond mitigation to support the MPMG Range use. The INRMP provides effect mechanisms to ensure net benefit despite loss of habitat. The INRMP is presently being updated. In addition, this Plan will be memorialized, not only in the INRMP, but also in the required Annual Reports (State of the Reservation). This section describes condition and intent for the various types of land actions, units, and parcels discussed for mitigation planning. Other types of land protection may come available and be included to this the Plan through coordination with MassWildlife and NHESP. However, this current Plan focuses on the following mitigation efforts; each one described in a section below.

- Land Preservation
 - o Land Preservation by Transfer of Parcels to MassWildlife
 - o Land Preservation with Management (Parcel H – Unit K)
 - o Pine Barrens Forest Canopy Reserve Areas (FCRA)
- Management of existing habitat with Mitigation Focal Areas
 - o Pine Barrens Mitigation Focal Areas
 - o Grasslands Mitigation Focal Areas
- Monitoring and research of rare species
- Avoidance and minimization
- Cost of management

Figure 5-1 provides an overview map of JBCC including the location of land preservation parcels and mitigation focal areas. To date, the MAARNG has already performed actions which contribute to the net benefit of the rare species at Camp Edwards and JBCC including the following:

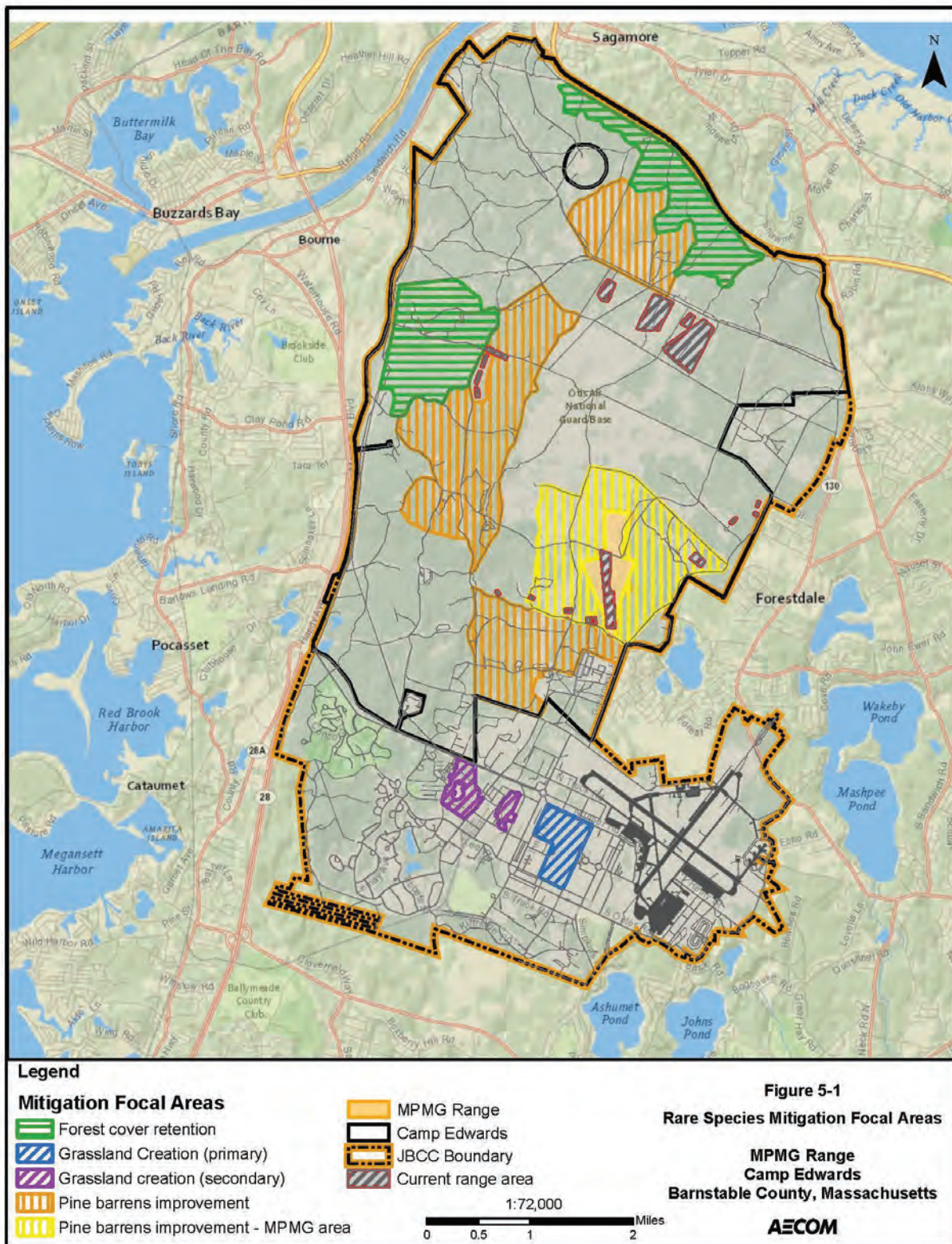
- Land Transfer of Tract 5 (133 acres) 2014, 2017 (PPSO)
- Land Transfer of Tracts 1-4 (128 acres) 2019 (PPOF)
- Land Transfer of Parcel H of unit K (150 acres) (MG)
- Development and implementation of Range Complex Master Plan
- Development and implementation of site-wide INRMP

On-going actions are continuing which contribute to the management of resources at Camp Edwards:

- Collaborative development of mutually beneficial mitigation and monitoring strategies
- Range and infrastructure environmental review and design process
- Mitigation implementation

The conversion, management, and protection of rare species habitat will be assigned to “Mitigation Focal Areas”. Benefits of using focal areas including consolidating mitigation for maximum benefit while providing flexibility of management and ensuring sufficient acreage for new or revised projects. The Mitigation Focal Areas include two types of areas where active or passive mitigation through management may occur:

- Pine Barrens Mitigation Focal Areas
- Grassland Mitigation Focal Areas



Some parcels may have multiple mitigation strategies applied such as land preservation combined with management of grasslands as is proposed at Parcel H – Unit K.

A summary of impacts and mitigation for the MPMG Range and other projects described in Section 4.0 are provided in **Table 5.2**.

5.1 Land Preservation

Land preservation actions include the transfer of parcel to MassWildlife as describe in Section 5.1.1 and the preservation of land through the creation and management of the Forest Canopy Reserve Areas (or Forest Retention Areas) as described in **Section 5.1.2**.

5.1.1 Land Preservation with Transfer of Parcels to MassWildlife

Based on previous and ongoing discussions and coordination efforts with MassWildlife, MassWildlife will provide mitigation credit for parcels already transferred, parcels to be transferred, and possible parcels to be transferred in the future. Projects proposed within the JBCC will be reviewed individually regarding impacts to rare species including an analysis of alternatives and rare species impacts avoidance, minimization, and mitigation. For the purposes of the JBCC, specifically MAARNG activities at JBCC, MassWildlife has agreed that land previously transferred for mitigation by MAANG or SMRC may be used for credit for a different project in the same habitat type if the original project was cancelled. Accordingly, in order to provide a long-term net benefit to State-listed species, MAARNG proposes to utilize land acreage credits for the parcel previously transferred to MassWildlife as part of the Capped Landfill Solar Array project that is no longer occurring. This includes Tract 5 (SMRC) and Parcel H – Unit K

MAARNG and other agencies at the JBCC have worked with NHESP to transfer land at the JBCC to the Commonwealth of Massachusetts, Division of Fisheries and Wildlife (MassWildlife) as a primary mitigation measure for rare species impacts for the previously proposed solar array project at the closed landfill and more recently the overall mitigation bank. Land transfer elements as part of the overall MAARNG mitigation bank includes:

- Transfer of SMRC parcels owned by the Commonwealth of Massachusetts direct to MassWildlife ownership (Track 5, Tracts 1-4)
- Transfer of the Massachusetts Division of Capital Asset Management and Maintenance (DCAMM) parcels under MAARNG license (Parcel H – Unit K)
- Active management on MAARNG-held parcels and MassWildlife-owned parcels

The following section is a description three parcels within four mitigation areas possible as summarized in **Table 5-1** below.

Table 5-1: Mitigation Transfer Parcels and Acreages

Mitigation Transfer Parcels	Habitat	No Management Proposed	Manage Grassland (Standard #4)	Total
Tracts 1-4	PPOF	128.0		128.0
Tract 5A	PPSO	133.0		133.0
Parcel H – Unit K	MG, PP, red cedar, invasives		150.0	150.0
Totals		261.0	150.0	411.0

Table 5-2: Summary of Impacts and Mitigation

Acres of Direct Impact	Pine Barrens Guild	Grasslands Guild	Eastern Box Turtle	TOTAL
MPMG Range	171	36	207	207
Gym Expansion	8		8	8
Transient Troop Headquarters		18		18
Sierra Range Expansion	11		11	11
Tango Range Expansion	2		2	2
Infantry Squad Battle Course (ISBC)	65		65	65
TOTAL	257	54		311
Mitigation Acreage Required based on MESA Ratios ^{1,2}	Pine Barrens (2:1)	Grassland (2:1) ³	Eastern Box Turtle (1.5:1)	TOTAL
MPMG Range	342	36	310	378
Gym Expansion	16		12	16
Transient Troop Headquarters		36		36
Sierra Range Expansion	22		17	22
Tango Range Expansion	4		3	4
Infantry Squad Battle Course (ISBC)	130		98	130
TOTAL	514	72		586
Land Preservation Proposed	Pine Barrens Guild	Grassland Guild	Eastern Box Turtle	TOTAL
MPMG Range (Tract 5, FCRA)	133		177	310
Gym Expansion (Tracts 1-4)	16			16
Transient Troop Headquarters (none)				0
Sierra Range Expansion (FCRA)			17	17
Tango Range Expansion			3	3
Infantry Squad Battle Course (ISBC)			98	98
TOTAL	149	0	294	443
Management Mitigation Proposed by MAARNG ² (at 8:1)	Pine Barrens Guild	Grassland Guild	Eastern Box Turtle	TOTAL
MPMG Range	832	36		868
Gym Expansion				0
Transient Troop Headquarters		144		144
Sierra Range Expansion	88			88
Tango Range Expansion	16			16
Infantry Squad Battle Course (ISBC)	520			520
TOTAL	1456	180	0	1636

¹ Impacts may overlap, acreages used for totals are highlighted in grey

² Totals not including "continued maintenance/management" (e.g., Standard #3)

³ 36 acres at the MPMG Range to be mitigated at 1:1 ratio

All numbers have been rounded up to the nearest whole number

5.1.1.1 Tracts 1-4

Tracts 1-4 (see **Figure 5-2**) are comprised of 128.0 acres located within the Town of Falmouth owned by the SMRC and licensed to MassWildlife for recreation and hunting as part of Crane WMA. Several tracts were set aside for the SMRC decades ago with the expressed intent of future mitigation use and their management and use is under the control of the SMRC. The license was expiring in November 2019 prior to transfer. These tracts are dominated by pitch pine-oak woodland dominated by white oak with some pitch pine component and dense understory dominated by low-bush blueberry and huckleberry. The western half of these tracts is moraine dominated (including “Mt. Zig”) with more pitch pine and topographic relief while the eastern half is level and has little pine being dominated with white oak. These tracts have been transferred to MassWildlife after being deemed to be surplus similar to Tract 5 below. This allowed this land to be transferred to MassWildlife ownership and be used for future mitigation of projects at JBCC. No management of these tracts by MAARNG is proposed. Transfer required approval of the SMRC and signature by the Governor, which was completed on in September of 2017 (see **Appendix E**). Transfer of these tracts will significantly contribute to ensuring net benefit for the Eastern Box Turtle and Eastern Whip-poor-will through land protection. In addition, with the consolidation of the Crane WMA parcels with Tracts 1-4, a large area can be protected and managed for wildlife habitat. The following table outlines the various tracts and associated descriptions. No costs are associated with this mitigation method other than staff coordination with MAARNG and MassWildlife.

Table 5-3: Mitigation Tracts 1-4

Mitigation Transfer Parcel	Habitat	Total
Tracts 1-4	PPOF	128.0
Total		128.0

5.1.1.2 Tract 5

Tract 5 is comprised of 132 acres located within the Towns of Falmouth, Bourne, and Sandwich along the southern boundary of the JBCC and abuts the Crane WMA as shown on **Figure 5-2**. It is almost all PPSO woodlands with a mature pitch pine canopy except for a small cleared area. It is bounded on all sides by either dirt roadways or railroad lines. Bearberry (*Arctostaphylos uva-ursi*) is common plant along these roadsides which is an evergreen groundcover that thrives on sandy, acidic soils. Tract 5 has already been transferred from SMRC MassWildlife as signed by Governor Charles Baker in 2017 relative to the Capped Landfill Solar Array project. As that project is no longer going forward, this tract is still available to be utilized for rare species mitigation for the MPMG Range project and other projects proposed. This is particularly viable as the PPSO habitat existing provides good quality replacement for the MPMG Range and consolidates with the Crane WMA. The following table provides a description of the resources at this tract.

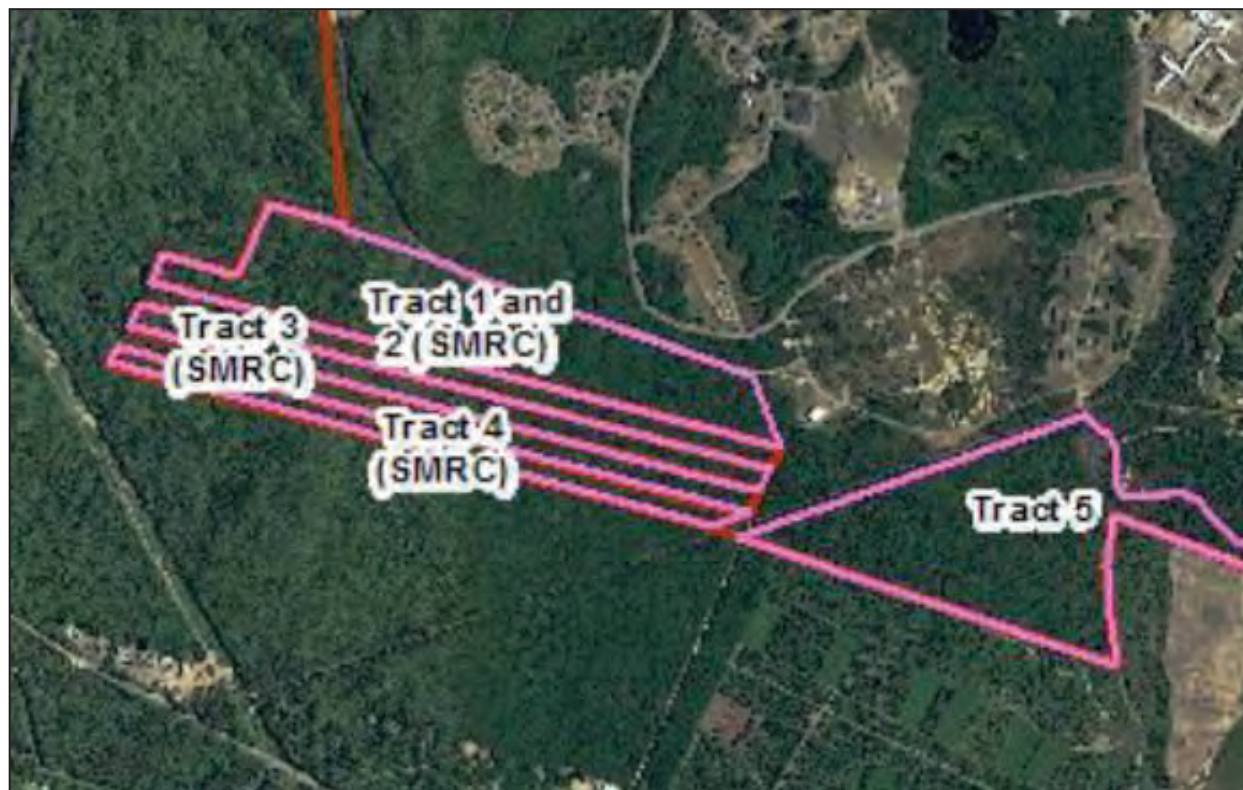


Figure 5.2: Mitigation Tracts 1-4

The eastern portion of the tract (identified as Track 5B) was previously slated for grassland conversion in accordance with the Solar Array Project Grasslands Mitigation Plan. However, based on PPSO condition and Eastern Box Turtle records, current use is as PPSO mitigation. The western portion of this tract (identified as Track 5A above) was slated to be held "in reserve" for future projects needing PPSO mitigation. The western portion may benefit from a prescribed burn but is currently in suitable PPSO condition. This large tract of high quality PPSO natural community adjacent to Crane WMA will significantly contribute to net benefit for a variety of pine barrens lepidopterans, Eastern Whip-poor-will, and Eastern Box Turtles. Mitigation credit for this parcel would be transferred from the Capped Landfill Solar Array project and applied to the MPMG range. No costs are associated with this mitigation method other than staff coordination with MAARNG and MassWildlife.

Table 5-4: Mitigation Tract 5

Mitigation Transfer Parcel	Habitat	Total
Tracts 5	PPSO	133.0
Total		133.0



Figure 5.3: Mitigation Tract 5

5.1.2 Land Preservation with Management (Parcel H – Unit K)

Parcel H – Unit K is comprised of 150 acres located within the JBCC (see **Figure 5-4**). The parcel was owned by DCAMM and leased to the MA ANG/USAF who in turn licensed the parcel to the U.S. Department of Transportation (US DOT) for the Volpe Research Center. This parcel was proposed as mitigation for the Capped Landfill Solar Array project that has now been cancelled. Nonetheless, the parcel has been processed for transfer to MassWildlife to be used for future mitigation similar to the tracts described above. It had been proposed that the entire parcel would be maintained and managed as MG by MAARNG throughout the 150 acres over the course of eight years. This parcel will be used for both land preservation and management of grasslands.

Unit K is currently in an intermediate state consisting of cultural grassland, managed grassland, and transitional (treed) grassland. There was remnant impervious surfaces scattered throughout the area (14 acres) that was removed in 2013. The area is dominated by grass species including filiform fescue (*Festuca tenuifolia*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), hairgrass (*Deschampsia flexuosa*), redtop (*Agrostis gigantea*), poverty grass (*Danthonia spiccata*), and Pennsylvania sedge (*Carex pennsylvanica*). The only common tree species are immature pitch pine and red cedar. Sweetfern (*Comptonia peregrina*), bayberry (*Myrica pensylvanica*), blueberry, and dewberry are all through in dense clumps. Some areas are managed to reduce at least the first two species. Many nonnative and invasive species such as honeysuckle (*Lonicera* spp.), Asiatic bittersweet (*Celastrus orbiculata*), autumn olive, and spotted knapweed (*Centaurea maculosa*) occur in this grassland area. However, several Watch List species also occur and indicate the central area lacked soil disturbance. The previous commitments were to:

- Maintain all grassland areas outside the airfield fence in order to provide habitat for State-listed bird species and prevent areas from returning to forested lands.
- Approximately 27 acres will be managed each year either by mechanical means such a mowing or prescribed burns.
- This equates to return management intervals at any one area within this parcel every four years.
- Mowing to be accomplished in accordance with the Grasslands Management Plan 02, including but not limited to, not mowing the area during the period May 1 - July 31 of each year.
- Clear grassland areas that are slowly succeeding to forest. Seed with native grasses.
- Maintain as grasslands in accordance with the Grasslands Management Plan 02, in order to provide habitat for State-listed bird species and prevent areas from returning to forested lands.
- Particularly in Unit K, consider use of controlled burns for grassland management.³



Figure 5.4: View of Mitigation Parcel H - Unit K

³ Otis ANGB Solar Project Grasslands Mitigation Plan. October 2012, included as an appendix to the Environmental Assessment for Power Purchase Agreement Photovoltaic Solar Array Installation



Figure 5.5: View of Mitigation Parcel H - Unit K

Approximately 90 acres is presently dominated by forest or invasive shrubs as is not presently managed. The remaining 60 acres is MG that is managed by MAARNG through prescribed burning. Conversion to MG of the 90 acres is proposed by MAARNG along with continued management of the 60 acres. Mitigation credit would not be applied by MassWildlife for the transfer/protection of 150 acres until the habitat was fully converted to MG. However, the conversion and management over the eight-year period will mitigate the projects in this Plan and capacity for additional. The value of Parcel H – Unit K as grassland mitigation is that it provides “core” MG habitat area, which is critical to grassland species. MAARNG completion of habitat conversion will take the form of completed land clearing (approximately 60 acres remaining), followed by prescribed burns through 2023, one or two mowings (either targeted or complete depending on needs), and potentially approximately 20 acres of chemical treatment to manage the invasive species. Habitat conversion would be consistent with actions at Crane WMA (e.g., vertical extraction of trees, minor grading, seeding with local/regional native seed, and prescribed fire) under guidance of the State forester and others. This conversion and transfer will significantly contribute towards net benefit for multiple grassland obligates, including the Grasshopper Sparrow, Vesper Sparrow, and Upland Sandpiper.

An approximately 27 acre area will be managed each year. This will equate to every area of the parcel being managed on a four year return interval. This will allow for the slow conversion of low value habitat to high value grasslands. Once the eight year period has been completed (and all areas within the parcel managed two times), the parcel will be available to use the acreage as part of the “Mitigation Bank”. Management is being credited now as described in **Section 5.0**. The land transfer has already occurred but land preservation credits (at a 2:1 ratio = 75.0 acres) will not occur for another eight years.

It is the expressed hope of JBCC that USDOT and MassWildlife will develop a mutually beneficial agreement. The USDOT Volpe Research Center has been very helpful and supportive of grassland management. We believe the continued colocation is consistent with goals and interagency cooperation.

Table 5-5: Parcel H - Unit K

Mitigation Transfer Parcel	Habitat	Total
Parcel H – Unit K	MG, PP, red cedar, invasives	150.0
Total		150.0

MAARNG proposes and has discussed using long-term management of Parcel H – Unit K for MassWildlife as the primary grassland mitigation method. This present mutual benefit while also being most valuable conservation for grassland species. A grassland management plan will be developed for this parcel to guide MAARNG in the managing and treatment of the acreage to be converted to grassland or resulting in enhanced grassland. MAARNG is proposing to develop this plan with input from MassWildlife. Management strategies to review include lighter mechanized conversion to MG in combination with prescribed fire in lieu of heavy conversion of forest to grassland elsewhere. A slower transition back to grassland is proposed for a number of reasons. The highest priority reason is that initial investigation with the State botanist found several species indicating a lack of past soil disturbance. Maintaining this recently discovered diversity and condition is high conservation value while also restoring sandplain grassland condition of currently wooded areas. Additionally, MAARNG has had good results with combining intensive fire with herbicide and mechanical management while minimizing mycorrhizal impacts. While results at Crane WMA are exemplary, this site would benefit from a slower conversion and its history as a sandplain grassland field means the species are already there and waiting for release rather than converting PPSO to MG.

The standard for grassland conversion for projects included herein is to manage an acreage equal to the project take annually for an eight year period. This achieves an 8:1 ratio consistent with other mitigation (i.e., 4:1 ratio, plus same for continued management). For the grasslands, this effort will be apportioned based on the identified priorities and the goal of the entirety of the parcel being suitable and occupied sandplain grassland at the end of the eight years. Some portions require basic maintenance (e.g., targeted spray and fire) while others will require successive treatments and rotation of intensive burning, spraying invasives (including encroaching native species), and targeted mowing). A standard metric will be to treat no more than half of the cantonment (non-airfield) grasslands with any combination within a six month period.

A key consideration is working to maximize species benefit within the parcel and across the cantonment grassland. The parcel combining with the adjacent southwest corner is the prime area which requires small stands of trees, while Upland Sandpipers need wide open space. The current structure of the parcel provide a great opportunity to maintain current rare species use by all species while improving conditions throughout with a mosaic of sandplain grassland reference condition. Secondary sites have been identified if required and are described briefly below. However, maximum benefit can be achieved for all listed species by MAARNG improvement of Park H – Unit K as opposed to clearing PPSO in cantonment.

5.1.3 Pine Barrens Forest Canopy Reserve Areas

The Forest Canopy Reserve Areas (FCRA) are comprised of 1,177 acres in two separate areas within Camp Edwards as shown on **Figure 5-1** and **Figure 5-6** in green. The intent of these FCRA's are to be "set aside" for management planning for the goal of retention of the forest canopy to preserve a closed canopy condition which is valuable for the Eastern Box Turtle. That is, these areas are for the preservation of more forested later successional areas. These areas are primarily vegetated with mature PPOF with closed

canopy. These FCRA will also allow woods with less of a canopy cover to evolve into a more closed canopy condition. Two distinct FCRA have been identified:

- **Primary FCRA** (or first FCRA) 545.0 acres in northern unit
- **Secondary FCRA** (reserve, if needed) 632.0 acres in southern unit

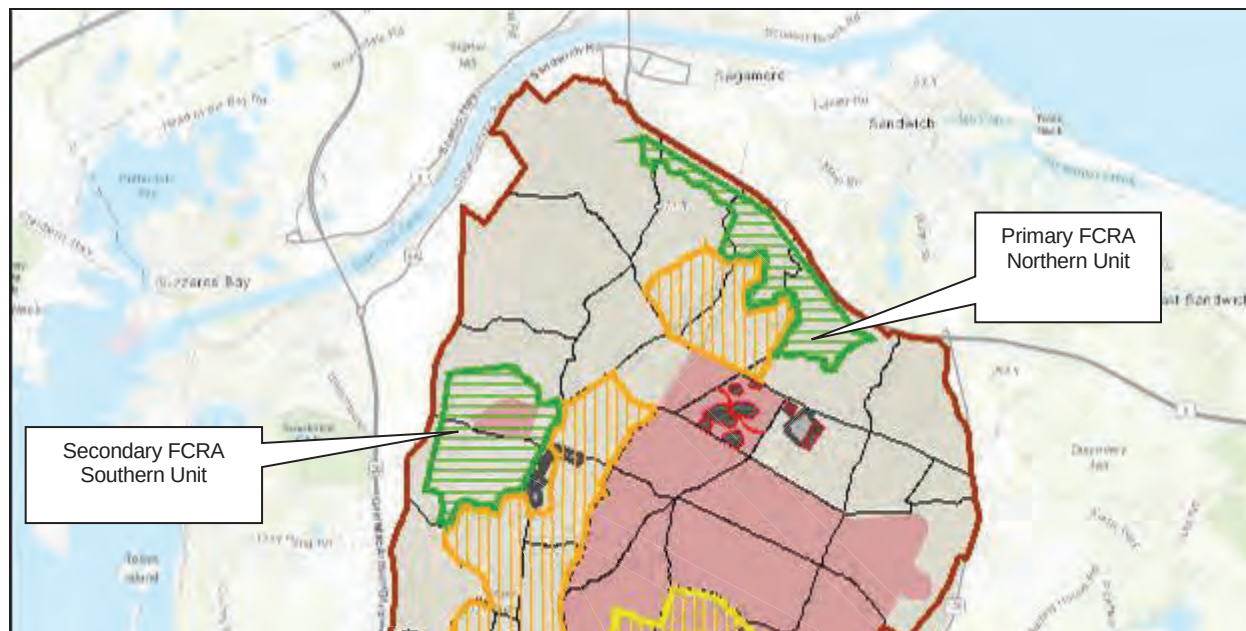


Figure 5.6: Forest Canopy Reserve Areas

FCRA will be included in the INRMP update and all other Camp Edwards/JBCC planning documents to place priority on maintaining the closed forest canopy condition. Existing roads and firebreaks would be maintained to preserve as much canopy closure as possible, especially as canopy fire hazard is low in these areas. Pine barrens habitat improvement and other forest opening projects will not be planned within FCRA. Although not proposed at this time, any prescribed burning that may be planned will be designed to limit canopy impacts through ignition, timing, and other methods as well as to limit ground-level intensity.

In order to maintain and improve the level of MAARNG training at Camp Edwards, the FCRA will not limit MAARNG or other service training activities beyond those limits currently in place due to the EPS (e.g., no off-road travel, no vegetation cutting without Natural Resources Office approval, etc.). FCRA will not impede maintenance of existing utilities and infrastructure (e.g., powerline ROW, bivouac site[s], roads and firebreaks). Training use in designated FCRA is minimal and will not increase to a level problematic for Eastern Box Turtles or canopy retention.

Table 5-6: Forest Canopy Reserve Areas

FCRA Parcel	Habitat	Total
Primary FCRA – Northern Unit	PPOF, PPSO, oak forest	545.0
Secondary FCRA – Western Unit	PPOF, PPSO, oak forest	632.0
Total		1,177.0

If the designation of one or both of these areas as FCRA becomes precluded due to unforeseen changes in Army training requirements or other true requirements, then designation of replacement areas in currently healthy, closed forest condition will be coordinated with MassWildlife. If groundwater remediation activities require clearing forested areas, coordination will occur to determine if long-term site plans warrant excising the area from the FCRA and/or designating replacement.

The cost of this type of mitigation is limited to developing planning documents and management strategies for each of the areas. That is, there is no physical work in these areas for mitigation purposes proposed at this time including no current plans for further fire breaks or prescribed burns.

5.2 Mitigation Focal Areas

Mitigation Focal Areas have been developed by the Camp Edwards Natural Resources Office in order to describe various types of mitigation possible for potential impacts of projects on rare species. The following two types of Mitigation Focal Areas are described in detail below and in **Table 5-7** along with the seven physical parcels that have been assigned to each types. Over 4,600 acres have been identified for mitigation.

- Pine Barrens Mitigation Focal Areas
- Grassland Mitigation Focal Areas

Table 5-7: Mitigation Focal Areas and Acreages

Area Description	Pine Barrens Mitigation Focal Areas	Grasslands Mitigation Focal Areas	Total
Northern Unit	519		519
Western Unit	1,204		1,204
Southern Unit	619		619
MPMG Zone	1,060		1,060
Training Area BA-2		78	78
1500/1700 Areas		29	29
Totals	3,402	107	4,686

The following table identifies how each of the mitigation areas types associate with the various guilds.

Table 5-8: Mitigation Areas and Associated Guilds

Mitigation Focal Area	Pine Barrens Guild	Grassland Guild	Northern Harrier	Eastern Whip-poor-will	Eastern Box Turtle
Pine Barrens Mitigation Focal Areas	x		x	x	x
Grassland Mitigation Focal Areas		x	x		

5.2.1 Pine Barrens Mitigation Focal Areas

The Pine Barrens Mitigation Focal Areas are comprised of 2,342 acres in three different areas within Camp Edwards as shown in **Figure 5-1** and **Figure 5-7** in orange. The intent is to implement needed management of these focal areas in order to maintain the PPSO and SOS communities. All Pine Barrens Mitigation Focal Areas were chosen based upon long-term management planning for the best areas to improve pine barrens conditions based on combined need for ecosystem management, Army training, and wildland fire hazard. Fires that did occur within the frequently burned areas burned less intensely and more patchily. The three focal areas, plus the MPMG zone, are core areas for PPSO and SOS at Camp Edwards, but are also where these communities are most at risk due to encroachment, lack of fire, vegetative density, and ongoing conversion/mesification. Management of these areas has the most potential benefit to rare fauna and flora as well as the overall pine barrens ecosystem and also serves to most benefit Army training and reduction of fire hazard. Additionally, the proximity to the Impact Area is intended for maximum benefit to species losing habitat due to tree encroachment and lack of management in ordnance hazard zones. Three distinct Pine Barrens Mitigation Focal Areas have been identified, all of which are located outside of the Impact Area:

- **Northern unit:** 519 acres dominated by PPSO and SOS, needing management due to white oak encroachment and severely over-mature scrub oak; high potential for moths, New England Cottontail, Eastern Whip-poor-will
- **Western unit:** 1,204 acres dominated by PPSO, prioritized for prescribed fire and mechanical treatment; high priority PPSO and SOS restoration adjacent to Impact Area. Includes Training Area A-5 restoring pine shrub savanna
- **Southern unit:** 619 acres in active management for PPSO and SOS, critical need of further management as well as having close proximity to MPMG “take”

In addition, as part of the MPMG Range project, there are an additional 1,060 acres of very high priority PPSO and SOS that need to be managed to address severe fuel loading hazard and detrimental pitch pine encroachment impacting habitat quality and potential high hazard condition from MPMG Range development identified as the “MPMG Zone”. The majority of this zone is Impact Area or other ordnance hazard zones of very high habitat value degrading from lack of management. There is extremely high conservation value in reintroducing management. The following table provides a summary of the four Pine Barrens Mitigation Focal Areas along with identified habitat categories under existing conditions and habitat that could be restored through active management.

This “MPMG Zone” is not directly included in the overall mitigation plan calculations as timelines are uncertain when work would be started and the work is directly linked to the proposed MPMG Range project. However, implementation of the necessary management to reduce fuels and fire hazard will be highly beneficial to pine barrens species and critical to community safety. Uncertainty is based on funding or ordnance removal, firebreaks, and development of aerial ignition program.

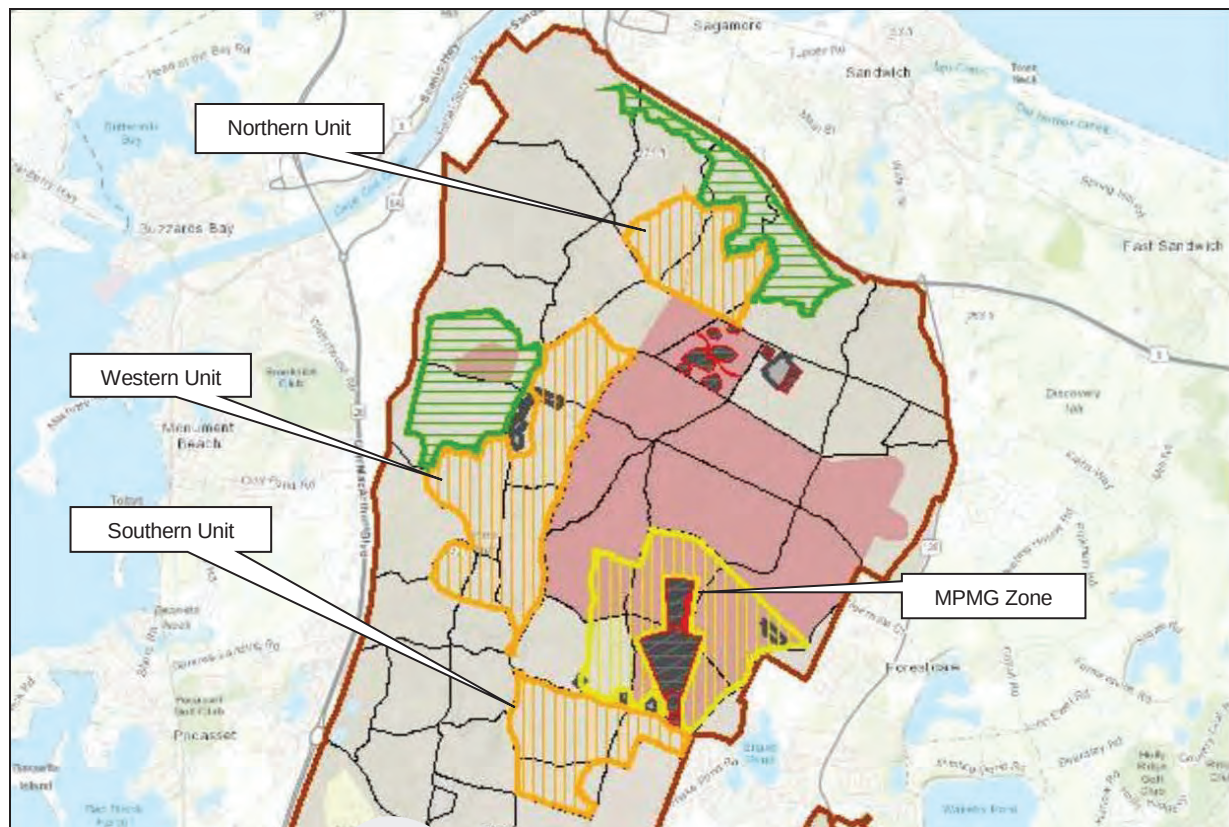


Figure 5.1 Pine Barrens Mitigation Focal Areas

Table 5.1 Pine Barrens Mitigation Focal Areas

Area Description	Habitat	Total
Northern Unit	PPSO, SOS	519
Western Unit	PPSO	1,204
Southern Unit	PPSO, SOS	619
Subtotal		2,342
MPMG Zone	SOS, PPSO, PPOF	1,060
Total		3,402

Mitigation of restoring healthy PPSO and SOS habitats can be done mechanically or by prescribed fires. The two are often most effective when combine for reduces restoration timelines and reduced fire behavior. Mechanical management is much more expensive, but when targeted to facilitate further actions can maximize conservation benefit. Also, as described in Standard #1, mechanical forestry is critical for providing open canopy woodland/shrub condition. The cost of this mitigation is estimated below.

- **Costs of manual mitigation:** Mechanical pine barrens rehabilitation/improvement costs the same, typically, for mowing (e.g., brontosaurus and other forestry mowers) or whole-tree

harvesting with various benefits to each, but whole-tree harvesting typically reducing restoration timelines and long-term expense at \$2,200/acre.

- **Cost of prescribed fire mitigation:** Prescribed fire is budgeted by burn day, which in pine barrens at Camp Edwards typically ranges from 30 acres to 120 acres at \$10,000/day but also requiring long-term planning and management/preparation costs to include fire management program, operation planning, firebreaks, and fuel preparation. See **Section 6.0** for more information on fire management.

5.2.2 Grassland Mitigation Focal Areas

The Grassland Mitigation Focal Areas are comprised of 107 acres in two different areas within the JBCC Cantonment Areas as shown in Figure 5-1 and Figure 5-8 (below) in purple. The intent is to hold these areas in reserve for grassland conversion in the event additional area is needed or conditions/agreements change relative to the primary mitigation area (Parcel H – Unit K). Neither area would be as beneficial for State-listed species as intensive improvement/management in this primary location, but if needed they can provide nearby grassland habitat by removing existing woodland.

The primary weakness to mechanical forestry is dependence on market influence and biomass power generation which is in decline in New England. Reduction in biomass power generation poses a significant risk to effective pine barrens restoration in New England. Two distinct areas have been identified:

- **Training Area BA-2:** 78 acres of PPSO community in a rough “doughnut” shape, leaving a scrub oak filled depression interior that could be managed as a habitat component.
- **1500 Area and 1700 Area:** 29 acres of PPOF immediately west of existing managed grasslands, but separated by paved parking with limited use by remediation programs, especially lay-down and storage for well drilling operations.

The following table provides a summary of the two Grassland Mitigation Focal Areas along with identified habitat categories under existing conditions and habitat that could be restored through active management.

Table 5-10: Grassland Mitigation Focal Areas

Area Description	Habitat	Total
1500 and 1700 Area	PPOF	29.0
Training Area BA-2	PPOF, PPSO	78.0 *
Total		107.0

* Currently wooded area, surrounding nine acre central scrub oak frost bottom (excised from mitigation). Grassland mitigation benefit from proximity to frost bottom

The intent is to utilize one or both of these parcels if Parcel H – Unit K is untenable. Conversion of these areas to MG would involve mechanically converting forested areas to grasslands by removing trees and brush, harrowing, and seeding with native grass seed. Management of the MG would include mechanical mowing and /or prescribed fire every three years and chemical treatment of invasive species, as needed. The cost of this mitigation is estimated below.

- **Costs of manual conversion:** Conversion of forested areas to grassland at \$6,000/acre.
- **Cost of prescribed fire mitigation:** Prescribed fire is budgeted by burn day, which in grasslands at Camp Edwards typically ranges from 20 acres to 60 acres at \$10,000/day.

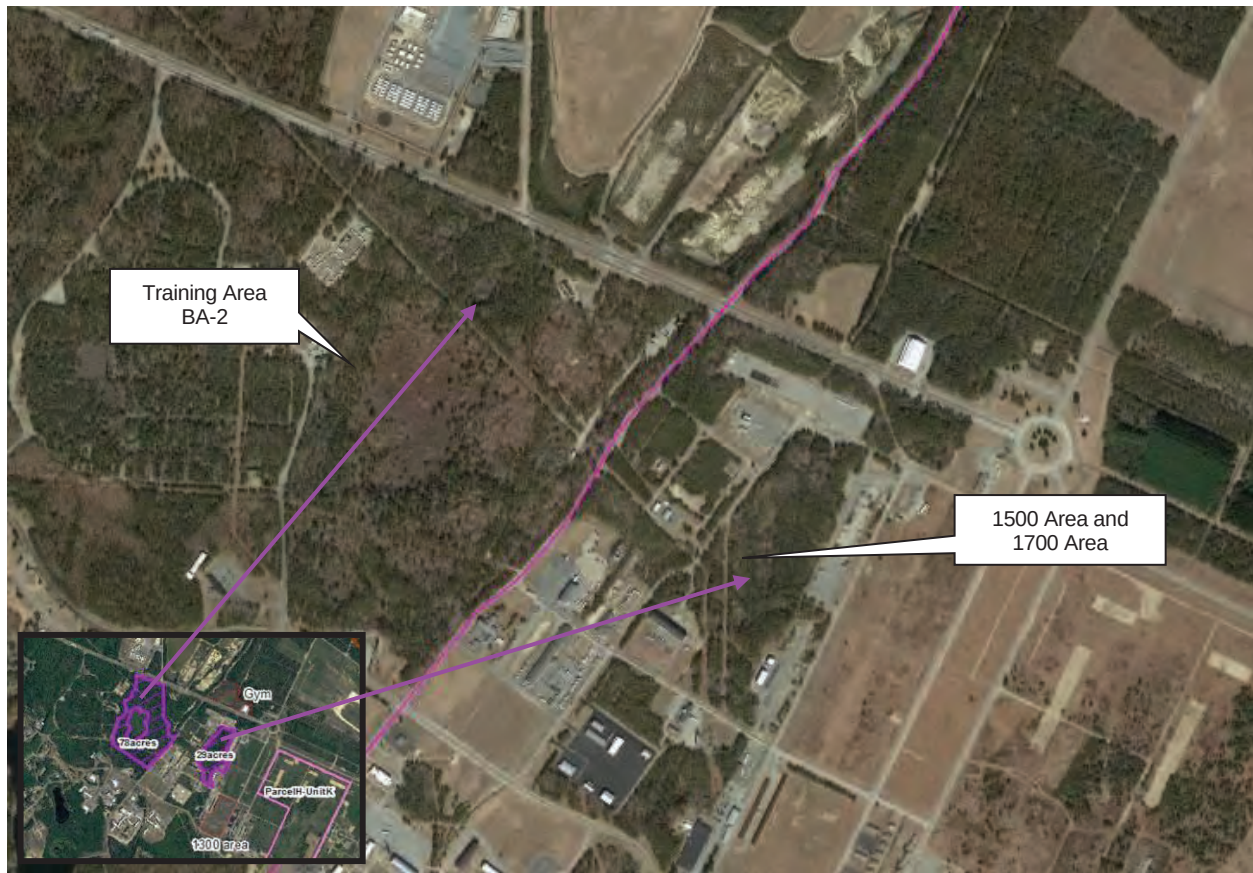


Figure 5.8: Grassland Mitigation Focal Areas

5.3 Monitoring and Research

The following monitoring and research efforts are anticipated to be performed in the upcoming years by MAARNG or with support of MAARNG. Mitigation funding will be required to monitor resources to evaluate effects of proposed actions and effects (long- and short-term) of mitigation actions. This is critical to address some unknowns and to guide adaptive management strategies. Monitoring and research that has already been performed is discussed in **Section 2.13**. Please refer to Table 5-11 for a summary of mitigation costs and year proposed.

- **Moth (Lepidoptera) Survey:** While excellent baseline information exists from Mello (1998, 2017), a targeted survey protocol must be developed and implemented. A plan is scheduled for contracting in 2020 with biennial implementation beginning in 2021.
- **Eastern Whip-poor-will Survey:** Annual implementation of Massachusetts Nightjar Survey Project, including additional route and/or points to cover range and mitigation areas and evaluate population response to impacts and management.
- **Eastern Whip-poor-will Research:** Support of MassWildlife research focused on eastern whip-poor-will. The current focus is a migration study receiving both financial and personnel support from MAARNG.
- **Eastern Box Turtle Monitoring:** Long-term (e.g., four to five year) monitoring of eastern box turtles found and transmitted during construction phase of various project(s) to evaluate impacts of range development and habitat management.

- **Grassland Bird Monitoring:** Annual implementation of grassland bird monitoring throughout MG parcels outside the airfield fence This in continuation of point counts initiated in 2015 and following area census efforts conducted from the 1980s through 2015, providing robust baseline data for trend analysis.
- **Site-wide Bird Monitoring:** While not focused on State-listed fauna site-wide bird monitoring provides for effective site-wide and regionalized impacts analysis.
- **Rare Plant Monitoring:** Populations of State-listed plants will continue to be monitored with particular focus on areas adjacent to project sites or in mitigation parcels.
- **Monitoring of Invasive Species:** The MAARNG has an active invasive plant monitoring mapping and treatment program through the INRMP which is particularly critical in grassland habitat.

5.4 Alternatives Analysis, Avoidance, and Minimization

In consultation with NHESP, the Applicant has developed a plan to avoid and minimize impacts to rare species. A variety of measures will be implemented to avoid and minimize impacts as described below.

- **Site selection:** An alternatives analysis is performed for each project to determine the best site selection relative to impacts and design.
- **Design minimization:** All projects have been designed with significant reductions compared to Army standards specifically to minimize habitat impacts (e.g., reduction of two 800 meter lanes on MPMG Range). Intensive project development including environmental review occurs to minimize impacts.
- **Restrict lighting used in the proposed development (and during construction)** to sodium lights or lights within the yellow/red range. Moths are attracted to lights in the blue range (i.e., mercury vapor lights) which should be avoided.
- **Minimize impacts to rare species during the construction phase of the Project.** Components of construction phase elements include, but are not limited to, employee and construction phase education.
- **Avoid wetlands:** During the site design process, impacts to wetlands will be avoided where possible. If work is proposed within the 100-foot buffer zone to wetlands, approval from the local Conservation Commission will be required. Indirect impacts will be minimized through the use of design minimization, stormwater management, and other BMPs, as applicable.

5.5 Cost of Management

MAARNG has developed a budget for the mitigation of MPMG and the other projects. This budget has been proposed to include all management costs, including mechanical, fire, monitoring and research. Also included is a discussion of financial mechanisms to guarantee restoration and management of habitat

Financial resources are budgeted for the proposed actions through Federal (Army, National Guard Bureau) funding. The Project has been designed to meet the long-term net benefit performance standard by providing for financial or in-kind contributions toward the development. Monitoring and research funding will be provided over a period of years as described in **Table 5-11**. Mitigation funding for range MILCON projects is through the environmental budget of ARNG while facilities projects are through a combination of environmental (e.g., staff) and installation funding. Environmental funding is entered through the Status Tool for Environmental Programs (STEP) and we maintain a seven-year budget including these plans and projects which are included in the INRMP project tables. In addition to the monitoring and research funding, the MAARNG will be funding the various habitat management actions proposed as described in this Plan.

Table 5-11: Actions Proposed by Year

Year		Action	Acres	Cost	Year total
1	2019	Land transfer	132		\$181,700
		Mechanical harvest (Wheelock)	52	\$114,000	
		Prescribed burn	406	\$42,500	
		Mechanical prep for burns*	18	\$11,200	
		Admin (plans, permits)		\$14,000	
2	2020	Prescribed burn	160	\$51,000	\$458,600
		Mechanical harvest (RAW3)	40	\$88,000	
		Mechanical prep for burns	42	\$54,000	
		Admin (plans, permits)		\$22,500	
		Moth survey plan		\$26,500	
		Eastern Box Turtle support		\$216,600	
3	2021	Prescribed burn	160	\$51,000	\$334,500
		Mechanical harvest (BA-7/BA-1)	50	\$110,000	
		Mechanical prep for burns	30	\$36,000	
		Admin (plans, permits)		\$22,500	
		Moth survey year 1		\$55,000	
		Eastern Box Turtle support		\$60,000	
4	2022	Prescribed burn	160	\$51,000	\$162,000
		Mechanical prep for burns	30	\$36,000	
		Admin (plans, permits)		\$15,000	
		Eastern Box Turtle support		\$60,000	
5	2023	Prescribed burn	160	\$51,000	\$205,000
		Mechanical prep for burns	20	\$24,000	
		Admin (plans, permits)		\$22,500	
		Moth survey year 2		\$55,000	
		Eastern Box Turtle support		\$60,000	
6	2024	Prescribed burn	160	\$51,000	\$162,000
		Mechanical prep for burns	30	\$36,000	
		Admin (plans, permits)		\$15,000	
		Eastern Box Turtle support		\$60,000	
7	2025	Prescribed burn	160	\$51,000	\$205,000
		Mechanical prep for burns	20	\$24,000	
		Admin (plans, permits)		\$22,500	
		Moth survey year 3		\$55,000	
		Eastern Box Turtle support		\$60,000	

Due to early planning for mitigation needs, MAARNG accessed \$76,600 of funds dedicated to MPMG Range mitigation and leveraged this for an additional \$158,791 of funded mitigation projects. Funding is also approved for the coming seven years in the Federal budget, but will benefit from the funding assurance provided by a formal CMP. The direct FY2019 funds and associated acres were obligated for mitigation implantation as follows:

- Wheelock Overlook: \$114,461.50 (52 acres)
- Prescribed Burn (Grassland Parcel H - Unit K): \$7,487.50 (42 acres, burn days only)
- Prescribed Burn (Pine Barrens Focal Areas): \$56,492 (446 acres, 8 burn days)
- Eastern Box Turtle Protection Plan development and initial survey: \$36,000
- In-house turtle surveys: estimated \$5,270
- Site-wide and grassland bird monitoring: \$12,320
- State-listed plants : \$3,360
- **Total: \$235,391**

Ongoing monitoring includes the following:

- Grassland and site-wide birds: \$8,960
- State-listed plants: \$3,360

The following actions were performed in FY2020 (October 2019):

- Roads and Grounds crews mowed about 80 acres of Parcel H - Unit K in October 2019 to fight back invasive plants and woody encroachment. While this is more than the intended 30% per year management standard (#4) it is well within that percentage for the overall grassland complex in Cantonment. The mowing was specifically targeted on setting back invasive shrubs which is most effective with a late season mow. The location was predominately the area cleared of trees in 2017 and is at the greatest risk of loss to invasive shrubs. This over investment relative to the mitigation bank is not intended to reduce effort in following years but can help to offset management shortfalls that may occur due to unforeseen circumstances.

5.6 Annual Reviews

The MAARNG will commit to annual reviews by NHESP to determine the success of the mitigation work. The Camp Edwards Environmental & Readiness Center (E&RC) already performs annual reviews publishes as required by Chapter 47, Acts of 2002. An Annual State of the Reservation Report is published for each training year. Copies of the report are provided to the EMC, SAC, and CAC, made available at the town libraries in Bourne, Sandwich, Mashpee, and Falmouth, and a notice of availability published in the Environmental Monitor annually. The MAARNG recommends that the annual review coincide with the drafting of the Annual Report prior to publishing.

DRAFT

6.0 Fire Management

Natural communities within the Camp Edwards, such as pitch pine and scrub oak communities, are fire-dependent systems shaped over thousands of years. With Euro-American influence, the natural fire regime has mostly been suppressed and replaced with infrequent human induced catastrophic fires creating a severe wildland urban interface. Risk of wildfire at the base increases the risk of wildfire entering the adjacent urban/suburban areas outside of the base. It is imperative that the MAARNG and the surrounding communities address and plan for wildland fire. Fuel load is presently extreme particularly in areas with UXO hazards as is the case in the majority of areas around the MPMG Range.

New aspects of range use at Camp Edwards introduce significant wildfire hazard into unmanaged and high risk fuels conditions through the use of tracers and training aids including flares. Tracers are forms of ammunition that include a small pyrotechnic charge which makes the trajectory of the ammunition visible in the day time and night time. All ranges using tracers will need to be surrounded with firebreaks and managed fuel conditions. Other ignition sources are flares (used to illuminate the range temporarily at night) and simulators (used to mimic artillery or grenades from opposing forces).

In addition, the MPMG Range is located partially within the dudged (high explosive) Impact Area at the northern portion of the proposed range. Additionally areas surrounded the range to the west and east are UXO hazard areas due to past range use. Risk reduction measures are proposed prior to range use through reduction of fuels, creation and maintenance of fire breaks, and prescribed burning. The Camp Edwards Integrated Wildland Fire Management Plan (IWFMP) is presently being updated and will include the location of needed firebreaks including appropriate scale to sufficiently reduce the risk of MPMG Range-caused wildfires. Firebreaks will help facilitate safe suppression operations combined with prescribed burning to reduce wildfire risk.

The initial 2 to 5 years of fire management will be the most challenging as fuel loading is extreme due to vegetative growth and lack of fire after the end of explosive ordnance training and a majority of areas have ordnance concerns. The MAARNG is in the process of planning now for future actions including ordnance removal and fuel treatment efforts. The introduction of fire will only occur once these actions are completed introducing timing uncertainty. Following initial entry with fire, there will be some increase in fine and light woody fuels requiring at least one re-entry fire to reduce ignition probability and achieve hazard mitigation through reduction of ladder fuels and other characteristics.

6.1 Firebreaks

The firebreak project involves the construction and maintenance of firebreaks throughout Camp Edwards to reduce the risk of a large wildfire and assist in managing the fighting of fires. Firebreak and fuels management involves the alteration of fuels to reduce the likelihood of a fire starting or to reduce its effects if one does start. These techniques may improve access for fire apparatus, and provide buffer or safety zones for firefighters while focusing on improving habitat conditions overall. Natural communities within the Camp Edwards, such as PPSO and SOS communities, are fire-dependent systems shaped over thousands of years. With Euro-American influence, the natural fire regime has mostly been suppressed and replaced with infrequent human induced catastrophic fires creating a severe wildland urban interface. It is imperative that the MAARNG and the surrounding communities address and plan for wildland fire.⁴

The firebreak planning standard is a 15-foot gravel or hardpacked dirt road with 30-feet of winter mowed grass/forb/low shrub on each side and a 200-foot fuel management buffer (shaded fuel break) beyond that

⁴ IWFMP 2006

on each side with mosaic understory mowing (initial) and mechanical tree thinning to 20-40 foot spacing. This project involves 10.0 acres of new road (roughly 4.5 miles of new road) which will be considered a Take and 77.0 acres of mowed firebreak edge which will be considered as overall habitat benefit from mowing for early successional species. This will result in the direct impact, but not loss, of PPSO, _____ acres of SOS, _____ acres PPOF, and _____ acres of MG habitat to range development and firebreak roads.

Most or all species are anticipated to benefit from a combination of direct habitat management (e.g., fuel management buffers, prescribed fire) and the indirect habitat management made possible through range development, fire management support (e.g., new or improved firebreaks), and ordnance remediation. An explicit overarching goal for fire and fuels management is to maintain the existing barrens habitat types. Firebreaks will directly convert 10 acres of habitat into new firebreak roads. The remaining 77 acres will be mowed 30-foot edges from the roads managed for fire control while also enhancing habitat value, but especially intended to allow for managing currently unmanageable and degrading habitat. Shaded fuel breaks will be designed and implemented to maintain community composition, but in more open conditions which will better support all the listed species and provide for community safety and ecosystem resilience.

Strategic firebreaks are proposed to be constructed along the exterior of the MPMG Range and surrounding area. The firebreak immediately surrounding the range will be part of initial construction. Additional firebreaks will be constructed as a separate project with different funding. Well planned, strategically located, and well maintained firebreaks are key to reduce the risk of a large wildfire and assist in managing the fighting of fires. Firebreak and fuels management involves the alteration of fuels to reduce the likelihood of a fire starting or to reduce its effects if one does start. These techniques may improve access for fire apparatus, increase water resources available on-site, adjust target placement, and provide buffer or safety zones. The proposed firebreaks are shown in **Figure 6-1** which include a combination of:

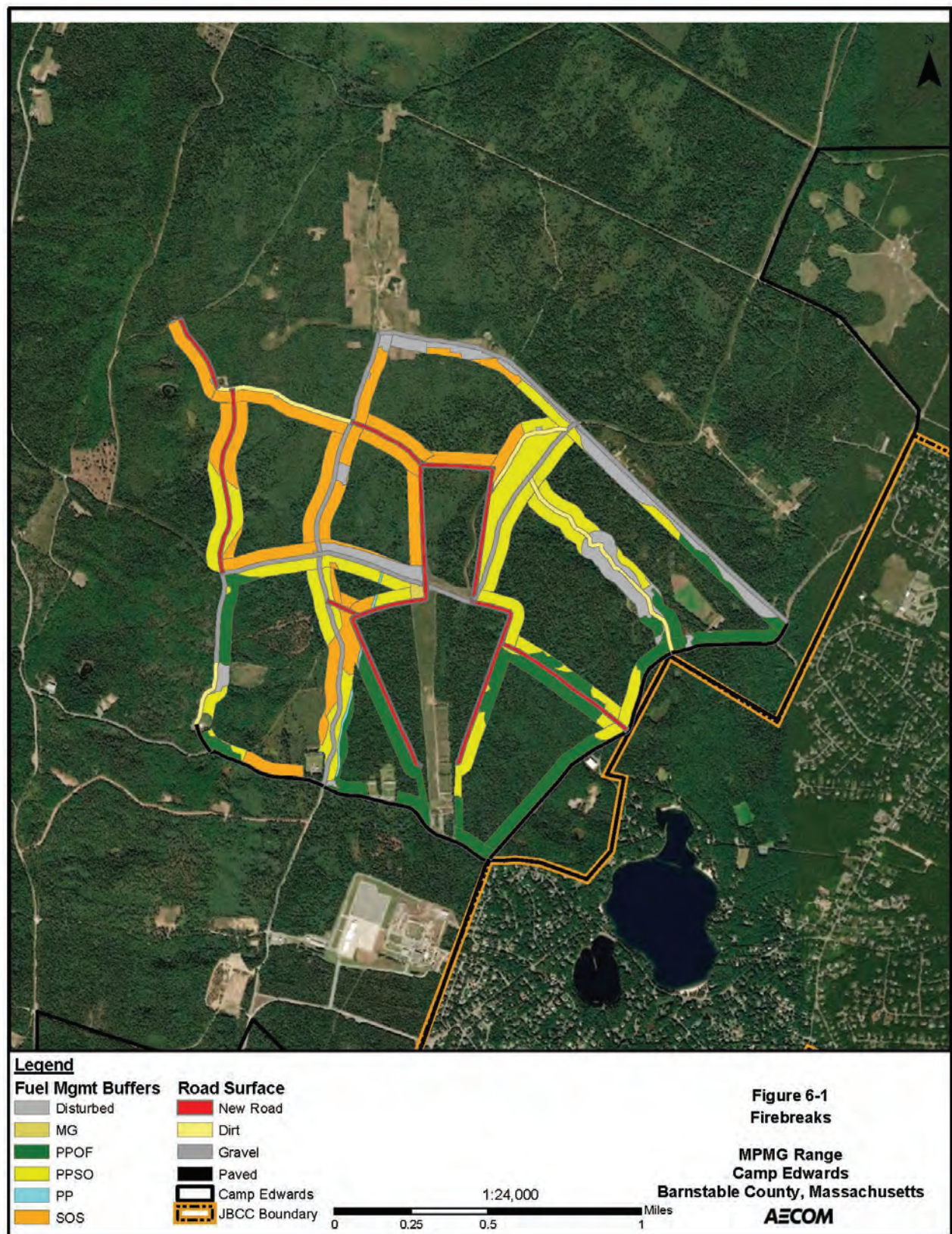
- Maintaining existing roads and mowed edges,
- Improving and widening existing roads and/or mowed edges
- Creating new roads and mowed edges, and
- Creating shaded fuel reduction zones flanking all fire breaks.

Firebreaks will be located along existing roads where they exist. However, based on anticipated fire behavior additional break are necessary to minimize ecological and community risk. The firebreak planning standard is a 15-foot gravel road with 30-feet of winter mowed grass/forb/low shrub on each side and a 200-foot fuel management buffer beyond that on each side with mosaic, targeted understory mowing (initial) and mechanical tree thinning to 20-40 foot tree spacing. Each of these firebreak components are described in more detail below. It is anticipated that most or all pine barrens species will benefit from a combination of direct habitat management (e.g., fuel management buffers, prescribed fire) and the indirect habitat management made possible through range development, fire management support (e.g., new or improved firebreaks), and ordnance remediation. Construction of the MPMG Range and tracer use elsewhere forces fire hazard reduction projects in areas previously and currently unmanageable due to UXO hazard. This inability to manage is the greatest threat to SOS and associated rare species at Camp Edwards, and, by extension, Southeastern Massachusetts.

Overall firebreak elements include:

- **Firebreak roadways:** 15-foot wide gravel or dirt road; maintained sufficiently for infrequent emergency and management vehicles.
- **Mowed edges:** 30-foot wide mowed edges (total width with road and both sides = 75 feet);
- **Shaded fuel breaks:** 200-foot wide thinned forest buffer on either side (20-40 feet average tree spacing).

Please see **Appendix A** the end of this section for photographic examples of these elements.



Firebreak work associated with the MPMG Range is proposed to involve 10 acres of new road (roughly 4.5 miles of new road) and 77 acres of new mowed firebreak edge. The roadway impacts are addressed in **Section 4.6** relative to the MPMG Range project. While the roads are being treated as a Take, the introduction of additional road edge and shaded fuel breaks is considered beneficial pine barrens management, including Eastern Box Turtles, assuming BMPs for maintenance are followed. Monitoring will inform this determination and responsive action/mitigation.

6.1.1 Firebreak Roadways

Firebreak roadways are designed to be 15-foot wide and constructed of either gravel or dirt. Dense-grade bluestone will be used where needed with stretches of roadway stabilized and capped. These roadways are either existing and will be improved to meet the current planning standard width or they will be newly constructed (see **Figure 6-1**). New roadways will look similar to the existing roads surrounding the Impact Area. Firebreak work associated with the MPMG Range is proposed to involve 10.0 acres of new road (roughly 4.5 miles of new road). Range roads along the exterior of the MPMG Range and within the range will be graded and spot repaired as necessary to allow for emergency access (fire response) and will be gated and locked most of the time. The intent is somewhat primitive roads, but sufficient for habitat management assess and emergency response as with the training road/trail network existing at Camp Edwards.

6.1.2 Mowed Edges

Mowed edges will be 30-foot wide to allow for tractor mowing (two bat-wing deck widths). These edges will be mowed once a year late November to mid-December and will be cut down to 6-8 inches. Mowed edges will be located at firebreaks and adjacent to primary access roads for the MPMG Range. The vegetation is kept low enough to minimize fire behavior. It is critical to provide separation to reduce crown fire potential and minimize firefighter exposure at edges. In addition, this low vegetation management allows for emergency equipment to pull off the road.

This work will provide a moderately high diversity of native grasses, forbs, and low shrubs anticipated to be used by pollinators and other rare species to include Eastern Box Turtle nesting habitat. This treatment allows for effective mowing of woody species while avoiding negative impacts on turtles and birds. Current roads managed in this way have exceptional pollinator habitat and use by woodland edge species. Vegetation such as wild indigo (*Baptisia tinctoria*) is abundant as are heath species such as blueberry, huckleberry, and scrub oak, all intermixed with openings of bare soil, native grasses, and variety of flowering plants, ideal for species like the Frosted Elfin and Walsh's Digger Bee. Additionally, research has found that Whip-poor-wills at Camp Edwards prefer these edges for display and nesting. Access to forbs and diverse forage is apparently a primary limiter to species like the New England Cottontail at Camp Edwards and the edges will presumably provide nesting habitat for Eastern Box Turtles and puddles for Agassiz's Clam Shrimp.

The mowing of roadway edges for fire protection is not considered a Take of rare species as it will enhance the habitat as described above and the habitat is still vegetated. This work actually improves habitat for rare species concerned by providing edge habitat (used by Eastern Whip-poor-wills) and rare food/nesting (turtles) habitat including forbs for a variety of species. Maintenance work will be scheduled in late fall/early winter to avoid encounters with rare species and designed to minimize or eliminate any impacts to rare species. Approximately 77 acres of new mowed edges are proposed throughout Camp Edwards as shown on **Figure 6-1**.

6.1.3 Shaded Fuel Breaks

Shaded fuel breaks are strips of land adjacent to the mowed edges of the roadways where fuel is managed and reduced to limit the spread of a fire especially development or spreading of crown fires. These fuel breaks will be roughly 200-feet wide and mechanically thinned. The goal of this management feature is to maintain significant tree canopy with an open heath/scrub understory while reducing severe wildfire conditions that currently exist including closed canopy with severe ladder fuels (connection of shrub layer to canopy). This will maintain a high quality PPSO natural community and barrens heath community. At this time, these fuel breaks are proposed specifically for the MPMG Range but may be used in the future elsewhere if needed. An example of a target condition is found at the western portion of Crane WMA (northern unit).

Trees would be thinned to roughly 20 or 30 foot spacing to minimize potential for running crown fire while maintaining canopy cover for speckled shade and moisture retention. Mechanical treatment of the understory will be done with by mowing with a skid steer or other heavy equipment only as needed to reduce wildlife hazard which will likely occur in the winter. This forestry will occur hopefully in 2021 to 2023.

With the reduced canopy cover, the understory would benefit significantly from increased solar exposure, a critical need of pine barrens moths, but drying conditions would be moderated by remaining canopy to reduce fire hazard. As a benefit, shaded fuel breaks will mimic typical thinning projects for southern pine beetle risk reduction (e.g., 80 square feet per acre basal area) while providing enhancement of pine barrens flora and fauna. Retention of the trees will help to reduce potential noise issues when the range is in use and will minimize tracer ricochet and travel. The overall goal is to maintain and promote a high quality pine barrens habitat while significantly reducing wildfire hazard, which are consistent and achievable goals realized with success through the region and on-site over the past five years.

6.2 Prescribed Burns

Prescribed burning is a form of active management that is labor intensive and requires much planning in advance. Historically the pine barrens were subject to periodic burning by wildfire. These fires resulted in a regeneration and maintenance of the habitat type. Absent other management intervention strategies, fire may be needed for many of the ecological processes which take place in the pine barrens habitat. Without fire or other disturbances, the pitch pine canopy closes and greatly reduces the value of habitat for the rare moth species. White oak also begins to dominate pine and oak stands and convert communities through mesification. Wildfires are typically contained and extinguished before large areas are burned. Prescribed burns are controlled and can closer mimic the wildfires of the past. Reduction of fuel loads could prevent or reduce the intensity of possible wildfires thereby protecting existing and proposed developments such as bordering neighborhoods. In order to implement prescribed burning, MAARNG developed the 2007 IWFMP which has been implemented since that time with successful burning of over 4,000 acres.

The goal of fire management is to support the military mission of the Camp Edwards Training Site, to promote public safety and the protection of the surrounding community from wildland fire, while promoting the sustainable management of native biological systems by encouraging sound fire management planning, policy, and procedure and also to:

- Guide the decision making process so that safety, social, political, and resource values are evaluated and addressed with appropriate management.
- Provide a framework for fuels management through the use of prescribed fire.
- Provide a platform for cooperation in planning and implementing a fire program within and across agency boundaries.

General policy for the JBCC is to control wildfires due to the potential for damage to resources, the protection of property, and to avoid potential liability from property loss and threats to human safety. However, an integral part of wildland fire management at Camp Edwards includes proactive steps at both the local and landscape scale. Fire management strategies specific to Camp Edwards at the JBCC include wildland fire suppression, wildland fire use, prescribed fire, non-fire fuel management, no action policy, and emergency rehabilitation and restoration, if needed. The IFMP outlines potential management strategies and options.⁵

Prescribed burns are, or will be planned throughout the Pine Barrens Focal Areas and MPMG Zone. Burn plans already exist for the northern and western units, with some burns already completed. Fire techniques and management goals vary by unit and operation, but overall are designed to scorch the majority of the ground and shrub level, promoting resprouting and plant vigor and reducing ladder fuels. A primary need of fire management is treatment diversity. Homogenous treatment leads to homogenization of habitat and, typically, significant reduction in biodiversity as it selects for only a subset of species depending on timing, severity, and other conditions. A mix of seasonality, weather conditions, ignition techniques, pre-treatment, and other variables is critical to ecosystem management and meeting conservation goals.

6.2.1 Fuel Treatments

Fuels within pine barrens include fine fuels from the leaf litter of oaks and pitch pines that is fast drying and can ignite rapidly. Moderate fuels in the shrub layer and heavy fuels comprised of larger diameter branches and logs which are slower to burn than the fine fuels. Older stands of scrub oak and ericaceous shrubs have more dead branches which can catch fire. Vegetation present at Camp Edwards like huckleberry and scrub oak contain volatile oils that may increase the intensity of a fire. The type of fuels can affect how a fire ignites, how it spreads, the intensity of the fire, and the duration of the fire.

A burn plan will quantify the "fuel load" for any mitigation areas proposed to be burned which is the amount of combustible material within a habitat including live fuels, dead woody material, and leaf litter. When a burn plan is developed, the fuel load is estimated based on field assessment and fuel model assignments, quantifiable reduction goals can be developed at that time. For example, for units with high fuel loads (and therefore, more fire danger), the fuel load goals may be reduction of 60-80 percent. Once these loads are established, mechanical treatments can be performed tailored to each burn unit. If fuel loads should be reduced by 60-80 percent, then it is possible to perform a heavy mechanical treatment reducing the midstory shrub layer by this amount to be followed by a prescribed burn.

Fuel loads can be reduced through mechanical treatments such as mowing, brush-hogging, and logging of trees. This treatment is often used to treat areas prior to prescribed burns to reduce fuel loads. Prescribed burning is critical tool to keeping fuel loading down to avoid catastrophic wildfire. Immediate areas surrounding the range and priority fire breaks will require targeted mechanical mowing of shrub layer (mastication) to safely implement fire. This could create short-term impact on state-listed species (e.g., lepidoptera) and some loss of turtles. Efforts will be made to implement brush mowing during the hibernation period, however, burning masticated fuels could also present a risk to turtles. Mastication will be limited to areas critical to provide for safe prescribed burning or critical wildfire hazards areas. Many areas are currently unburnable or unsafe to burn without prior fuel treatment of overstory (e.g., dense pitch pine canopy) or understory (e.g., dense and tall scrub oak).

⁵ https://www.massnationalguard.org/ERC/fire_mgmt.htm

6.2.2 Burn Intervals

Burn intervals necessary to avoid extreme hazard conditions are being studied at this time and it will likely be necessary to have less than a 5-year return interval. Prescribed burns will likely occur every three years depending on conditions and adaptive management as the MPMG Range is used. The MPMG Zone will likely require frequent burning in the initial five years of range operations (annual to biennial) to reduce fuel loads, reduce fire risk from duff/litter and forest structure, and enhance habitat. Maintenance burning will likely occur on a three-year interval within approximately 2,000 acres. This will mimic historic fire intervals of the SOS from the later 1800s through 1980s.

Short return intervals would be beneficial ecologically because that would facilitate patchy burns with low severity. Fuel accumulation is unlikely to support annual intervals unless there is some vegetative community conversion (e.g., significant incursion of grasses and other fine fuels to carry fire) which is counter to overall habitat goals. Longer return intervals will lead to more significant fuel loading and higher severity (less frequent, but more intense/severe burns). After the initial two burns within a unit, the annual leaf drop will be unlikely to carry fire and intervals will be two to five years based on fuel accumulation.

- Immediate areas surrounding MPMG Range will likely require frequent burning in the initial five-years (annual to biennial for first and second entry into a unit) to reduce fuel loads and reduce fire risk from duff/litter and forest structure.
- Anticipated maintenance burning on three-year average (range two to five years) interval throughout approximately 2,000 acre area. Rotation should closely mimic historic fire interval of these scrub oak barrens from the late 1800s through the 1980s.
- Likely short-term impact on scrub oak and heath lepidopterans in immediate area, but based on rotation and rerun intervals through large areas, this should provide significant long-term benefit.

It is anticipated that areas within the MPMG Zone will be subject to ordnance removal and mechanical fuel treatment before any prescribed burns occur. Therefore, it will likely be at least 2023 before fire is reintroduced into the areas surrounding the MPMG Range. Safety standards addressing firefighter proximity to potential ordnance for prescribed burning and wildfire suppression are being investigated and developed. Burning will likely require aerial ignition of interior areas and ordnance removal within a safety buffer around firebreaks.

6.2.3 Fire Training

MAARNG funds and hosts wildland fire training including a spring safety refresher. Typically, MAARNG hosts an annual wildland fire mini-academy for local wildland fire partners through New England. The partners provide program and operation support to MAARNG in return. This ensures all well-trained wildland fire community and maintains partnerships. Additionally, MAARNG has a volunteer in-house fire crew (all serving "other duties") receiving internal safety refreshers and support, proactive fire support, equipment maintenance, and wildland fire operational support.

6.3 Management Methods

Active management involves mechanical treatments (i.e., mechanical tree removal, brush hogging) and, if practicable, prescribed burning. MAARNG has identified management units suitable for active management. These units will be subjected primarily to mechanical actions in accordance with the proposed management goals. In many circumstances such as locations close to boundaries, highways, or buildings, fire may not be an appropriate means for managing habitat. Mechanical removal of vegetation can mimic many of the benefits of fire where fire is precluded due to complexity or proximity to resources.

Restoration, for the purposes of this Plan, is defined as the reversion of a succeeding habitat condition to a previously existing habitat condition. For example, reduction of non pine barrens species from the tree canopy to promote the pine barrens habitat vegetation can be performed in areas not presently identified as pine barrens. This is an appropriate strategy where the pine barrens habitat once existed but has become dominated by non pine barrens species such as white pine and white oak which are less tolerant to fire. By removing or reducing the canopy coverage using forestry management activities, the habitat value can be "increased" in areas where the pitch pine overstory has become dense or overgrown and has thereby reduced the value of the rare species habitat provided by the scrub oak and ericaceous understory. Methods used for habitat management are described in **Section 5.3**.

6.3.1 Mechanical Tree Removal

Mechanical tree removal is the removal of individual trees from the tree canopy to promote the growth of shrub species in the understory and promote healthier tree and stand condition in the overstory. It serves to maintain or restore more early succession pine barrens habitat and usually involves whole-tree harvesting. This can be achieved through logging with or without chipping of the harvested logs. Stand treatment is determined based on site conditions, habitat goals, and forestry assessment. Logs will be removed from the mitigation area or trees will be chipped at the site. As there is no merchantable timber at Camp Edwards, chipping for biomass fuel generation is standard. This depends on market and sufficient generation. If chipping is the method of disposal for the logs, all chips shall be removed from the site in order to reduce build-up of fire fuel and avoid mesification and conversion of pine barrens through increase in soil nutrients. A significant benefit of whole tree removal combined with fires is restoring lower soil nutrient conditions that support the barrens community. Additionally, pine chips encourage bark beetle incursions. Logging, including the dragging of trees to a landing area, can be used to create bare areas in the soil to promote recolonization of heath or grasses species in areas of dense scrub oak cover and to provide more mineral habitat for the recolonization of pine barrens species. While some scarification of the soil is beneficial, the management contractor will be directed to minimize scarification of the soil in order to reduce the colonization of densely grown pitch pine saplings.

Timing of this type of treatment and application as mitigation for projects depends on the timing of the projects. For example, this type of mechanical tree removal includes projects such as the Wheelock Overlook timber harvest which was completed in 2019 to remove live and dead standing trees in order to reduce canopy closure and dead fuel loading on approximately 50 acres where a 2015 prescribed burn occurred. The removal of the dead trees will improve the safety of the area for training purposes, significantly reduce smolder/smoke hazard for fire, and help to restore the PPSO in this area. In addition, the thinning of mature trees will increase understory productivity and enhance wildlife value. This treatment has been prioritized as the first mitigation implementation to offset loss of pine barrens habitat to the development of the MPMG Range as this restoration component is a critical accomplishment associated with the MPMG Range project (See Standard #1). The cost of mechanical tree removal is typically around \$2,200/acre but is dependent on market value for biomass generation (a declining industry, regionally).

6.3.2 Mastication

Mastication involves the mechanical removal of the understory by mowing and chipping. Buildup of wood chips can increase the fuel load of the habitat and create a smolder concern in addition to increasing soil nutrients (counter to barrens management). Therefore, chips would need to be removed from the treated area or kept at a minimum. Scrub oak can be cut to approximately one foot above the ground by brush hogging and will regenerate with sprouts. This type of cutting is recommended for early successional scrub oak habitat where the scrub oak is greater than three feet in height. Based on scrub oak growth rates, some areas will be treated by mastication once every 10 years if not maintained by fire. Timing of additional treatments will be decided based on future monitoring efforts. The cost of mastication averages \$2,000/acre. Mastication is critical to making some areas burnable or managing fuels in areas otherwise unburnable. Fire

is typically the best method for removing masticated debris (chips) and the collapse of hazardous fuels to ground level makes unburnable fuels management with high intensity ground level fire and exceptional scrub oak response.

6.4 Adaptive Management

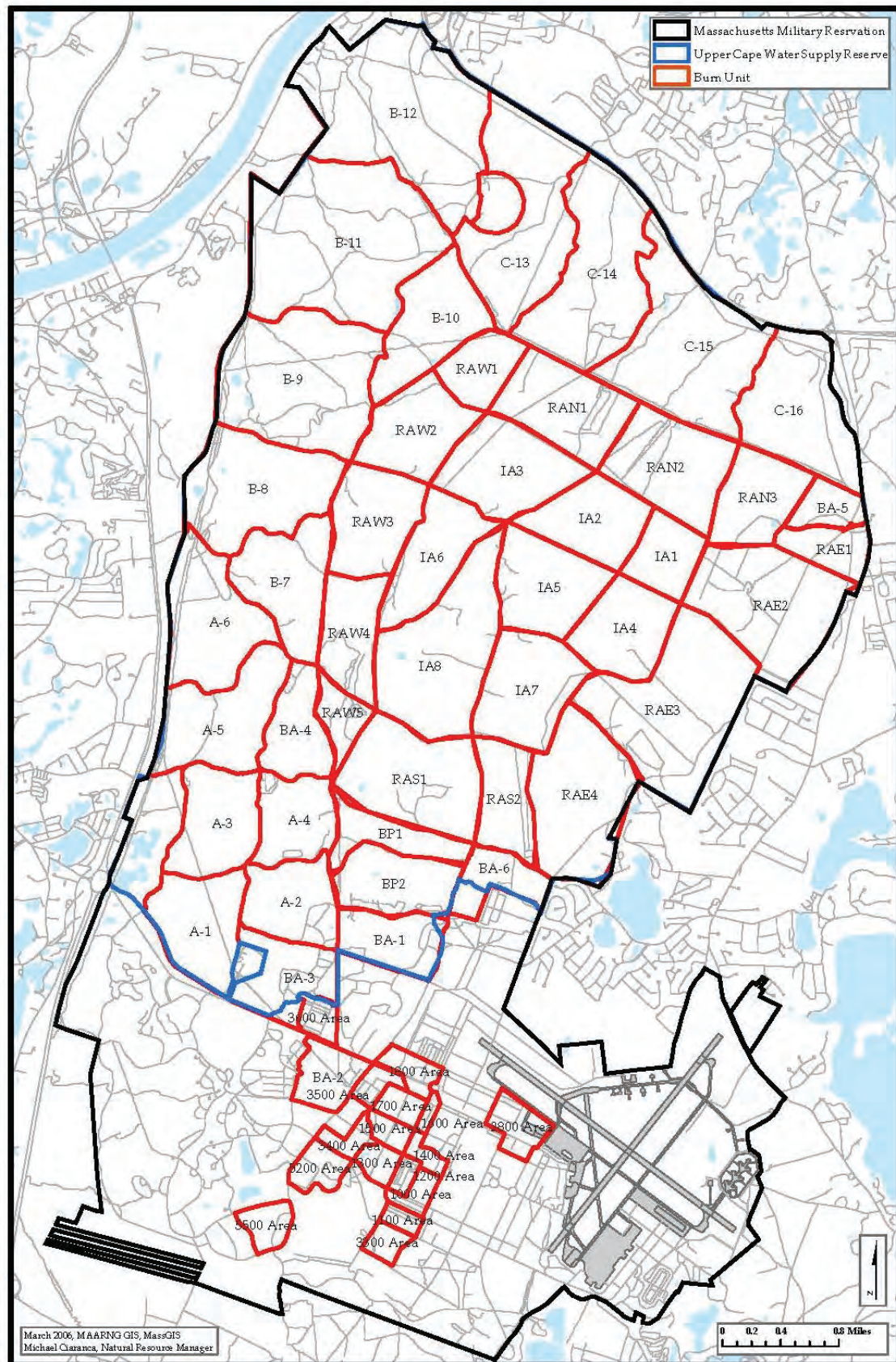
All fire management at Camp Edwards is performed with a focus on minimizing ecological impact and maximizing community safety. Monitoring of various resources will guide adaptive management for the use of fire. Information obtained from monitoring will allow the MAARNG to react accordingly, if reasonable. Necessary adjustments will be made relative to return intervals of fire or other management actions. Adaptive management will also allow the MAARNG to mitigate unanticipated negative effects, if any, specifically on State-listed species such as Eastern whip-poor-wills, State-listed moths, Eastern Box Turtles, etc. Impacts on State-listed species and vegetation guilds will be assessed. All monitoring will be reported to the State annual including actions taken, action proposed, monitoring of resources, and assessment of management and treatment regimes.

Adaptive management will model expected fire behavior, inform fuel reduction projects, and drive long-term management decisions on type and frequency of management. Options include reducing management (e.g., longer return burn interval) or increasing management (e.g., adding mowing, shorter return burn interval) depending on results from both wildfire and natural resources monitoring (e.g., moths). If treatments intended for habitat improvement are found to have unanticipated negative impacts, sufficient areas are identified for mitigation to provide additional mitigation and/or adjust techniques appropriately.

6.5 Fire Management Performance Standards

All activity at Camp Edwards must meet the EPS Fire Management Performance Standards which include the following:

- 11.1 All activities and uses shall manage, prevent, detect, and suppress fires on the Camp Edwards Training Area in coordination with the local and state fire services and natural resource managers in the E&RC.
- 11.2 Prescribed burns will be used as a habitat management and fire prevention tool. Prescribed burns will be used to reduce natural fire potential and create or maintain diverse and rare species habitat.
- 11.3 Pre-suppression activities will include strategic firebreaks and other management of vegetation in high risk and high-incidence areas. The INRMP and Fire Management Plan will be consulted for proposed actions.
- 11.4 Other than the above, no open fires are allowed.



Appendix A: Fire Management Element Photographs

DRAFT

Appendix A: Fire Management Element Photographs**Photo 1: Mowed Firebreaks**

Image show current conditions (September 2019) of mowed firebreak with a 20-foot mow to the right of the road and an 8-foot mow to the left. Note the plant diversity in the mowed areas which is consistent throughout and responds well to an annual later fall mow.

**Photo 2: Mowed Firebreaks**

Image show current conditions (September 2019) of mowed firebreak with a 30-foot mow to the right of the road and an 10-foot mow to the left. These edges provide quality habitat for many species.



Photo 3: Shaded Fuel Breaks

Image shows management results to maintain high quality pine barrens by reducing overall basal area, ladder fuels, and canopy connectivity to significantly moderate fire behavior and facilitate fire suppression response.

**Photo 4: Shaded Fuel Breaks**

Aerial example of shaded fuel breaks in the western portion of the Crane Wildlife Management Area.



Photo 5: Managed Fuel Breaks



Photo 6: Managed Fuel Breaks



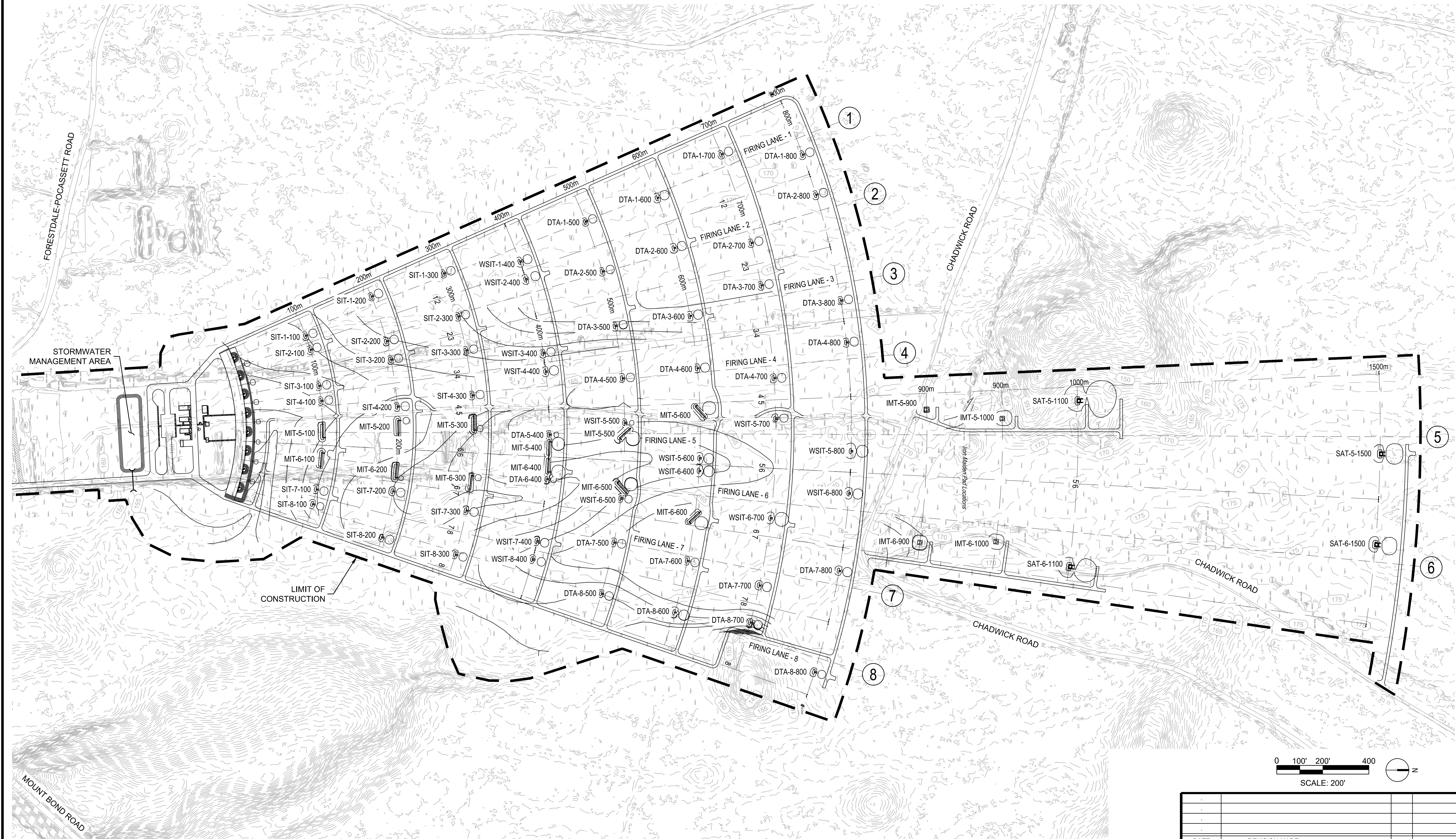
**Photo 7: Range Floor
(Managed Grasslands)**



Appendix C: MPMG Range Design Plans

- Overall Site Plan (1500M) Sheet SP201 dated 19 July 2019
- Surface Danger Zone Plan (1500M) Sheet C-402 dated 19 July 2019
- Overall Existing Conditions Plan (1500M) Sheet V-200 dated 26 March 2019
- Overall Site Plan Sheet C-003 16 September 2019
- Surface Danger Zone Plan Sheet C-401 dated 16 September 2019

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OVERALL SITE PLAN (1500M)			
DATE: 07/19/2019	DES BY: HAB	BAKER PROJECT NUMBER 170789	SHEET NO: SP201
SCALE: AS NOTED	DWN BY: HAB	GOV. PROJECT NUMBER 250194FY19	59 OF 74
SIZE: ANSI D	CHK BY: KM		
FILE: SP201.DWG			

Michael Baker
INTERNATIONAL

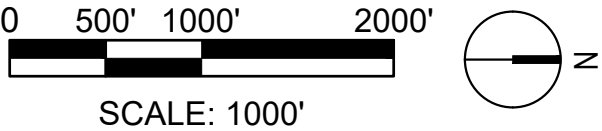
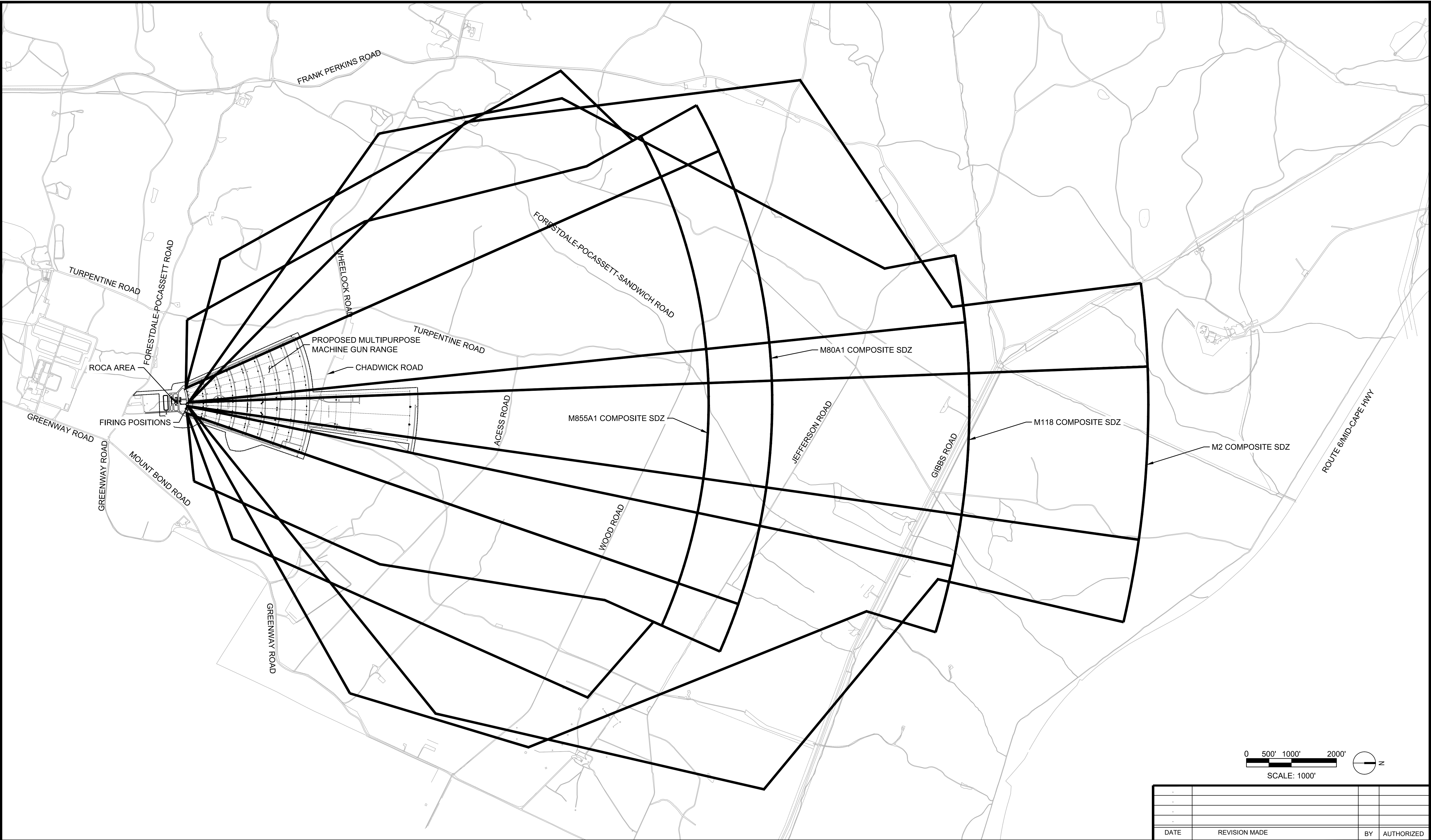
MICHAEL BAKER INTERNATIONAL
125 CAMBRIDGE PARK DRIVE, SUITE 502
CAMBRIDGE, MASSACHUSETTS 02140

AUTOMATED MULTIPURPOSE MACHINE GUN RANGE (MPMG)
CAMP EDWARDS JOINT BASE CAPE COD
BOURNE, MASSACHUSETTS



TYPE A: APPENDIX 07-22-2019

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Michael Baker
INTERNATIONAL

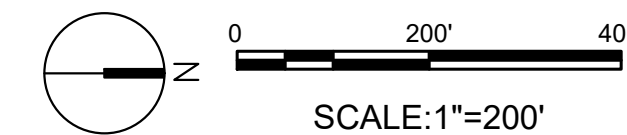
MICHAEL BAKER INTERNATIONAL
125 CAMBRIDGE PARK DRIVE, SUITE 502
CAMBRIDGE, MASSACHUSETTS 02140

AUTOMATED MULTIPURPOSE MACHINE GUN RANGE (MPMG)
CAMP EDWARDS JOINT BASE CAPE COD
BOURNE, MASSACHUSETTS



TYPE A APPENDIX 07-22-2019

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		BAKER PROJECT NUMBER	
		GOV. PROJECT NUMBER	

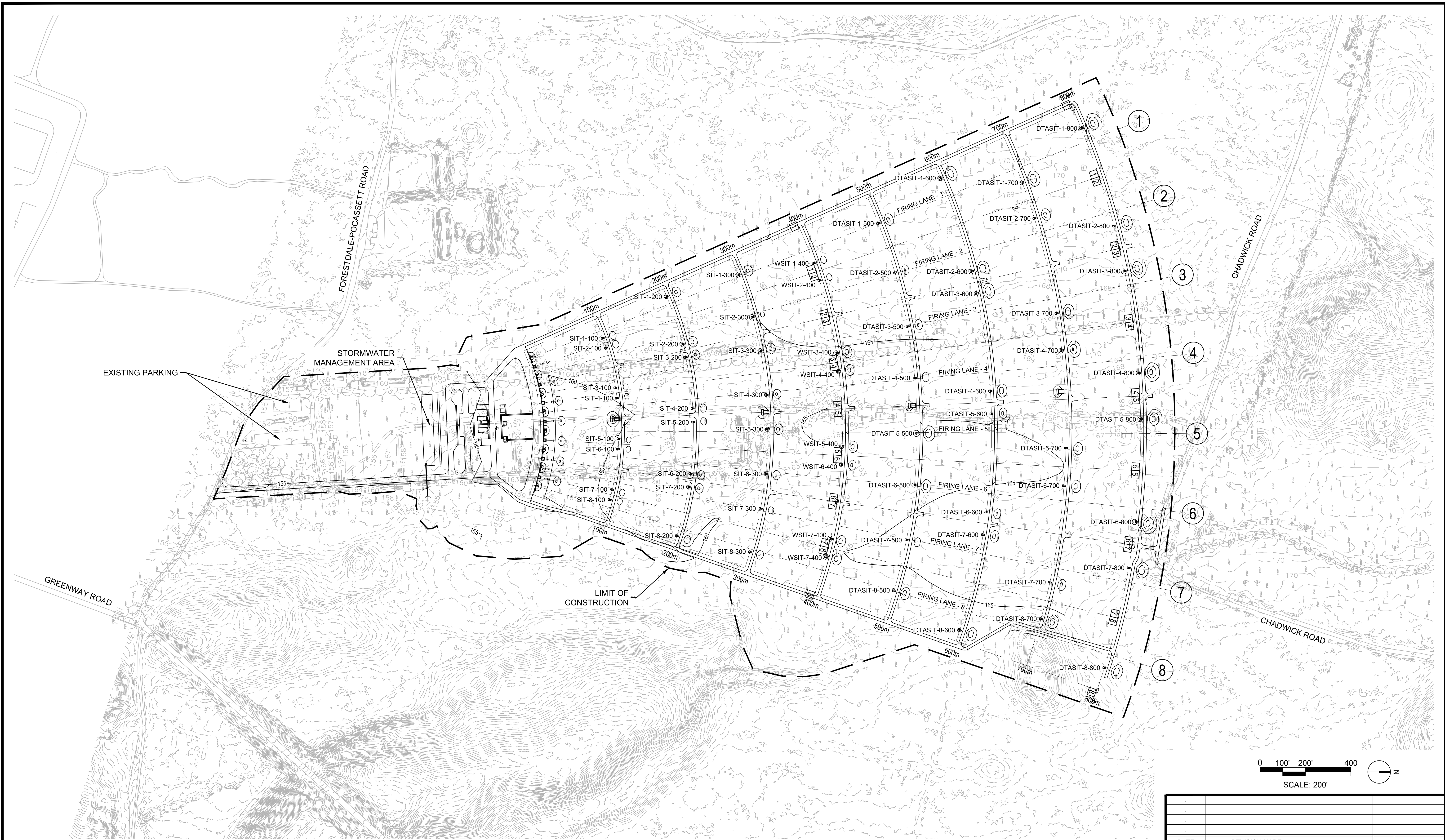


MICHAEL BAKER INTERNATIONAL
125 CAMBRIDGE PARK DRIVE, SUITE 502
CAMBRIDGE, MASSACHUSETTS 02140

AUTOMATED MULTIPURPOSE MACHINE GUN RANGE (MPMG)
CAMP EDWARDS JOINT BASE CAPE COD
BOURNE, MASSACHUSETTS



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DATE	REVISION MADE	BY	AUTHORIZED
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OVERALL SITE PLAN			
DATE: 9/16/19	DES BY: HAB	BAKER PROJECT NUMBER 170789	SHEET NO: C-003
SCALE: AS NOTED	DWN BY: HAB		
SIZE: ANSI D	CHK BY: KM	GOV. PROJECT NUMBER 250194FY19	
FILE: C-003.DWG			6 OF 185



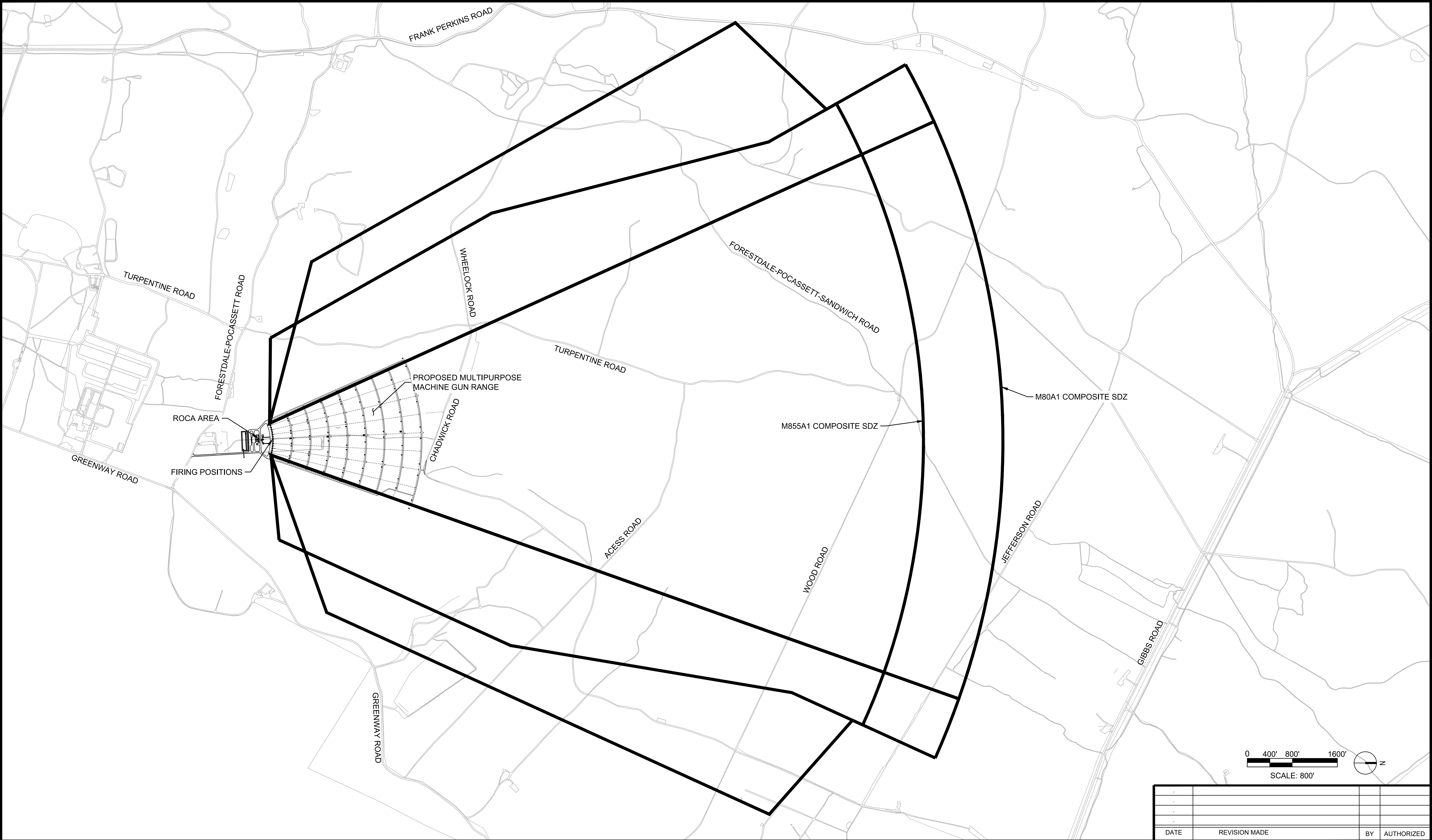
MICHAEL BAKER INTERNATIONAL
125 CAMBRIDGE PARK DRIVE, SUITE 502
CAMBRIDGE, MASSACHUSETTS 02140

AUTOMATED MULTIPURPOSE MACHINE GUN RANGE (MPMG)
CAMP EDWARDS JOINT BASE CAPE COD
BOURNE, MASSACHUSETTS



65% DESIGN

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MICHAEL BAKER INTERNATIONAL
125 CAMBRIDGE PARK DRIVE, SUITE 502
CAMBRIDGE, MASSACHUSETTS 02140

AUTOMATED MULTIPURPOSE MACHINE GUN RANGE (MPMG)
CAMP EDWARDS JOINT BASE CAPE COD
BOURNE, MASSACHUSETTS



DATE	REVISION MADE	BY	AUTHORIZED
AUTOMATED MULTIPURPOSE MACHINE GUN RANGE (MPMG)			
SURFACE DANGER ZONE PLAN			
DATE: 9/16/19	DES BY: HAB	BAKER PROJECT NUMBER 170789	SHEET NO: C-401
SCALE: AS NOTED	DWN BY: HAB		
SIZE: ANSI D	CHK BY: KM	GOV. PROJECT NUMBER 250194FY19	
FILE: C-401.DWG			66 OF 185

65% DESIGN

Appendix D: Noise Impact Report

- United States Army Public Health Center (USAPHC) Noise Assessment for the Proposed MPMG Range Camp Edwards, Massachusetts dated 1 May 2019



DEPARTMENT OF THE ARMY
US ARMY PUBLIC HEALTH CENTER
BUILDING 5158
8252 BLACKHAWK ROAD
ABERDEEN PROVING GROUND MARYLAND 21010-5403

MCHB-PH-WMG

23 July 2019

MEMORANDUM FOR Camp Edwards Headquarters (NGMA/Mr. Matthew D. McKay),
1203 West Inner Road, Camp Edwards, MA 02542

SUBJECT: Environmental Health Sciences, Environmental Noise Consultation
No. S.0064236b-19, Noise Assessment for Proposed Multi-Purpose Machine Gun
Range, Camp Edwards, Massachusetts, 1 May 2019

1. Subject document is enclosed.
2. The U.S. Army Public Health Center (APHC) strives to provide high quality products and services in a timely manner. We would appreciate a few moments of your time to tell us how we did. Please visit the following link:
<https://usaphcapps.amedd.army.mil/Survey/se.ashx?s=25113745052C38DC>. To help ensure we evaluate the proper project:
 - a. For Question 1 "Directorate/Division" please indicate:
 - (1) Directorate: Environmental Health Sciences and Engineering
 - (2) Division: Environmental Health Sciences
 - b. For Question 2 "Type of product or service received," please indicate:
Technical or Surveillance Report
3. Our points of contact for this consultation are Ms. Kristy Broska, Environmental Protection Specialist or Ms. Catherine Stewart, Branch Chief, Environmental Noise, APHC, commercial 410-436-3829 or DSN 584-3829, or e-mail:
kristy.a.broska.civ@mail.mil or catherine.m.stewart20.civ@mail.mil.

FOR THE DIRECTOR:

Encl

ALICK E. SMITH
LTC, MS
Director, Environmental Health Sciences
and Engineering



U.S. ARMY PUBLIC HEALTH CENTER

8252 Blackhawk Road, Aberdeen Proving Ground, Maryland 21010-5403

**Environmental Health Sciences, Environmental Noise Consultation
No. S.0064236b-19, July 2019
Environmental Health Sciences and Engineering**

**Noise Assessment for Proposed Multi-Purpose Machine Gun Range,
Camp Edwards, Massachusetts, 1 May 2019**

Prepared by Ms. Kristy Broska, Environmental Noise Branch

**Distribution authorized to U.S. Government Agencies only; protection of
privileged information evaluating another command: July 2019. Requests
for this document must be referred to Camp Edwards Headquarters
(NGMA), 1203 West Inner Road, Camp Edwards, MA 02542.**

General Medical: 500A, Public Health Surveys

**EXECUTIVE SUMMARY
ENVIRONMENTAL HEALTH SCIENCES
ENVIRONMENTAL NOISE CONSULTATION
NO. S.0064236b-19
NOISE ASSESSMENT FOR
PROPOSED MULTI-PURPOSE MACHINE GUN RANGE
CAMP EDWARDS, MASSACHUSETTS
1 MAY 2019**

1. PURPOSE

The U.S. Army Public Health Center completed this consultation to provide the Massachusetts Army National Guard an updated noise assessment for the proposed Multi-Purpose Machine Gun (MPMG) range at Camp Edwards. In this consultation, the proposed MPMG is analyzed based on two alternative locations for the firing line and use of .50 caliber rounds.

2. CONCLUSIONS

2.1 Existing Activity

For existing small caliber ranges, Zone III remains within the boundary. Zone II extends slightly beyond the eastern boundary and encompasses multiple residential properties.

2.2 Proposed Activity: 7.62mm Rounds

The location of the proposed MPMG firing line has minimal impact on the overall size of the Noise Zones. Zone III remains within the boundary. Zone II extends beyond the eastern boundary, less than a half mile, encompassing multiple residential properties.

2.3 Proposed Activity: .50 Caliber Rounds

Zone III remains within the boundary for both alternative locations. Zone II extends less than a mile beyond the eastern boundary and encompasses multiple residences and an elementary school.

3. RECOMMENDATIONS

Include the information from this consultation in the environmental analysis documentation for the proposed action.

Continue to provide public notification of upcoming training events, particularly the .50 caliber activity.

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**ENVIRONMENTAL HEALTH SCIENCES
ENVIRONMENTAL NOISE CONSULTATION
NO. S.0064236b-19
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1 MAY 2019**

1. PURPOSE

The U.S. Army Public Health Center completed this consultation to provide the Massachusetts Army National Guard an updated noise assessment for the proposed Multi-Purpose Machine Gun (MPMG) range at Camp Edwards.

2. REFERENCES AND TERMS

Appendix A contains a list of references used to prepare this consultation. The glossary provides definitions for acronyms, abbreviations, and terms.

3. GENERAL

The proposed MPMG range would replace the inactive Known Distance Range. This proposed action was addressed in a previous noise assessment (U.S. Army Institute of Public Health, 2014). In this consultation, the proposed MPMG is analyzed based on two alternative locations for the firing line and the use of .50 caliber rounds. The 2014 assessment was based upon a maximum ammunition size of 7.62mm.

In this assessment the following identification names are used: Alternative 1 – “MPMG firing line based on the existing Know Distance firing line” and Alternative 2 – “MPMG firing line is 100 meters north of the existing Known Distance firing line.” The maximum caliber utilized in the analysis is included with the alternative number (i.e., Alternative 2 (.50 caliber)). Figure 1 illustrates the location of the proposed MPMG range.

4. NOISE ASSESSMENT GUIDELINES

Noise Zones are defined in Army Regulation (AR) 200-1. Per AR 200-1, noise-sensitive land uses, such as housing, schools, and medical facilities are acceptable within the Land Use Planning Zone (LUPZ) and Noise Zone I, normally not recommended in Noise Zone II, and not compatible in Noise Zone III (Department of the Army, 2007). Table 1 lists the land use planning guidelines.

Use of trademarked name(s) does not imply endorsement by the U.S. Army but is intended only to assist in identification of a specific product.
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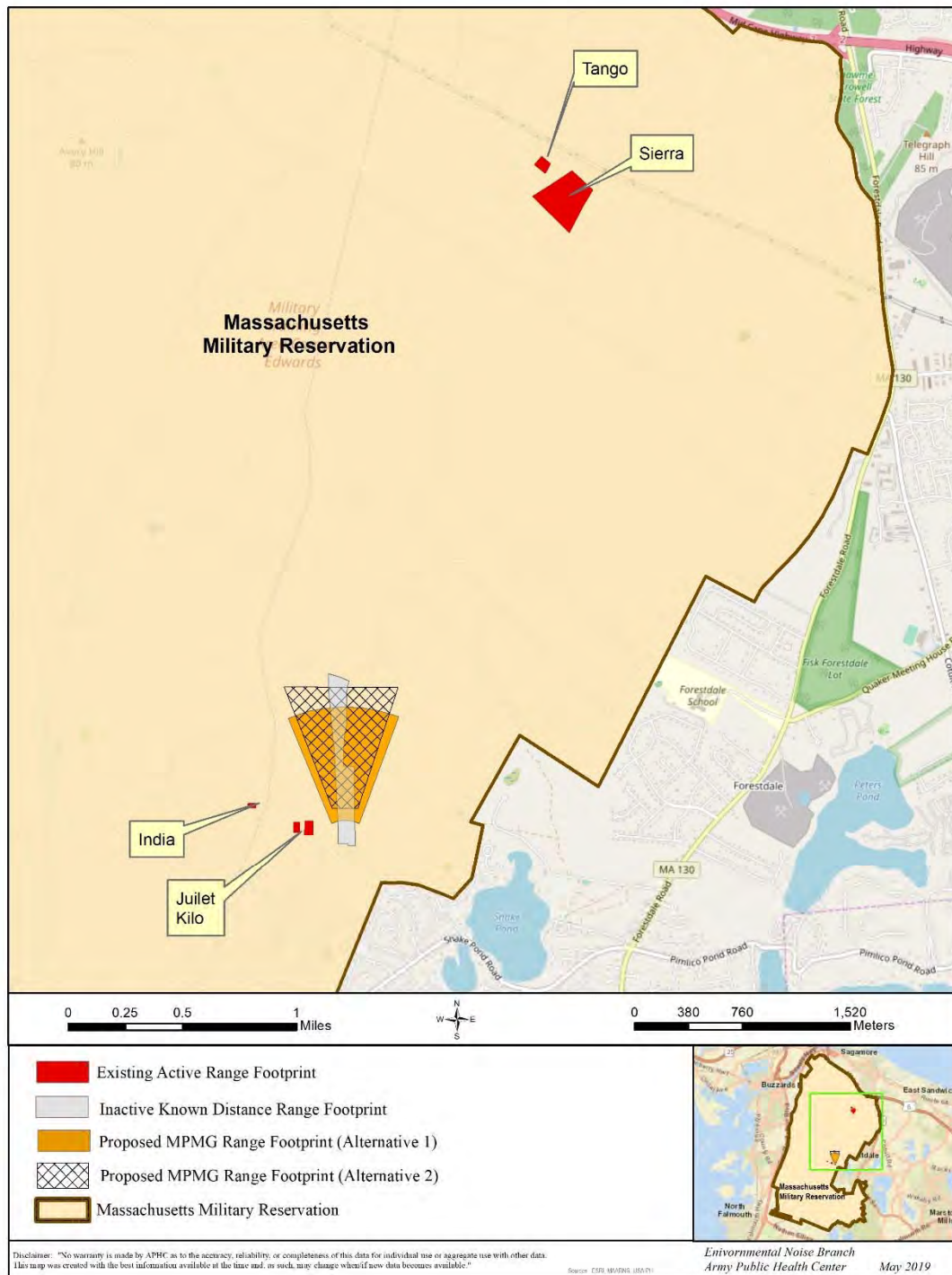


Figure 1. Proposed MPMG Location

Table 1. Land Use Planning Guidelines

Noise Zone	Noise Limits			Noise-Sensitive Land Use
	Aviation ADNL (dB)	Impulsive CDNL (dB)	Small Arms Peak (dB)	
LUPZ	60 – 65	57 – 62	n/a	Generally Compatible
I	< 65	< 62	< 87	Generally Compatible
II	65 – 75	62 – 70	87 – 104	Generally Not Compatible
III	> 75	> 70	> 104	Not Compatible

Legend:

dB = decibel

ADNL = A-weighted Day-Night average sound Level

CDNL = C-weighted Day-Night average sound Level

LUPZ = Land Use Planning Zone

Note:

Source: AR 200-1

5. NOISE CONTOURING PROCEDURES

The Small Arms Range Noise Assessment Model (SARNAM) is the standard U.S. Army small caliber weapons (.50 caliber and below) noise simulation program (U.S. Army Corp of Engineers, 2003). The program requires operations data concerning types of weapons, quantity of ammunition, and range layout. The SARNAM calculation algorithms assume weather conditions or wind direction that favors sound propagation in all directions.

Table 2 lists the ammunition types used to develop the Noise Zones.

Table 2. Baseline Activity Small Caliber Noise Zone Inputs

RANGE FACILITY	AMMUNITION UTILIZED
India	5.56mm
Juliet	9mm
	.40 caliber
	5.56mm
	7.62mm
	9mm
Kilo	5.56mm
	5.56mm
Sierra	5.56mm
Tango	5.56mm

Legend:

mm = millimeter

6. NOISE ASSESSMENT

6.1 Baseline Condition

Figure 2 illustrates the Noise Zones for the existing active small caliber ranges. Zone III (> 104 dB Peak) does not extend beyond the boundary. Zone II (87–104 dB Peak) extends approximately 150 meters beyond the boundary encompassing a small residential area west of Snake Pond.

6.2 Proposed Action

For reference, Alternative 1 refers to the proposed MPMG firing line being located on the existing Know Distance firing line and Alternative 2 is based on the proposed MPMG firing line being located 100 meters north of the existing Known Distance firing line. For both alternatives, the .50 caliber rounds would fire approximately 30 days per year, using the two center lanes of the MPMG.

6.2.1 Alternative 1 (7.62mm)

Figure 3 illustrates the Noise Zones for the existing active ranges and the proposed MPMG range using 7.62mm rounds. Zone III does not extend beyond the boundary. Zone II extends up to 650 meters beyond the boundary. The expanded Zone II would encompass additional residential properties northeast of Snake Pond.

6.2.2 Alternative 2 (7.62mm)

Figure 4 illustrates the Noise Zones for the existing active ranges and the proposed MPMG range using 7.62mm rounds. Zone III does not extend beyond the boundary. Zone II extends up to 550 meters beyond the boundary. The expanded Zone II would encompass additional residential properties northeast of Snake Pond.

6.2.3 Alternative 1 (.50 Caliber)

Figure 5 illustrates the Noise Zones for the existing active ranges and the proposed MPMG range using .50 caliber rounds. Zone III does not extend beyond the boundary. Zone II extends, up to 1,400 meters, beyond the boundary to Route 130. The expanded Zone II would encompass multiple residential neighborhoods and an elementary school.

6.2.4 Alternative 2 (.50 Caliber)

Figure 6 illustrates the Noise Zones for the existing active ranges and the proposed MPMG range using .50 caliber rounds. Zone III does not extend beyond the boundary. Zone II extends, up to 1,300 meters, beyond the boundary to Route 130. The expanded Zone II would encompass multiple residential neighborhoods and an elementary school.

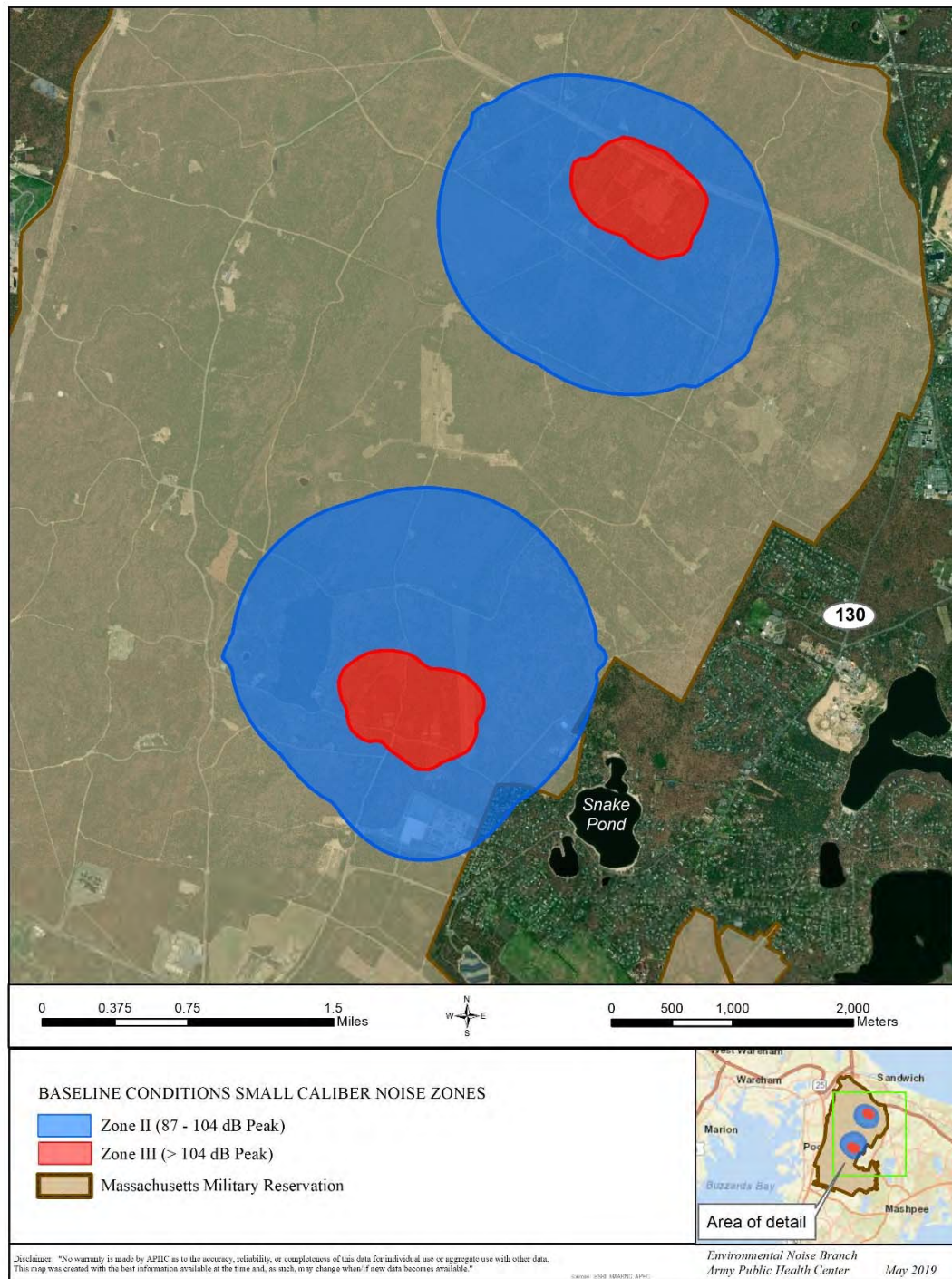


Figure 2. Camp Edward Existing Small Caliber Noise Zones

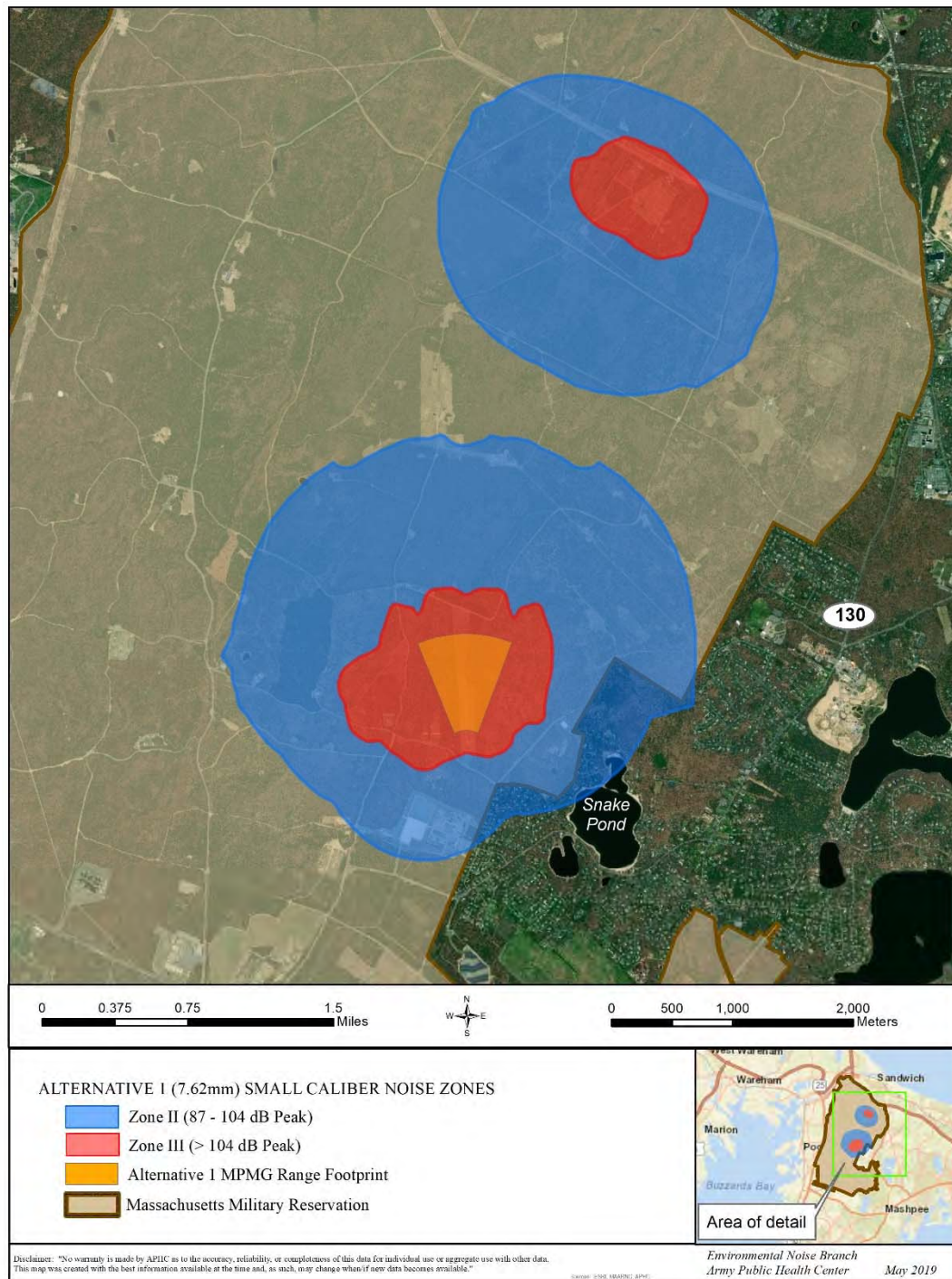


Figure 3. Alternative 1 (7.62mm) Projected Small Caliber Noise Zones

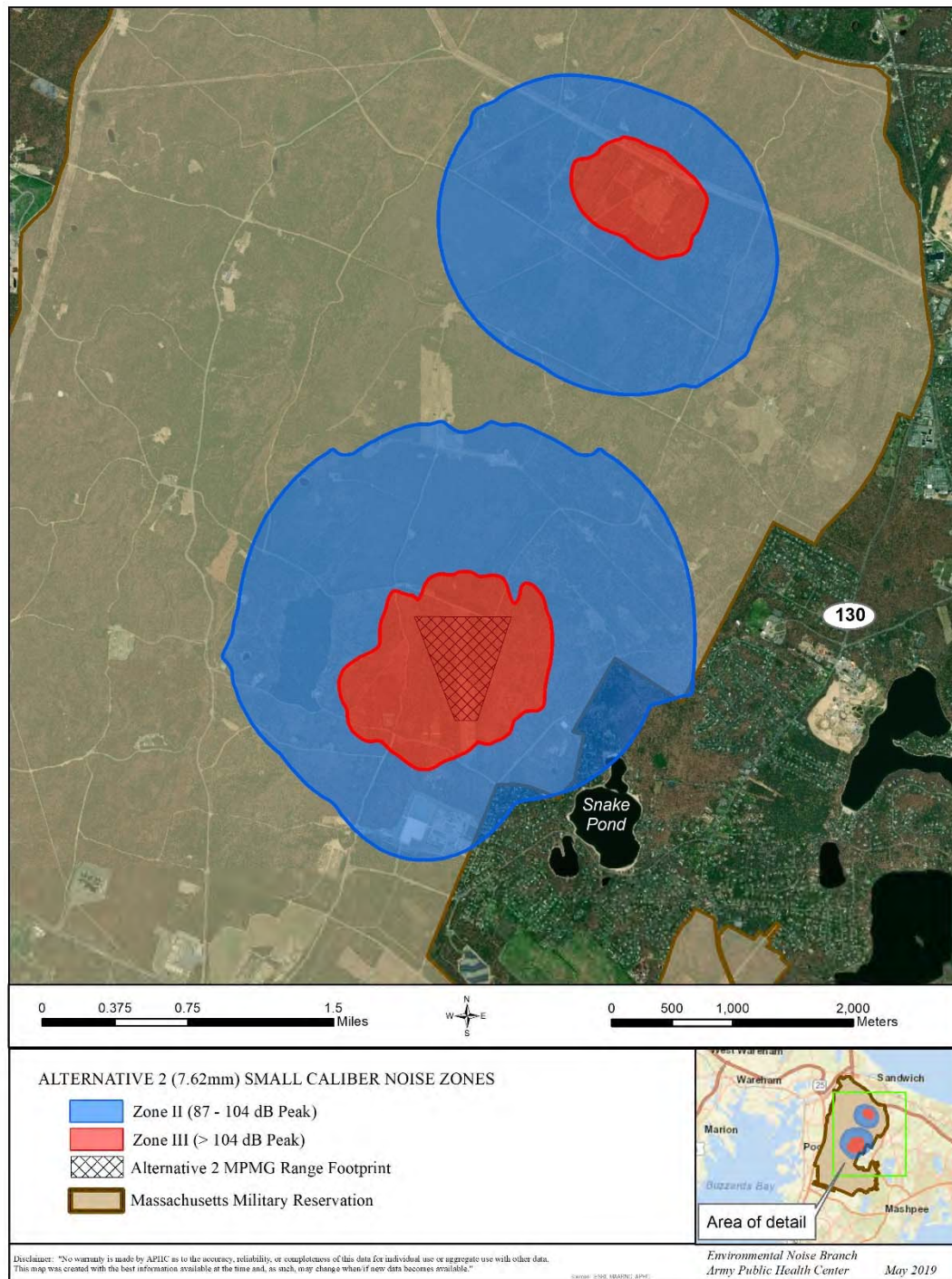


Figure 4. Alternative 2 (7.62mm) Projected Small Caliber Noise Zones

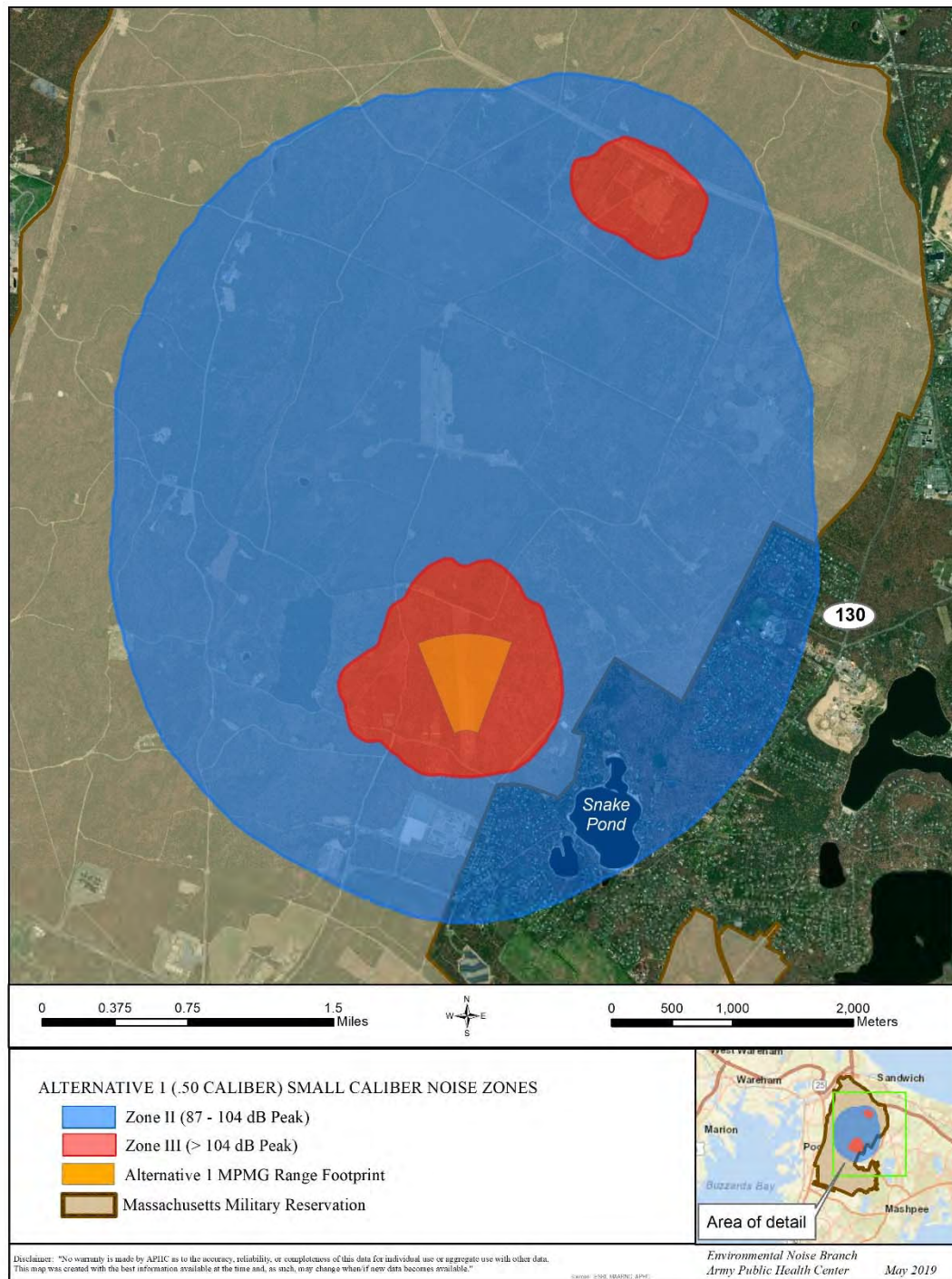


Figure 5. Alternative 1 (.50 Caliber) Projected Small Caliber Noise Zones

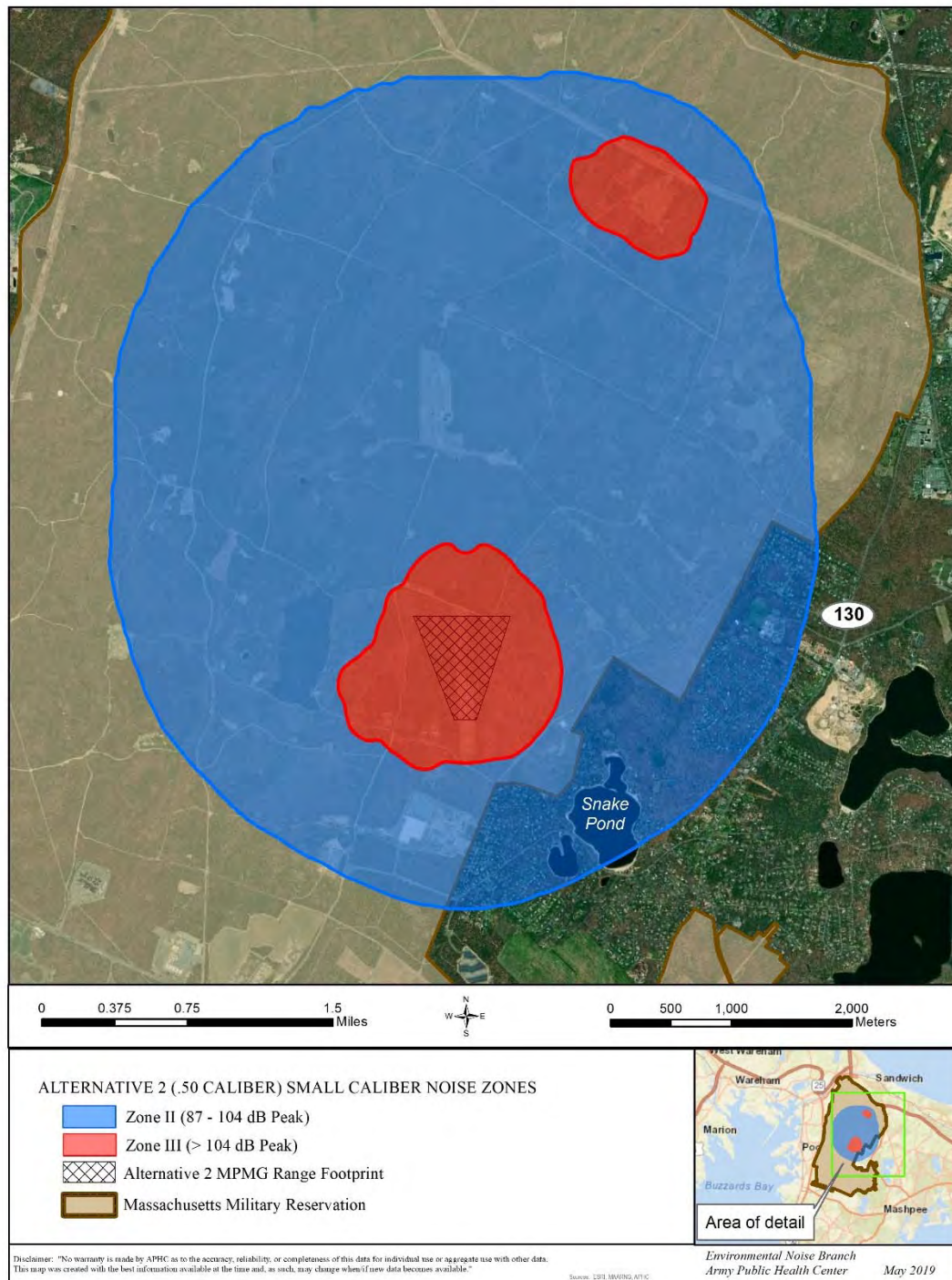


Figure 6. Alternative 2 (.50 Caliber) Projected Small Caliber Noise Zones

6.3 Details of Off Base Noise Zones

Figures 7 through 11 provide a detailed view of the small arms Noise Zones in the Forestdale community. Tables 3 through 5 list the total acreage and off base acreage for each Noise Zone based upon each scenario.

Table 3. Existing Activity Small Caliber Noise Zones Acreage

Noise Zone	Total Acreage	Off Base Acreage
Zone II (87–104 dB Peak)	2,754	26
Zone III (> 104 dB Peak)	394	0

Legend:
dB = decibels

Table 4. Small Caliber Noise Zones Acreage for MPMG with 7.62mm Rounds

Noise Zone	Alternative 1 Location		Alternative 2 Location	
	Total Acreage	Off Base Acreage	Total Acreage	Off Base Acreage
Zone II (87–104 dB Peak)	3,257	166	3,293	127
Zone III (> 104 dB Peak)	667	0	693	0

Legend:
dB = decibels

Table 5. Small Caliber Noise Zones Acreage for MPMG with .50 Caliber Rounds

Noise Zone	Alternative 1 Location		Alternative 2 Location	
	Total Acreage	Off Base Acreage	Total Acreage	Off Base Acreage
Zone II (87–104 dB Peak)	7,395	921	7,323	832
Zone III (> 104 dB Peak)	788	0	802	0

Legend:
dB = decibels

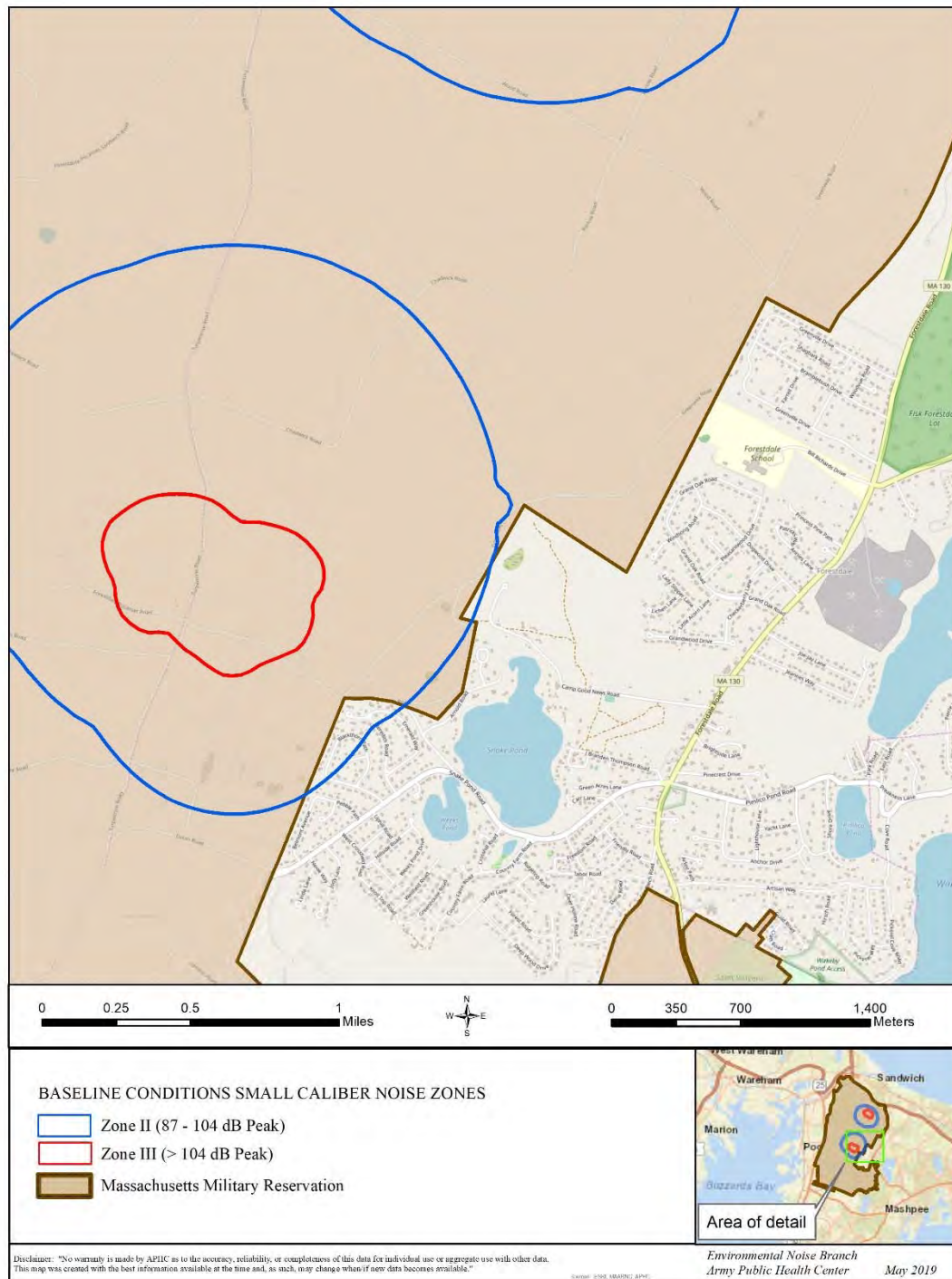


Figure 7. Detailed View Existing Small Caliber Noise Zones

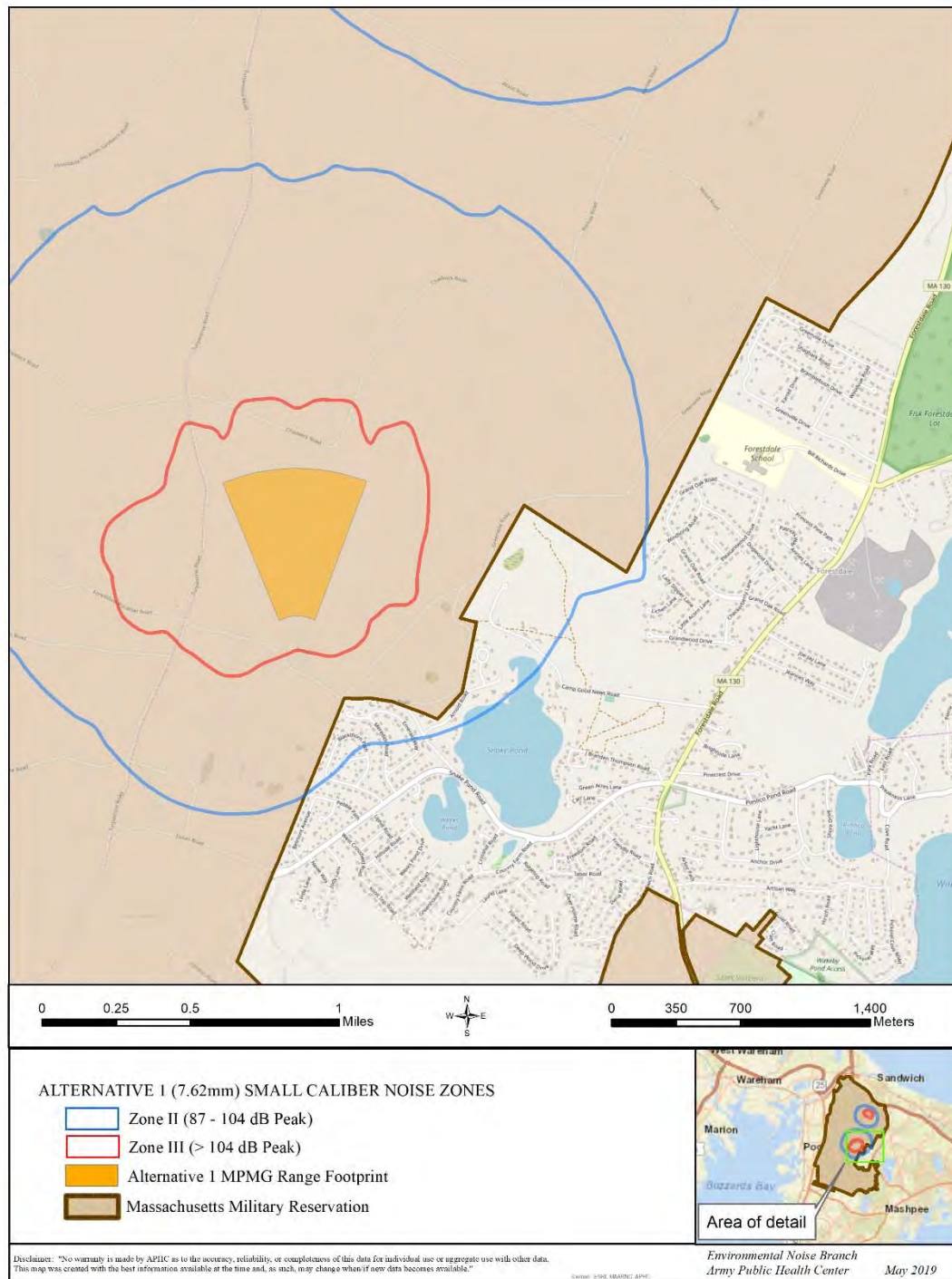


Figure 8. Detailed View Alternative 1 (7.62mm) Projected Small Caliber Noise Zones

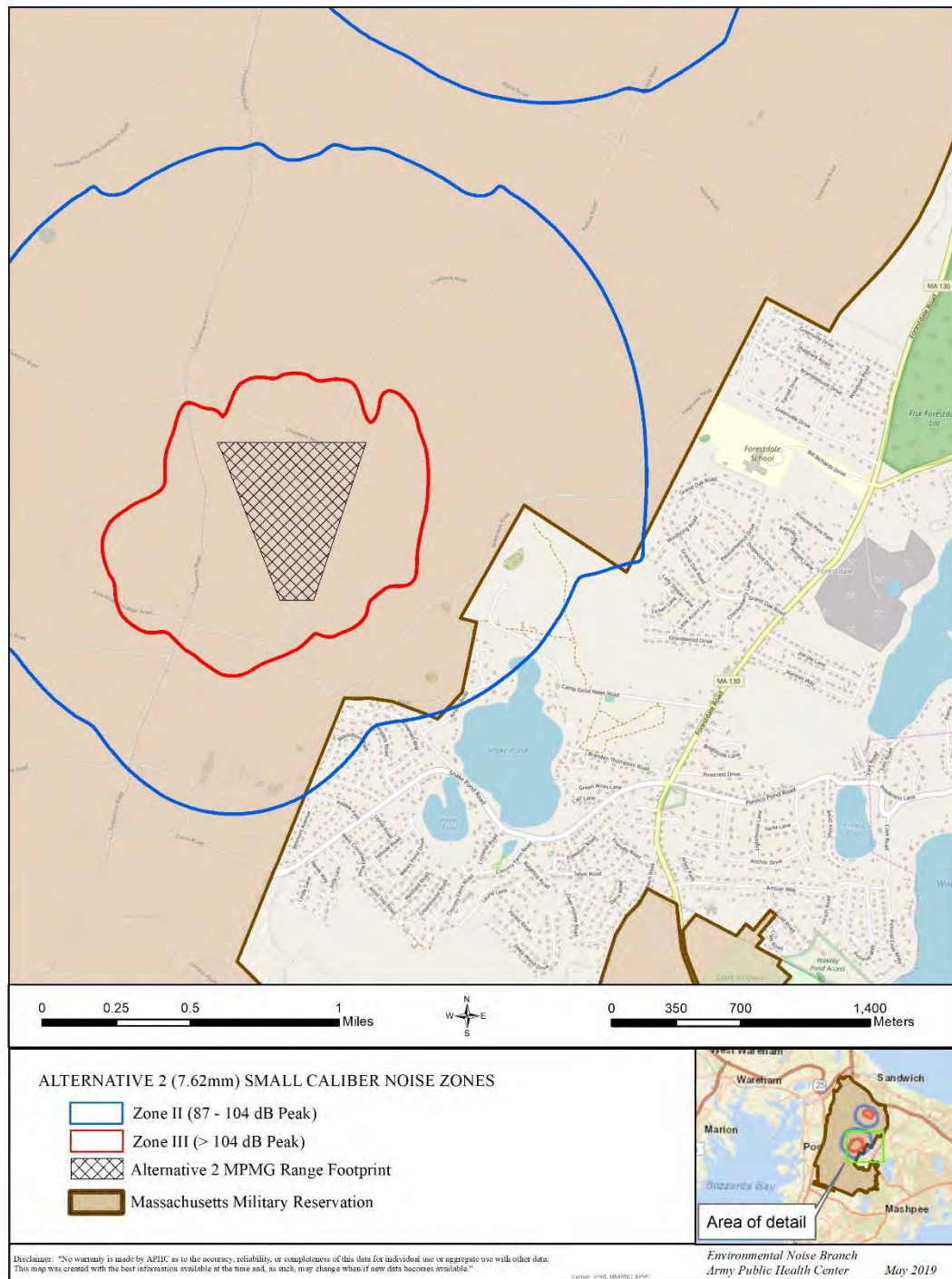


Figure 9. Detailed View Alternative 2 (7.62mm) Projected Small Caliber Noise Zones

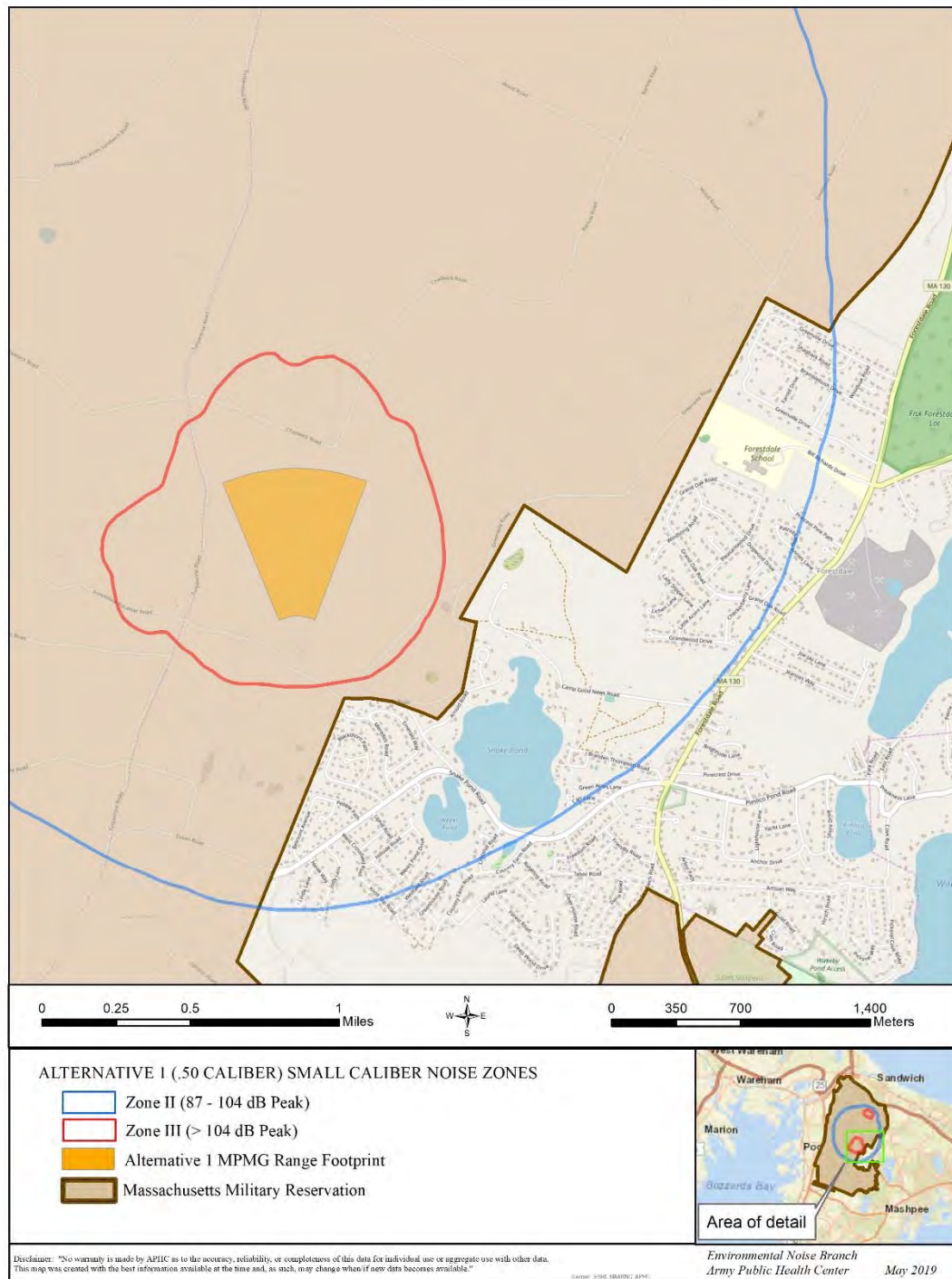


Figure 10. Detailed View Alternative 1 (.50 Caliber) Projected Small Caliber Noise Zones

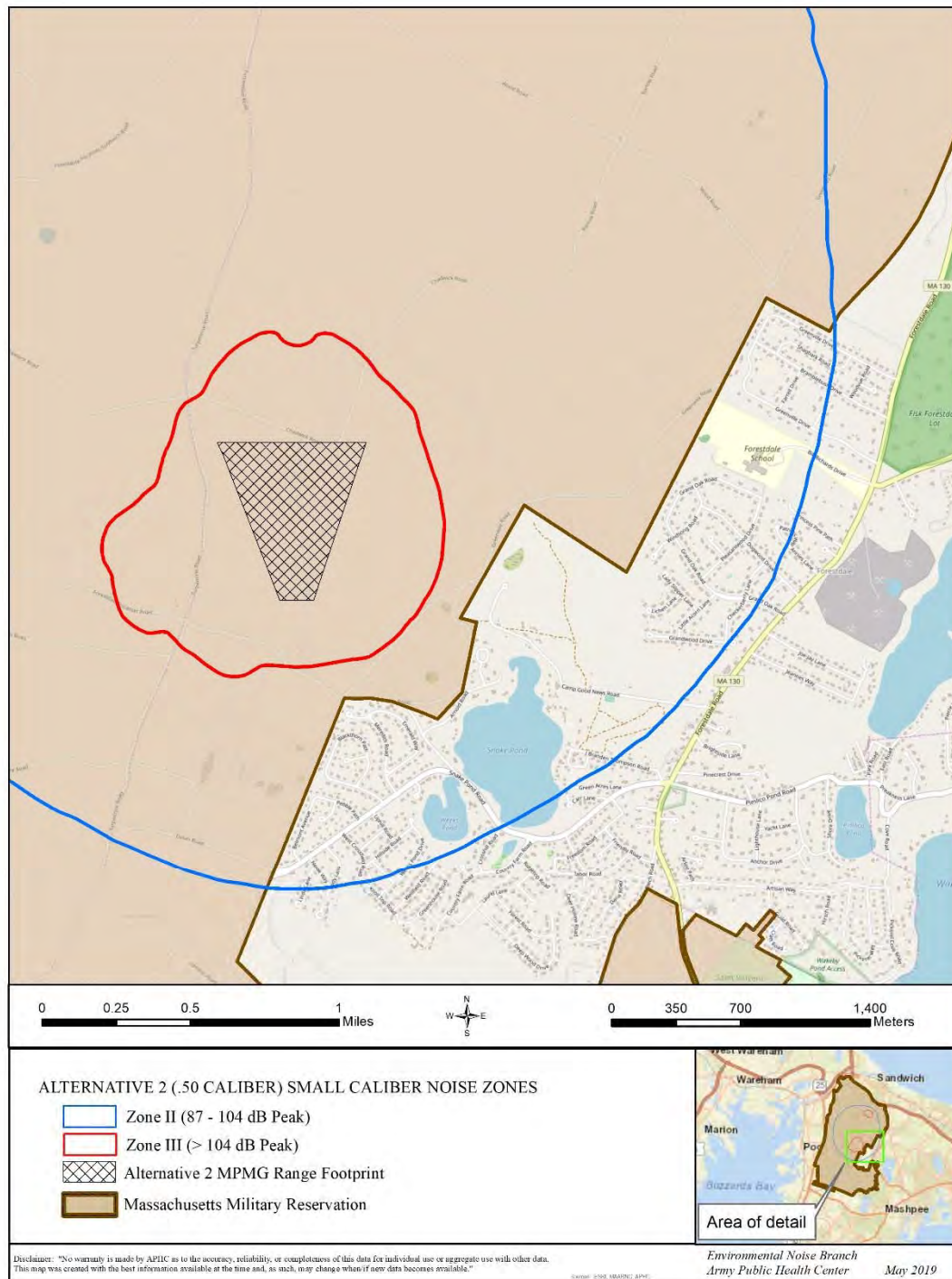


Figure 11. Detailed View Alternative 2 (.50 Caliber) Projected Small Caliber Noise Zones

7. FINDINGS

For the existing small caliber range activities, Zone III remains within the boundary. Zone II extends slightly beyond the eastern boundary encompassing a small residential area west of Snake Pond.

With the 7.62mm rounds, both alternative locations of the proposed range generates a Zone II that extends beyond the eastern boundary encompassing multiple residential properties. Alternative 1 would increase the off base Zone II area from 26 to 166 acres and Alternative 2 would increase to 127 acres. Zone III remains within the boundary.

With the .50 caliber rounds, both alternative locations of the proposed range generate a Zone II that extends less than a mile beyond the eastern boundary. Within this area there multiple residential neighborhoods and an elementary school. Alternative 1 would increase the off base Zone II area from 26 to 921 acres and Alternative 2 would increase to 832 acres. Zone III remains within the boundary.

8. RECOMMENDATIONS

Include the information from this consultation in the environmental analysis documentation for the proposed actions.

Continue to provide public notification of upcoming training events, particularly the .50 caliber activity.

KRISTY BROSKA
Environmental Protection Specialist

APPROVED:

CATHERINE STEWART
Branch Chief
Environmental Noise

APPENDIX A

REFERENCES

Department of the Army. 2007. Army Regulation 200-1, Environmental Protection and Enhancement, Chapter 14, Operational Noise.

U.S. Army Construction Engineering Research Laboratories. 2003. SARNAM Computer Model, Version 2.6.2003-06-06.

U.S. Army Institute of Public Health. 2014. Environmental Noise Consultation No. WS.0030762b-15, Operational Noise Assessment for Proposed Multi-Purpose Machine Gun Range, Camp Edwards, Massachusetts, 27 October 2014. Aberdeen Proving Ground, Maryland.

GLOSSARY

Acronyms/Abbreviations

AR

Army Regulation

dB

Decibels

mm

millimeter

MPMG

Multi-Purpose Machine Gun

SARNAM

Small Arms Range Noise Assessment Model

Terms

Decibels (dB)

A logarithmic sound pressure unit of measure.

Noise

Any sound without value.

Noise Zone III

The area around a noise source in which the Peak level is greater than 104 dB for small caliber weapons.

Noise Zone II

The area around a noise source in which the Peak level is 87–104 dB for small caliber weapons.

Noise Zone I

Includes all areas around a noise source in which the Peak level is less than 87 dB for small caliber weapons. This area is usually suited for all types of land use activities.

Peak

Peak is a single-event sound level without weighting.

Appendix E: Agency Comment Letters

- USEPA Comment Letter dated 5 September 2019
- MassDCR Comment Letter dated 10 September 2019
- EMC Comment Letter dated 13 September 2019



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
ENVIRONMENTAL MANAGEMENT COMMISSION
Building 3468, Beaman Street, Camp Edwards, MA 02542-5003

CHARLES D. BAKER
Governor

KARYN E. POLITO
Lieutenant Governor

KATHLEEN A. THEOHARIDES
Secretary

RONALD AMIDON

MARTIN SUUBERG

LEO ROY
Commissioners

September 13, 2019

Mr. Keith Driscoll
NEPA/MEPA Manager
Joint Force Headquarters
Massachusetts National Guard
2 Randolph Road
Hanscom AFB, MA 01731-3001

AECOM
Attn: Ms. Kathryn Barnicle
9 Jonathan Bourne Drive
Pocasset, MA, 02559

Project Name: Multi-Purpose Machine Gun (MPMG) Range
Proponent: Massachusetts National Guard
Location: Camp Edwards, Massachusetts
Document: Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) for the Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA)

Dear Mr. Driscoll/Ms. Barnicle;

The Environmental Management Commission (EMC) was created within the Executive Office of Environmental Affairs by Chapter 47 of the Acts of 2002. The purpose of the EMC is to provide permanent protection of the drinking water supply and wildlife habitat of the Upper Cape Water Supply Reserve (the Reserve), created as public conservation land by Chapter 47 of the Acts of 2002, by oversight, monitoring and evaluation of all military and other activities on the reserve to ensure they are consistent with this purpose. The Camp Edwards Training Ranges are co-located with and are within the Reserve. The EMC has the following comments on the above referenced IICEP for the EA in accordance with NEPA:

Overview:

As described in the IICEP, the Massachusetts National Guard is preparing environmental documentation for proposed construction and operation of a Multi-Purpose Machine Gun (MPMG) Range at Camp Edwards,

ENVIRONMENTAL MANAGEMENT COMMISSION

Massachusetts. Construction of a MPMG Range will provide National Guard personnel with a modernized small arms training venue to efficiently accomplish mandatory soldier tasks and mission training to include meeting weapons qualification requirements in a manner that protects human health and the environment.

The proposed MPMG Range would be built over and improve on the existing Known Distance (KD) Range, and is proposed to be developed with range-specific structures to include soil berms and potentially other types of engineered solutions for projectile capture. The KD Range parcel is owned by the Commonwealth and is currently leased to the Department of the Army, with licenses to the Massachusetts National Guard.

The Massachusetts National Guard is currently identifying environmental resources, issues and constraints associated with the proposed project area to effectively assess potential environmental impacts associated with the proposed action. The Massachusetts National Guard is requesting baseline information regarding potential environmental issues at, or in the vicinity of, the proposed project area.

The EMC has been working closely with the Massachusetts National Guard and their consultants to provide guidance and compliance assistance with regard to environmental issues unique to the proposed Project. A site visit to the Project site by the EMC Environmental Officer was made on August 8, 2019 with the Massachusetts National Guard and their consultants, as well as with a representative from the Massachusetts Environmental Policy Act within the Executive Office of Energy and Environmental Affairs and with representatives of the MassWildlife Natural Heritage and Endangered Species Program. In addition, the Massachusetts National Guard has presented information regarding the proposed MPMG Range location and design to the EMC and its advisory councils, the Science Advisory Council (SAC) and the Community Advisory Council (CAC). The CAC assists the EMC by providing advice on issues related to the protection of the water supply and wildlife habitat on the reserve; and the SAC assists the EMC by providing scientific and technical advice relating to the protection of the drinking water supply and wildlife habitat on the Reserve. Finally, the EMC has participated in meetings with the Massachusetts National Guard and MassWildlife to establish a mitigation bank and overall strategy to facilitate implementation of long-term planning efforts including modernization of the Camp Edwards range complex and infrastructure.

General Comment:

EMC Environmental Performance Standards (EPS): The construction, operation and maintenance of the proposed MPMG Range must comply with the current revision of the Environmental Performance Standards, dated April 6, 2017. The final design and the operation, maintenance and monitoring plan for the MPMG Range will require approval by the EMC prior to construction and operation.

Specific Comments:

Solid and Hazardous Waste: The Massachusetts National Guard is advised that there may be soils contaminated with oil and hazardous materials (OHM) and munitions items located at the proposed project location. A plan for the management of OHM and munitions items which may be found during construction should be developed by the Massachusetts National Guard. (EPS 14.0-16.0)

Construction Management Plan: A construction management plan should be provided which defines the limits of the proposed work area, how construction vehicles and personnel will be controlled to remain within work areas, construction and laydown areas, erosion control, dust suppression, vehicle parking and refueling areas and noise during construction. (EPS 4.5, 4.6, 5.0, 8.0, 9.0, 12.0)

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Refueling During Construction: EPS 15.3.3 states that no storage or movement of fuels supporting field activities, other than in vehicle fuel tanks is permitted except in approved containers no greater than five gallons in capacity. The Massachusetts National Guard is advised that a waiver of EPS 15.3.3 may be granted by the EMC for the duration of the construction period subject to EMC review and approval of a site specific Spill Prevention, Control and Countermeasure Plan. All construction-related refueling and equipment maintenance activities must be conducted in accordance with an EMC-approved refueling plan.

Access Control/Coordination/Communication: The Massachusetts National Guard is advised to develop an access control and communications plan during construction activities with Camp Edwards Range Control personnel. This plan will be particularly important during the National Guard Annual Training cycle and for the recreational hunting program at Camp Edwards.

Ammunition: The EMC recommends that the MPMG Range be designated as a copper ammunition-only range. (EPS 19.0)

Alternative 2: Southerly Location Alternative: The IICEP states that this alternative would result in greater noise impacts to the community. The Massachusetts National Guard has performed an on-site noise study and noise modeling for the MPMG. The studies concluded that there would be noise impacts to the community during range use (the nearest off post community is approximately 500 meters to the southeast and 1000 meters to the east). The EMC has recommended additional noise studies to be performed during training activities at the MPMG to determine if nuisance conditions exist and if noise mitigation is necessary. (EPS 9.0)

MPMG Range Operation and Maintenance: The EMC recommends that appropriate funding be appropriated to ensure that the MPMG Range will be adequately staffed to ensure operation and maintenance activities are compliant with the required Operation, Maintenance and Monitoring Plan. (EPS 19.0)

Finally, the Massachusetts National Guard should continue to work closely during the permitting and the execution of the Project with the Massachusetts Department of Environmental Protection, the Environmental Management Commission, and the Massachusetts Division of Fisheries and Wildlife, who maintains custody, care and control of the Upper Cape Water Supply Reserve. Early coordination with Commonwealth and municipal resource agencies is recommended with regard to rare species and wetland resources which may be impacted by the proposed project.

Thank you for the opportunity to provide comments on behalf of the EMC. If you have any questions regarding these comments, please contact me at 508-968-5127 or at 508-946-2871.

Sincerely,



Leonard J. Pinaud
Executive Director/Environmental Officer
Environmental Management Commission

Ec: Commissioner Amidon, Department of Fish and Game
Commissioner Suuberg, Department of Environmental Protection
Commissioner Roy, Department of Conservation and Recreation
Environmental management Commission Science Advisory Council

ENVIRONMENTAL MANAGEMENT COMMISSION

Environmental management Commission Community Advisory Council

Mr. Jason Zimmer, Massachusetts Division of Fisheries & Wildlife, Southeast Wildlife District

Mr. David Paulson, Massachusetts Division of Fisheries & Wildlife, Natural Heritage and Endangered Species Program

BG Christopher Faux, JBCC Executive Director

LTC Matthew Porter, Commander, Camp Edwards

Mr. Paulo A. Baganha, Massachusetts National Guard Environmental Program

Dr. Michael Ciaranca, Massachusetts National Guard Environmental & Readiness Center, Camp Edwards



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

OFFICE OF THE
REGIONAL ADMINISTRATOR

September 5, 2019

Keith J. Driscoll
NEPA/MEPA Manager
Massachusetts National Guard
2 Randolph Road
Hanscom AFB, MA 01731-3001

RE: Scoping Comments for the Environmental Assessment for the Multi-Purpose Machine Gun Range, Camp Edwards, Massachusetts

Dear Mr. Driscoll:

This letter is provided in response to your August 7th request for input regarding key issues that should be addressed in the Environmental Assessment (EA) for the proposed Multi-Purpose Machine Gun Range at Camp Edwards. According to your letter the project will create a modern small arms range that will support mission training and allow soldiers to meet weapons qualifications requirements. The range is proposed on land leased from the Commonwealth of Massachusetts on an existing area referred to as the Known Distance (KD) Range.

We appreciate the opportunity to comment in advance of the preparation of the EA for the project. Our comments below provide background information and suggestions regarding potential environmental issues relevant to the proposed action that we recommend be considered as you work to develop the EA.

The KD Range has been subject to investigation and cleanup under Section 1431(a) of the Safe Drinking Water Act (SDWA), 42 USC § 300i(a), as amended, and two Administrative Orders (AOs) concerning response actions issued thereunder (U.S. Environmental Protection Agency Region 1 (EPA) AO SDWA 1-97-1019 (AO1) and AO SDWA-1-2000-0014 (AO3)). The Administrative Record containing key supporting documents from the investigation and cleanup is available at the Impact Area Groundwater Study Program Office (IAGWSPO), 1807 West Outer Road, Camp Edwards, MA. Mr. Shawn Cody is the point of contact for that information and he can be reached at 339-202-9370.

The final cleanup remedy under AO3 for the KD Range is contained in two (2) separate Decision Documents (DD). The February 2019 Training Areas Operable Unit DD (KD West is one of 36 sites or locations contained within this DD) presents the selected remedy for the KD West Range. The selected action for KD West was data review and/or confirmatory soil sampling and geophysical screening. Details of these proposed actions are contained in Appendix F to the DD. These actions are ongoing and the findings memo for all Training Areas post-DD work will be

prepared in 2020. The need for Land Use Controls (LUCs) will be determined after completion of the investigations as described in the Decision Document.

The September 2015 Small Arms Ranges (SAR) DD (KD East is one of 40 locations contained within this DD) presents the selected remedy for the KD East Range. The selected action for KD East was confirmatory soil sampling and potential removal actions. Details of these proposed actions are contained in Appendix D to the DD. These actions have been completed and the findings memo for all SAR post-DD work is currently being drafted. LUCs have been established in the DD to protect groundwater monitoring wells and other environmental sampling equipment on and around the small arms ranges.

EPA established use restrictions at the KD Range in May 1997 with the issuance of AO2 (SDWA I-97-1030), but those restrictions were lifted in May 2017 when EPA issued a Final Response to a 31 August 2016 Massachusetts National Guard (MANG) Request to modify the AO2 Scope of Work ("SOW"). EPA modified Sections II.A.1.a and Section II.A.1.f of the SOW to not prohibit firing of lead ammunition or other "live" ammunition at small arms ranges at or near the Training Range and Impact Area to the extent those actions receive approval and oversight from the Environmental Management Commission (EMC) in accordance with the Environmental Performance Standards.

- The authorization was conditioned upon continued compliance with all conditions established by the EMC.
- The authorization was conditioned upon MANG requesting and then receiving funds necessary to ensure compliance with the approved Operations, Maintenance, and Monitoring Plan.
- The authorization does not extend to any other ammunition or training device.
- The proposed use of this ammunition or training device was authorized only to the extent it does not interfere with the completion of investigation and cleanup activities.
- This decision will be reviewed as appropriate, but no less often than every five years. The purpose of the review is to revisit the appropriateness of the decision in providing adequate protection of human health. The scope of the review will include, but is not limited to, the following questions: are the ranges operating as designed (i.e., monitoring or maintenance); have any of the cleanup standards changed since the decision; and is there any new information that would warrant modifying or withdrawing the decision? If appropriate, additional actions (including, if necessary, reopening the decision) may be required as a result of these reviews. EPA retained all its enforcement authorities pursuant to existing Administrative Orders.

Your letter also describes that the proposed project "...includes a process for selection of pollution prevention strategies and best management practices through the joint coordinated review efforts of the Environmental Management Commission, the United States Environmental Protection Agency and the Massachusetts Department of Environmental Protection." As such, the EMC should continue to be consulted during the range design and development process, including the selection of pollution prevention strategies and best management practices that will be codified in an Operations, Management, and Maintenance Plan (OMMP) for the Multi-Purpose Machine Gun Range. These strategies and practices should also be developed to adhere

to the conditions described above. It may also be a worthwhile exercise for the EA to consider how the adaptive management strategies employed during the Juliet, Kilo, Tango and Sierra Range pilot periods might apply to development and use of the KD Range.

Thank you for the opportunity to offer comments in advance of your work to prepare the EA. Please contact me at 617-918-1025 with any comments or questions. We look forward to reviewing the EA when it is available.

Sincerely,



Timothy Timmermann
Director, Office of Environmental Review

cc:

Kathryn Barnicle
AECOM
9 Jonathan Bourne Drive
Pocasset, MA 02559

Kathryn.barnicle@aecom.com



September 10, 2019

Keith J. Driscoll
NEPA/MEPA Manager
Massachusetts National Guard
2 Randolph Road
Hanscom AFB, MA 01731

Kathryn Barnicle
AECOM
9 Jonathan Bourne Drive
Pocasset, MA 02559

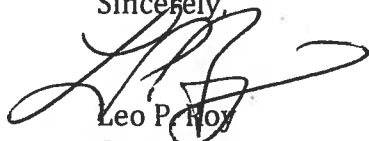
Dear Mr. Driscoll & Ms. Barnicle,

Thank you for the letter regarding Interagency and Intergovernmental Coordination for Environmental Planning for the proposed construction and operating of a Multi-Purpose Machine Gun Range at Camp Edwards.

The Department of Conservation and Recreation is represented on the Environmental Management Commission (EMC) and Leonard Pinaud is our point of contact. We will prepare comments through the EMC process. We have included Leonard Pinaud as a CC to this letter so that the EMC can be added to this process.

Thank you for your continued support of DCR and our programs which benefit so many Massachusetts citizens and other visitors.

Sincerely,



Leo P. Roy
Commissioner

CC: Leonard Pinaud, EMC
Commissioner Martin Suuberg, MassDEP
Commissioner Ronald Amidon, Dept. of Fish and Game

COMMONWEALTH OF MASSACHUSETTS · EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS

Department of Conservation and Recreation
251 Causeway Street, Suite 600
Boston MA 02114-2119
617-626-1250 617-626-1351 Fax
www.mass.gov/dcr



Charles D. Baker
Governor

Karyn E. Polito
Lt. Governor

Kathleen Theoharides, Secretary, Executive
Office of Energy & Environmental Affairs

Leo Roy, Commissioner
Department of Conservation & Recreation

Appendix F: Agency and Community Involvement



Massachusetts National Guard ENVIRONMENTAL & READINESS CENTER

Ensuring Military Readiness in Concert with the Environment at Joint Base Cape Cod

Building 3468, Beaman Rd., Camp Edwards, MA 02542 , 339-202-9342

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The Massachusetts National Guard readies E&RC in January 2001 to ensure the readiness of the state and federal environment for military operations. The E&RC is established to assist in the coordination of environmental, regulatory, and community groups or agencies in the primary objective of training in and with the environment. The E&RC will inform, develop, and involve all JBCC stakeholders on issues regarding training and the environment. Furthermore, the E&RC seeks to be a source of information for the community and a responsible partner in the provision of non-military training areas of JBCC.

The Environmental and Readiness Center will

- Facilitate the flow of information to ensure prompt and accurate responses to stakeholders
- Coordinate with other programs and commands to ensure effectiveness and operational communication with all JBCC communities
- Educate and inform stakeholders about Massachusetts National Guard training and environmental programs
- Ensure prompt, adequate and accurate notifications and sightings posing immediate environmental or environmental effects on base operations

Stakeholders

Individuals, groups, and organizations interested in JBCC activities are all stakeholders. The E&RC's community involvement aims to ensure JBCC stakeholders are informed and involved on an ongoing basis. Stakeholder groups include:

- Elitist Officials
- Local and Tribal Governments
- Military
- Media
- Regulators
- JBCC Trainees
- Neighbors
- Special Interest Groups

Advisory Groups

Advisory groups always play an important role in community involvement and environmental issues at JBCC. Advisory groups are groups comprised of various members interested in representing a group, such as the Association of Professional Cap Cod, a town, state, or a member of a large, any community member within the state and district involvement.

The groups mentioned largely discuss JBCC environmental issues and also have an impact on community's surrounding base. Please refer to the [Community Advisory Group](#) section of the website for information on all of JBCC's related community groups.

Issues - Key Community Concerns



The E&RC work with all stakeholders and interests and on matters regarding training and environment. BCC :
 Training on -on-on meetings, advisory on meetings, public meetings, and surveys/questionnaires. E&RC will seek to
 establish two-way communication with community groups. Key issues already identified include:

- Water quality/supply
- Training and real estate
- National Real Estate
- Environmental compliance (regulatory)
- Civil rights in housing practices, racial/ethnic disparities, historical buildings and structures, historical objects and :
 arrival data, and Native American sacred sites and properties of radiological, religious, and cultural significance
- Development
- Assessment of infrastructure and services
- Coordination of programs/activities
- Community impacts (management, infrastructure, and economy)

Scope of E&RC Activities

The E&RC community involvement implementation program objectives in following ways

Public Meetings - The Environmental Management Commission, Community Advisory Council, Senior Advisory Council, and Senior Management Board provide valuable recommendations, advice, and guidance on E&RC regarding ways to
 better accomplish its mission as environmental stewards with the understanding that training possible for National Guard soldiers.
 Public meetings held by various advisory councils offer a forum to inform council members and public about E&RC activities
 regarding projects, discussions, and questions and answers sessions.

Selectmen Update - The E&RC community involvement team will coordinate with JBCC commands and environmental
 programs of the Boards of Selectmen of the four Upper Cape towns annually to develop applications to JBCC, allowing
 selectmen to be informed about issues concerning environment and training activities at JBCC.

Cape Delegation Update - Similar to the Selectmen Update, E&RC will coordinate an annual Cape Delegation JBCC briefing.

Boards of Health Update - The E&RC will coordinate with JBCC environmental and land use programs to arrange an annual
 JBCC briefing for Boards of Health of the four Upper Cape Towns.

Water Coop Update - The E&RC will coordinate an annual Water Coop JBCC briefing.

Local Realtor Group Update - The E&RC will coordinate an annual JBCC briefing for local realtor groups in each of the four
 Upper Cape Towns.

One-on-one Discussions - Use of the two-way communication, on -on-on discussions provide a pivotal communication
 resource between E&RC and JBCC stakeholders. Interviews allow for a sharing of information, ideas, insights, and concerns.
 Information gained during discussions can be shared by E&RC to form a better understanding of community's
 perspectives on issues concerning JBCC and other stakeholders on issues of stakeholders. This information will also
 allow community organizations to be informed as a condition for community, ensuring their voices are heard in relation to JBCC.

Public Notices

News Releases - The community involvement team uses mass media outlets to inform JBCC stakeholders and general public.
 News releases are significant activities, issues, and announcements to JBCC. News releases play an important role in
 E&RC notification protocols to deliver information to the general public in a timely and widespread manner.

Newspaper Advertisements - Newspaper advertisements available through the local media are used to promote various events, do
 E&RC information releases, information about E&RC and its programs, or news items on E&RC's website.

Telephone 'Tree' - The E&RC team will support the setting up of a phone tree to quickly relay important information
 internally and externally with the JBCC as an immediate radio manual or environment or aff
 basis operations or community. E-mail responses will be used as a secondary source of communication to deliver follow-up
 information during situations.

PUBLICATIONS:

Calendar - The calendar will list monthly public meetings associated with environmental programs at JBCC. The calendar
 will be distributed to JBCC mailing lists monthly and will also be published on E&RC website.

JBCC Quick Guide - The JBCC Quick Guide will highlight military commands, environmental programs, and federal and state
 programs to the JBCC. The guide will be available in Information
 Release positions and on



Fact Sheets - Community involvement professionals will regularly produce fact sheets on training and information about E&RC national real estate, environmental compliance, and national real estate programs, training activities, planning, and other issues regarding JBCC and its stakeholders. The E&RC will distribute fact sheets to JBCC visitors and public meetings, open houses, community workshops, and other events.

Web Site - The website, www.EandRC.org, is an online repository of documents to inform public about E&RC's mission, its programs and staff, and promoting various training and dissemination of public information library for visitors to download as well as links to other JBCC programs and sites of interest.

Events - The community involvement team will sponsor special events to inform the public about basic activities and interact with community members. Special events may include:

- **Site Tours** - Annually E&RC arranges a tour for general public. And also for basic and intermediate military mission and environmental programs first and
- **Field Trips** - The E&RC arranges field trips upon request from various groups including schools, veterans' groups, colleges and universities, and environmental groups on a fee basis. The field trips are tailored to the interests of the group.
- **Internal Meetings** - The community involvement team will attend internal meetings held by various programs and commands a basic to gain an overall understanding of the organization's activities at JBCC. This knowledge will allow E&RC staff to better facilitate information requests by directing questions to appropriate information sources in a timely fashion.

:

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The purpose of the Environmental Management Commission (EMC) is to ensure proper management of drinking water supply and wildlife habitat of Upper Cape Water Supply Reserve (RSRV). The RSRV is 15,000 acres comprising water within the training area of Camp Edwards, major training area for Army National Guard Soldiers in Norf. The RSRV is 15,000 acres of Joint Base Cape Cod is largely comprised of undeveloped land on Camp Cod and is home to 37 species of plants. The Camp Edwards Training Area is a special aquifer area is a source of drinking water for Upper Cape Cod.

The EMC is comprised of commissioners of Department of Fisheries and Game, Department of Environmental Protection (MassDEP) and Department of Conservation and Recreation. Its authority comes from Massachusetts Chapter 47 of Acts of 2002 and a Memorandum of Agreement signed in 2001.

The EMC oversees compliance, and enforcement of, Environmental Performance Standards. Environmental Performance Standards are a set of standards specifically regarding Massachusetts Environmental Policy Act processes and reports in RSRV.

Chapter 47 of Acts of 2002 also transferred, solely, and control of nearly 15,000 acres of JBCC from special military reservation commission of Division of Fisheries and Wildlife of Department of Fisheries and Game.

Upper Cape Water Supply Reserve

Upper Cape Water Supply Reserve (Camp Edwards Training Area) and nearly 15,000 acres of JBCC are public reservations land dedicated for primary purposes:

- water supply and wildlife habitat protection,
- development and conservation of public water supply systems, and
- training of military forces of commonwealth; provided that military training is compatible with natural resource purposes of water supply and wildlife habitat protection.

The EMC's Role

The EMC, through Commission staff, oversees, monitors and evaluates activities in RSRV. The EMC ensures that all military and recreational RSRV activities are consistent with purposes of resource protection. The EMC's responsibility in overseeing compliance with Environmental Performance Standards is a key aspect of its role. The EMC also coordinates with MassDEP, Environmental Policy, and Division of Fisheries and Wildlife in enforcement of environmental laws and regulations in RSRV. Updates on RSRV are provided at EMC meetings and at EMC's Community Advisory and Senior Advisory Council meetings. The advisory councils assist EMC in its role of facilitating an open and public view of all activities in RSRV. ([Meeting Minutes](#))

Community Advisory Council (CAC)

The EMC's Community Advisory Council assists commission on issues related to protection of water supply and wildlife habitat in RSRV. The 15-member council consists of one representative from each of surrounding towns (Barnstable, Falmouth, Mashpee, and Sandwich), one representative from the local business community, one representative from the Cape Cod Commission, one representative from Upper Cape Regional Water Supply Cooperative, one representative from Wampanoag Tribe, and five other members appointed by governor. Meetings are held for information purposes. ([Meeting Minutes](#))

Science Advisory Council (SAC)

The EMC's Science Advisory Council provides significant technical assistance to the commission as it relates to protection of natural resources of the Reservation. The Science Advisory Council, appointed by the Governor, consists of scientists and engineers recognized for their expertise in areas of public health, agriculture, protection, wildlife and habitat management, and land management. Meetings are held on a regular basis per year. (Meeting Minutes)

Oversight Activities

The EMC oversees training and various monitoring activities conducted by the Massachusetts National Guard in the Reservation. An environmental officer is on-base supporting the EMC. The division and responsibilities of the environmental officer are to monitor activities being conducted on, and assess, Upper Camp Ward Supply Reservation / Camp Edwards Training Area and impacts of activities and seasons on the reservation and wildlife. The EMC also oversees training areas prior to, during, and immediately following training. The environmental officer validates reports, inspection forms, logs, and other information and data regarding ongoing activities and assesses the Reservation. The EMC validates whether or not a site is in compliance with Environmental Performance Standards and provides for information therein.

Monitoring and Evaluation

- The EMC determines compliance and may restrict activities in accordance with Chapter 47 of Acts of 2002, relating to the environmental protection of more than 15,000 acres of JBCC.
- The EMC performs various on-range monitoring of range resources' training operations and resources are properly informed of range requirements and are following prescribed procedures.

The Environmental Performance Standards

The Environmental Performance Standards are a list of requirements, or standards for performance, a guidebook for military and civilian services in protection of Camp Edwards' natural and cultural resources and ground water in the Reservation. These standards apply to the Massachusetts National Guard property as a Joint Base Cape Cod. The Environmental Performance Standards are based in large part on already existing federal, state, and Department of Defense regulations. In some cases, provisions offered by performance standards are more stringent than those offered by other regulations.

The Environmental Performance Standards are divided into general and specific performance standards. There are 19 specific performance standards that apply to the training area of Camp Edwards. These specific performance standards pertain to resource management as well as various species and habitat management, hazardous materials, solid waste, and pest and fire management, and an emphasis on wildlife and ground water protection. The goal is to ensure protection of ground water and wildlife and the overall impact of military training and civilian activities, as well as training.

The Annual State of the Reservation Report

The Environmental Management Commission receives a State of Reservation Report that provides an assessment of results of the Massachusetts Army National Guard's environmental management programs in the Reservation as it relates to Environmental Performance Standards. The Report also provides background information on base infrastructure and natural and cultural resources found in the Reservation.

For more information is available by contacting the EMC's environmental officer at 508-946-2871. Old records may be obtained by calling 339-202-9369.

MEETING MINUTES**Environmental Management Commission (EMC)**

- EMC minutes 05-23-19 FINAL
- EMC minutes 10-25-18 FINAL
- EMC minutes 06-01-17 FINAL
- EMC minutes 06-08-16 FINAL

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Community Advisory Council (CAC)

- CAC minutes 03-14-19 FINAL
- CAC minutes 10-04-18 FINAL
- CAC minutes 05-02-18 FINAL
- CAC minutes 10-25-17 FINAL
- CAC minutes 05-25-17 FINAL
- CAC minutes 10-05-16 FINAL w

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Science Advisory Council (SAC)

- SAC minutes 09-20-18 FINAL
- SAC minutes 05-10-18 FINAL
- SAC minutes 10-19-17 FINAL
- SAC minutes 05-18-17 FINAL
- SAC minutes 10-13-16 FINAL
- SAC minutes 04-27-16 FINAL
- SAC minutes 03-23-16 FINAL

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Appendix G: Camp Edwards Environmental Performance Standards (EPS) (2017)

APPENDIX A

ENVIRONMENTAL PERFORMANCE STANDARDS

ENVIRONMENTAL PERFORMANCE STANDARDS APRIL 6, 2017

For Massachusetts National Guard Properties at the Massachusetts Military Reservation

CAMP EDWARDS TRAINING AREA GENERAL PERFORMANCE STANDARDS

None of the following banned military training activities shall be allowed in the Camp Edwards Training Areas:

- Artillery live fire
- Mortar live fire
- Demolition live fire training
- Artillery bag burning
- Non-approved digging, deforestation or vegetation clearing
- Use of 'CS', riot control, or tear gas for training outside the NBC bunkers
- Use of field latrines with open bottoms
- Vehicle refueling outside designated Combat Service Area and Fuel Pad locations
- Field maintenance of vehicles above operator level

Limitations on the use of small arms ammunition and live weapon fire fall into the following two categories:

- Live weapon fire is prohibited outside of established small arms ranges. Live weapon fire is not allowed on established small arms ranges except in accordance with Environmental Performance Standard 19, other applicable Performance Standards, and a range-specific plan approved through the Environmental Management Commission (EMC).
- Blank ammunition for small arms and simulated munitions may be used in areas outside of the small arms ranges, using only blank ammunition and simulated munitions identified on an approved list of munitions. Joint review and approval for inclusion on the list shall be through by the Environmental & Readiness Center (E&RC) and the EMC.

Each user will be responsible for proper collection, management, and disposal of the wastes they generate, as well for reporting on those actions.

Use and application of hazardous materials or disposal of hazardous waste shall be prohibited except as described in the Groundwater Protection Policy.

Vehicles are only authorized to use the existing network of improved and unimproved roads, road shoulders, ranges and bivouac areas, except where necessary for land rehabilitation and management, water supply development, and remediation, or where roads are closed for land rehabilitation and management.

Protection and management of the groundwater resources in the Camp Edwards Training Area will focus on the following:

- Development of public and Massachusetts Military Reservation water supplies.
- Preservation and improvement of water quality and quantity (recharge).
- Activities compatible with the need to preserve and develop the groundwater resources.

All users of the Camp Edwards Training Area must comply with the provisions of the Groundwater Protection Policy and any future amendments or revisions to the restrictions and requirements. These will apply to all uses and activities within the overlays relative to Wellhead Protection, Zone II's within the Cantonment Area, and the Camp Edwards Training Areas.

Development of water supplies will be permitted within the Camp Edwards Training Area after review and approval by the managing agencies, principally the Department of the Army and its divisions, together with the Massachusetts Department of Environmental Protection, and the Massachusetts Division of Fish and Wildlife.

All phases of remediation activities will be permitted within the Camp Edwards Training Area after review and approval by the managing agencies, principally the Department of the Army and its divisions, together with the federal and state agencies who will have jurisdiction for remediation.

Pollution prevention and management of the Camp Edwards training ranges will focus on and include the following:

The Camp Edwards Training Area, including the Small Arms Ranges (SAR) and their associated "Surface Danger Zones," and any areas where small arms or other munitions or simulated munitions are used, shall be managed as part of a unique water supply area under an adaptive management program that integrates pollution prevention, and best management practices (BMP), including the recovery of projectiles. This will be done through individual range-specific plans that are written by the Massachusetts National Guard and approved for implementation through the EMC and any other regulatory agency having statutory and/or regulatory oversight. Adaptive, in this context, means making decisions as part of a continual process of monitoring, reviewing collected data, evaluating advances in range monitoring, design and technology, and responding with management actions as dictated by the resulting information and needs of protecting the environment while providing compatible military training within the Upper Cape Water Supply Reserve.

A range plan shall be designed and followed to reduce the potential for an unintended release to the environment outside of the established containment system(s) identified in the range-specific plans. All users must be aware of, and comply with, the Environmental Performance Standards that are applicable to all SAR activities. Any range specific requirements will be coordinated through the E&RC with the EMC, incorporating those specific requirements into the appropriate range-specific plans and range information packets. Camp Edwards SAR Pollution Prevention Plan shall be followed to prevent or minimize releases of metals or other compounds related to the normal and approved operation of each SAR. The adaptive SAR management program components required in each range-specific plan shall include:

- Consultation with applicable agencies with oversight of the training area before undertaking any actions that are subject to state and/or federal regulatory requirements.
- Specific recovery plans for the removal and proper disposition of spent projectiles, residues and solid waste associated with the weapons, ammunition, target systems, and/or their operation and maintenance.
- Reduction of adverse impacts to the maximum extent feasible, including consideration for the design/redesign and/or relocation of the activity or encouraging only those activities that result in meeting the goal of overall projectile and/or projectile constituent containment.
- Internal and external coordination of documentation for the Camp Edwards range management programs and other related Camp Edwards management programs including: the Integrated Training Area Management Program, Range Regulations, Camp Edwards Environmental Management System, Civilian Use Manual, and Standard Operating Procedures.
- Long-term range maintenance, monitoring and reporting of applicable parameters and analysis.

The Massachusetts National Guard shall ensure that all training areas where munitions or simulated munitions are used or come to be located, including range areas, range surface danger zones, and any other areas within the Upper Cape Water Supply Reserve that are operational ranges are maintained and monitored following approved management plans that include planning for pollution prevention, sustainable range use and where applicable, restoration.

Protection and management of the vegetation of the Camp Edwards Training Area for focus on the following:

- Preservation of the habitat for federal- and state-listed rare species and other wildlife.
- Preservation of the wetland resource areas.
- Activities compatible with the need to manage and preserve the vegetative resources.
- Realistic field training needs.
- Identification and restoration of areas impacted by training activities.

Goals for the Adaptive Ecosystem Management approach to management of the Camp Edwards properties will be as follows:

- Management of the groundwater for drinking water resources
- Conservation of endangered species.
- Management of endangered species habitat for continuation of the species.
- Ensuring compatible military training activities.
- Allowing for compatible civilian use.
- Identification and restoration of areas impacted by training activities.

The Environmental Performance Standards will be incorporated into the programs and regulations of the Massachusetts National Guard as follows. Those standards relating to natural resources management shall be incorporated as standards into each of the state and federal environmental management programs and attached as an appendix or written into the documentation accompanying the plan or program. All the Environmental Performance Standards will be attached to the Integrated Training Area Management Plan 'Trainer's Guide' and to the Camp Edwards Range Regulations. Modification of the Standards Operating Procedures will include review and conformance with the Environmental Performance Standards for trainers and soldiers at Camp Edwards.

SPECIFIC RESOURCE PERFORMANCE STANDARDS IN THE CAMP EDWARDS TRAINING AREA

1. Groundwater Resources Performance Standards

1.1. All actions, at any location within the Camp Edwards Training Areas, must preserve and maintain groundwater quality and quantity, and protect the recharge areas 1:0 existing and potential water supply wells. All areas within Camp Edwards Training Areas will be managed as State Zone U, and, where designated, Zone I, water supply areas.

1.2 The following standards shall apply to designated Wellhead Protection Areas:

- The 400-foot radius around approved public water supply wells will be protected from all access with signage. That protection will be maintained by the owner and/or operator of the well, or the leaseholder of the property.
- No new stormwater discharges may be directed into Zone I areas.

- No in ground septic system will be permitted within a Zone I area.
- No solid wastes may be generated or held within Zone I areas except as incidental to the construction, operation, and management of a well.
- Travel in Zone I areas will be limited to foot travel or to vehicles required for construction, operation, and maintenance of wells.
- No new or existing bivouac activity or area shall be located within a Zone I area.
- All other areas will be considered as Zone II designated areas and will be subject to the standards of the Groundwater Protection Policy.

1.3 Land-use activities that do not comply with either the state Wellhead Protection regulations (310 CMR 22.00 et seq.) or the Groundwater protection Policy are prohibited.

1.4 All activities will support and not interfere with either the Impact Area Groundwater Study and/or the Installation Restoration Program. All activities shall conform to the requirements of Comprehensive Environmental Response, Compensation and Liability Act, the Massachusetts Contingency Plan, and the Safe Drinking Water Act.

1.5 Extraction, use, and transfer of the groundwater resources must not degrade [e.g. draw down surface waters] in freshwater ponds, vernal pools, wetlands, and marine waters, unless properly reviewed, mitigated, and approved by the managing and regulating agencies.

1.6 Land uses and activities in the Camp Edwards Training Areas will meet the following standards:

- Will conform to all existing and applicable federal, state and local regulations.
- Must be able to be implemented without interference with ongoing remediation projects.
- Allow regional access to the water supplies on the Massachusetts Military Reservation.

1.7 The following programs and standards will be used as the basis for protecting groundwater resources in the Camp Edwards Training Areas:

- Groundwater Protection Policy.
- Federal and Department of Defense environmental programs: Integrated Natural Resources Management Plan, Integrated Training Area Management Program, Range Regulations, Spill Prevention Control and Countermeasures Plan (or equivalent), Installation Restoration *Plan*, Impact Area Groundwater Study, or other remediation programs.
- State and federal laws and regulations pertaining to water supply.

2. Wetlands and Surface Water Performance Standards

2.1 Since there are relatively few wetland resources found at the Massachusetts Military Reservation, and since they are important to the support of habitat and water quality on the properties, the minimum standard will be no net loss of any of the wetland resources or their 100-foot buffers.

2.2 Land uses and activities will be managed to prevent and mitigate new adverse impacts and eliminate or reduce existing conditions adverse to wetlands and surface water resource areas. Impacts from remediation activities may be acceptable with implementation of reasonable alternatives.

2.3 Wetland area management priorities:

- Protection of existing; wetland resource areas for their contributions to existing and potential drinking water supplies.
- Protection of wetlands for rare species and their habitats.
- Protection of human health and safety.

2.4. Activities will be managed to preserve and protect wetlands and vernal pools as defined by applicable, federal, state, and local regulations. These activities will include replacement or replication of all wetland resource buffer areas, which are lost after completion of an activity or use.

2.5 All land altering activities within 100 feet of a certified vernal pool must be reviewed before commencement by the Massachusetts Department of Environmental Protection/Wetlands Unit and the Natural Heritage and Endangered Species Program within the Division of Fish and Wildlife for impacts to wildlife and habitat. The certification of vernal pools will be supported by the on site personnel and will proceed with the assistance of the appropriate state agencies.

2.6 All new uses or activities will be prohibited within the wetlands and their 100-foot buffers, except those associated with an approved habitat enhancement or restoration program; those on existing improved and unimproved roads where appropriate sediment and erosion controls are put in place prior to the activity; or those where no practicable alternative to the proposed action is available. No new roads should be located within the 100-foot buffers. Existing roads within such buffers should be relocated provided that:

- The relocation does not cause greater environmental impact to other resources.
- There are funds and resources allocated for resource management and that those resources are approved and available for the relocation.

2.7 During the period of 15 February to 15 May, listed roads/trails within 500 feet of wetlands will be closed to vehicle access to protect the migration and breeding of amphibians. Emergency response and environmental management activities will not be restricted.

- Donnelly and Little Halfway Ponds maneuver trails (excluding the permanently closed section along the eastern edge of Donnelly Pond) from Frank Perkins Road north to Wood Road
- Red Maple Swamp trail from Wood Road north and east to Avery Road
- Orchard and Jefferson Roads (continuous) from Cat Road south and east to Burgoyne Road
- Maneuver trail(s) in powerline easement north of Gibbs Road from Goat Pasture Road west to the boundary of training areas C-13 and C-14
- Grassy Pond trail (side access to Sierra Range) from Gibbs Road south to Sierra Range
- Sandwich Road from the powerline easement north to the gas pipeline right of way
- Bypass Bog/Mike Range Road from entrance to Mike Range south and west to Greenway Road

2.8 No new bivouac area shall be located within 500 feet of any wetland. Any existing bivouac within a wetland buffer shall be relocated provided there are funds and resources allocated for the relocation.

3. Rare Species Performance Standards

3.1 As the Natural Heritage and Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife has identified the entire Massachusetts Military Reservation as State Priority Habitat for state-listed species (version dated 2000-2001), all activities and uses must comply with the Massachusetts Endangered Species Act and its regulations.

3.2 Where activities and uses are not specifically regulated under the Camp Edwards Training Area Range and Environmental Regulations, including these Environmental Performance Standards, the MMR Environmental and Readiness Center must review the activities for conformance with the Integrated Natural Resource Management Plan, and shall- consult with the Natural Heritage and Endangered Species Program regarding potential impacts to state-listed species.

3.3 All activities impacting rare species habitat must be designed to preserve or enhance that habitat as determined by the MMR Environmental and Readiness Center in consultation with the Natural Heritage and Endangered Species Program.

3.4 Users are prohibited from interfering with state and federal listed species.

3.5 Users will report all sightings of recognized listed species, e.g. box turtles, within any area of the Massachusetts Military Reservation.

4. Soil Conservation Performance Standards

4.1 Activities and uses must be compatible with the limitations of the underlying soils. Limitations on uses and activities may be made where the soils or soil conditions would not support the activity.

4.2 Agricultural soil types will be preserved for future use.

4.3 Any perennial or intermittent stream identified by the Environmental & Readiness Center Office will be protected from siltation by retaining undisturbed vegetative buffers to the extent feasible.

4.4 Cultural resource evaluations must be completed before any earth-moving operation may take place in undisturbed areas with high potential for cultural resources, and earth moving may be limited to specific areas (See Cultural Resource Performance Standards).

4.5 An erosion control analysis will be made part of the land management programs (Integrated Natural Resource Management Plan, the Integrated Training Area Management Program, Range Regulations, Civilian Use, and Standard Operating Procedures) for the Camp Edwards Training Area, including appropriate mitigation measures where existing or potential erosion problems are identified.

4.6 For all improved and unimproved roads, ditches and drainage ways:

- All unimproved roads, ditches, roads and drainage ways identified for maintenance will be cleaned of logs, slash and debris.
- Unimproved roads and roads may not otherwise be improved unless approved for modification.
- Any trail, ditch, road, or drainage way damaged by activities will be repaired in accordance with the hazard and impact it creates.

4.7 Erosion-prone sites will be inspected periodically to identify damage and mitigation measures.

5. Vegetation Management Performance Standards

5.1 All planning and management activities impacting vegetation

- Will ensure the maintenance of native plant communities, and
- Shall be performed to maintain the biological diversity.

5.2 Revegetation of disturbed sites will be achieved by natural and artificial recolonization by native species.

5.3 Timber harvesting or clear-cutting of forested areas should not occur on steep slopes with unstable soils or within the buffers to wetland resources.

5.4 Vegetation management will be subject to a forest management and fire protection program prepared by the users in accordance with federal standards, and carried out in a manner acceptable to the Massachusetts Military Reservation Committee and other state agencies or commissions, as may be designated by the Commonwealth of Massachusetts.

6. Habitat Management Performance Standards

6.1 The Camp Edwards Training Area will be managed as a unique rare species and wildlife habitat area under an adaptive ecosystem management program that integrates ecological, socio-economic, and institutional perspectives, and which operates under the following definitions:

- Adaptive means making decisions as part of a continual process of monitoring, reviewing collected data, and responding with management actions as dictated by the resulting information and needs of the system.
- Ecosystem means a system-wide understanding of the arrangements of living and non-living things, and the forces that act upon and within the system.
- Management entails a multi-disciplinary approach where potentially competing interests are resolved with expert analysis, user and local interest considerations, and a commitment to compromise interests when the broader goal is achieved to manage the Camp Edwards Training Area as a unique wildlife habitat area.

6.2 The adaptive ecosystem management program will include:

- Coordinated documentation for the management programs, Integrated Natural Resource Management Plan, the Integrated Training Area Management Program, Range Regulations, Civilian Use, and Standard Operating Procedures.
- The Massachusetts National Guard Environmental and Readiness Center staff and necessary funding to support its ecosystem management plans, as related to the amount of training occurring.
- Cooperative agreements to create a management team of scientific and regulatory experts.
- Long-term land maintenance, monitoring of resources and trends, study and analysis.
- Recovery plans for species and habitats identified for improvement.
- Consultation with Federal and State agencies charged with oversight of the Endangered Species Program before any actions that may affect state and federal-listed species habitat.
- Reduction of adverse impacts to the maximum extent possible, including consideration for the relocation of the activity or encouraging only those activities that result in meeting a habitat management goal.
- Habitat management activities designed to promote protection and restoration of native habitat types.

7. Wildlife Management Performance Standards

7.1 Native wildlife habitats and ecosystems management will focus on the following:

- Protecting rare and endangered species, and,
- Maintaining biodiversity.

7.2 Hunting, recreation and educational trips must be approved, scheduled, planned, and supervised through Range Control.

7.3 Any activity or use will prioritize protection of life, property, and natural resource values at the boundaries of the Camp Edwards Training Area where wildlife interfaces with the surrounding built environment.

7.4 Wildlife management will include the following actions, specific to the species targeted for management:

- Development and implementation of a plan to monitor hunting of game species.
- Planning for multi-use objectives for recreation and hunting that incorporate public input and recommendations.
- Development of suitable monitoring programs for federal and state-listed species, and regular exchange of information with the Natural Heritage and Endangered Species Program.

8. Air Quality Performance Standard

8.1 All uses and activities will be responsible for compliance with both the State Implementation Plan for Air Quality and the Federal Clean Air Act.

8.2 Air quality management activities will include air sampling if required by regulation of the activity.

9. Noise Management Performance Standards

9.1 Noise management activities shall conform to the Army's Environmental Noise Management Program policies for evaluation, assessment, monitoring, and response procedures.

10. Pest Management Performance Standards

10.1 Each user will develop and implement an Integrated Pest Management Program to control pest infestations that may include outside contracting of services. Non-native biological controls should not be considered unless approved by federal and state agencies.

10.2 Each user will be held responsible for management of pests that threaten rare and endangered species, or are exotic and invasive species. Invasive plant species that may be considered pest species are those defined by the United States Fish and Wildlife Service and the Massachusetts Natural Heritage and Endangered Species Program of the Division of Fisheries and Wildlife office. Site-specific analysis will be performed before implementation of any proposed pest management plans.

10.3 Pest vegetation control must be balanced against environmental impact and any proposed pest management activities, including the use of herbicides and mechanical methods, within rare species habitat areas must be approved by the Natural Heritage and Endangered Species Program, or in the case of federally listed species, by the United States Fish and Wildlife Service.

10.4 Only herbicide formulations approved by the United States Environmental Protection Agency, the Department of Agriculture, the agency managing the user, and the Commonwealth of Massachusetts may be applied.

10.5 Herbicides and pesticides will not be applied by aerial spraying unless required by emergency conditions and approved under applicable state and federal regulations.

11. Fire Management Performance Standards

11.1 All activities and uses shall manage, prevent, detect, and suppress fires on the Camp Edwards Training Area in coordination with the local and state fire services and natural resource managers in the Environmental & Readiness Center.

11.2 Prescribed burns will be used as a habitat management and fire prevention tool. Prescribed burns will be used to reduce natural fire potential and create or maintain diverse and rare species habitat.

11.3 Pre-suppression activities will include strategic firebreaks and other management of vegetation in high risk and high-incidence areas. The Integrated Natural Resource Management Plan and Fire Management Plan will be consulted for proposed actions.

11.4 Other than the above, no open fires are allowed.

12. Stormwater Management Performance Standards

12.1 All stormwater facilities shall comply with the State Department of Environmental Protection Guidelines for Stormwater Management, including Best Management Practices and all other applicable standards for control and mitigation of increased storm water flow rates and improvement of water quality.

12.2 All increases in stormwater runoff will be controlled within the user's property.

12.3 No new stormwater discharges will be made directly into wetlands or wetland resource areas.

13. Wastewater Performance Standards

13.1 All wastewater and sewage disposal will be in conformance with the applicable Federal and Massachusetts Department of Environmental Protection agency regulations.

14. Solid Waste Performance Standards

14.1 All solid waste streams (i.e., wastes not meeting the criteria for hazardous wastes) will be monitored and managed to substitute, reduce, recycle, modify processes, implement best management practices, and/or reuse waste, thereby reducing the total tonnage of wastes,

14.2 All users will be held responsible for collection, removal and disposal outside of the Camp Edwards Training Areas of solid wastes generated by their activities.

14.3 All users must handle solid wastes using best management practices to minimize nuisance odors, windblown litter, and attraction of vectors.

14.4 No permanent disposal of solid waste within the Groundwater protection Policy area/Camp Edwards field training areas will be permitted.

15. Hazardous Materials Performance Standards

15.1 Where they are permitted, use and application of hazardous materials shall be otherwise minimized in accordance with pollution prevention and waste minimization practices, including material substitution.

15.2 No permanent disposal of hazardous wastes within the Groundwater protection Policy area/Camp Edwards field training areas will be permitted.

15.3 Fuel Management

15.3.1 Spill Prevention, Control, and Countermeasure Plan, is in place to reduce potential for a release. Camp Edwards Spill Response Plan is in place to respond to a release if an event should occur. All users will comply with these plans at the Camp Edwards Training Area.

15.3.2 If found, non-complying underground fuel storage tanks will be removed in accordance with state and federal laws and regulations to include remediation of contaminated soil.

15.3.3 No storage or movement of fuels for supporting field activities, other than in vehicle fuel tanks, will be permitted except in approved containers no greater than five gallons in capacity.

15.3.4 New storage tanks are prohibited unless they meet the following requirements:

- Are approved for maintenance heating, or, permanent emergency generators and limited to propane or natural gas fuels.
- Conform to the Groundwater Protection Policy and applicable codes.

15.4 Non-fuel Hazardous Material Storage

15.4.1 No storage above those quantities necessary to support field training activities will be allowed within the Camp Edwards Training Area except where necessary to meet regulatory requirements, and where provided with secondary containment.

15.4.2 When required by applicable regulation, the user shall implement a Spill Prevention, Control and Containment/Emergency Response or other applicable response plan.

16. Hazardous Waste Performance Standards

16.1 All uses shall comply with applicable local, state, and federal regulations governing hazardous waste generation, management, and disposal (including overlays relative to Wellhead Protection, Zone II' s within the Cantonment Area) .

16.2 Accumulations of hazardous waste shall be handled in accordance with regulations governing accumulation and storage.

16.3 Existing facilities must implement pollution prevention and waste minimization procedures (process modifications, material substitution, recycling, and best management practices) to minimize waste generation and hazardous materials use.

16.4 Occupants and users will be held responsible for removing all solid or hazardous wastes generated during the period of use/tenancy/visitation upon their departure or in accordance with other applicable or relevant regulations.

16.5 Remedial activities undertaken under the Installation Restoration Program, the Impact Area Groundwater Study Program, the Massachusetts Contingency Plan, or other governing remediation programs are exempt from additional regulation (e.g., waste generation volume limits). Removal, storage, and disposal of contaminated material are required to comply with all state, and federal regulations.

16.6 Post-remedial uses and activities at previously impacted sites will be allowed in accordance with terms and conditions of the applicable regulations.

16.7 All hazardous wastes will be transported in accordance with federal Department of Transportation regulations governing shipment of these materials.

16.8 Transport shall reduce the number of trips for transfer and pick-up of hazardous wastes for disposal to extent feasible. Tills may include planning appropriate routes that minimize proximity to sensitive natural resource areas, and reducing internal transfers of material, including transfers from bulk storage tanks to drums, tankers, carboys, or other portable containers or quantities.

16.9 No permanent disposal of hazardous wastes within the Groundwater Protection Policy area/Camp Edwards field training areas will be permitted.

17. Vehicle Performance Standards

17.1 Vehicles within the Camp Edwards Training Area will be limited to the existing improved and unimproved road system except where required for natural resource management or property maintenance or where off-road activity areas are located and approved by the Environmental and Readiness Center in consultation with the Massachusetts Division of Fisheries and Wildlife.

17.2 Unimproved, established access ways will be limited to use by vehicles in accordance with soil conditions as described in the Soil Conservation Performance Standards.

17.3 The number of military and civilian vehicles within the Camp Edwards Training Area will be controlled using appropriate scheduling and signage.

18. General Use and Access Performance Standards

18.1 General User Requirements. Requirements that will apply to all users, both public and private, in the Camp Edwards Training Area include the following:

- All acts that pollute the groundwater supply are prohibited.
- No litter or refuse of any sort may be thrown or left in or on any property.
- All users will be held responsible for providing, maintaining, and re- moving closed-system, sanitary facilities necessary for their use and activity.
- No person shall wade or swim in any water body except for activities approved by the Massachusetts National Guard including remediation, scientific study, or research.
- Vehicles may only be driven on roads authorized and designated for such use and parked in designated areas, and may not cross any designated wetland.
- Public users may not impede the military training activities.

18.2. Civilian Use Manual. To guide public conduct on the Massachusetts Military Reservation, a Civilian Use Manual will be prepared and periodically updated. All civilian users will obtain and follow this Manual.

18.3. Siting and Design Performance Standards

18.3.1 New or expanded buildings should not be proposed within the Camp Edwards Training Areas, with the following exceptions:

- Buildings to support allowed training, operations and activities, including upgrading of those facilities currently in place,
- Buildings used for the purposes of remediation activities,
- Buildings used for the purposes of development, operation and maintenance of water supplies,
- Buildings used for the purpose of natural resource and land management.

19. Range Performance Standards

19.1. All operational ranges including but not limited to small arms ranges (SAR) shall be managed to minimize harmful impacts to the environment within the Upper Cape Water Supply Reserve. Range management at each range shall include to the maximum extent practicable metal recovery and recycling, prevention of fragmentation and ricochets, and prevention of sub-surface percolation of residue associated with the range operations. Camp Edwards shall be held responsible for the implementation of BMPs by authorized range users, including collection and removal of spent ammunition and associated debris.

19.2. Small arms ranges shall only be used in accordance with approved range plans. These plans shall be designed to minimize to the maximum extent practicable the release of metals or other contaminants to the environment outside of specifically approved containment areas/systems. Occasional ricochets that result in rounds landing outside of these containment areas is expected and every effort to minimize and correct these occurrences shall be taken. Failure to follow the approved range plans shall be considered a violation of this EPS.

19.3. All operational SARs shall be closely monitored by the Massachusetts National Guard to assess compliance of the approved range plans as well as the implementation and effectiveness of the range specific BMPs.

19.4. Camp Edwards/Massachusetts National Guard Environmental and Readiness Center shall staff and request appropriate funding to support its SAR management plans.

19.5. All users must use and follow Camp Edwards' Range Control checklists and procedures to:

- Minimize debris on the range (e.g. shell casings, used targets)
- Minimize or control residues on the ranges resulting from training (e.g., unburned constituents, metal shavings from the muzzle blast)
- Ensure the range is being used for the designated purpose in accordance with all applicable plans and approvals

19.6. Camp Edwards is responsible for following range operation procedures and maintaining range pollution prevention systems. Range BMPs shall be reviewed annually for effectiveness and potential improvements in their design, monitoring, maintenance, and operational procedures in an effort to continually improve them. Each year the annual report shall detail the range-specific activities including, but not limited to, the number of rounds fired, number of shooters and their organization, and the number of days the range was in use. The annual report will also detail active SAR groundwater well and lysimeter results, as well as any range maintenance/management activities that took place that training year and the result of such activities, i.e. lbs of brass and projectiles recovered and recycled, etc. The Massachusetts National Guard shall provide regular and unrestricted access for the EMC to all its data and information, and will provide immediate access to environmental samples from the range, including range management and monitoring systems and any other applicable activities operating on the ranges.

19.7. Range plans and BMPs for training areas shall be reviewed and/or updated at least every three years. Management plans for new and upgraded ranges shall be in place prior to construction or utilization of the range. Range plans, at a minimum, will address long-term sustainable use, hydrology and hydrogeology, physical design, operation, management procedures, record keeping, pollution prevention, maintenance, monitoring, and applicable technologies to ensure sustainable range management. Range plans shall be integrated with other training area planning processes and resources.

19.8. The Massachusetts National Guard shall establish procedures for range maintenance and where applicable, maintenance and/or clearance operations to permit the sustainable, compatible, and safe use of operational ranges for their intended purpose within the Upper Cape Water Supply Reserve. In determining the frequency and degree of range maintenance and clearance operations, the Massachusetts National Guard shall consider, at a minimum, the environmental impact and safety hazards, each range's intended use, lease requirements, and the quantities and types of munitions or simulated munitions expended on that range.

Appendix H: Greenhouse Gas Analysis

**Multi-Purpose Machine Gun (MPMG) Range
at the Known Distance (KD) Range**

Greenhouse Gas Analysis

January 30, 2020

Greenhouse Gas Analysis

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1 BACKGROUND INFORMATION

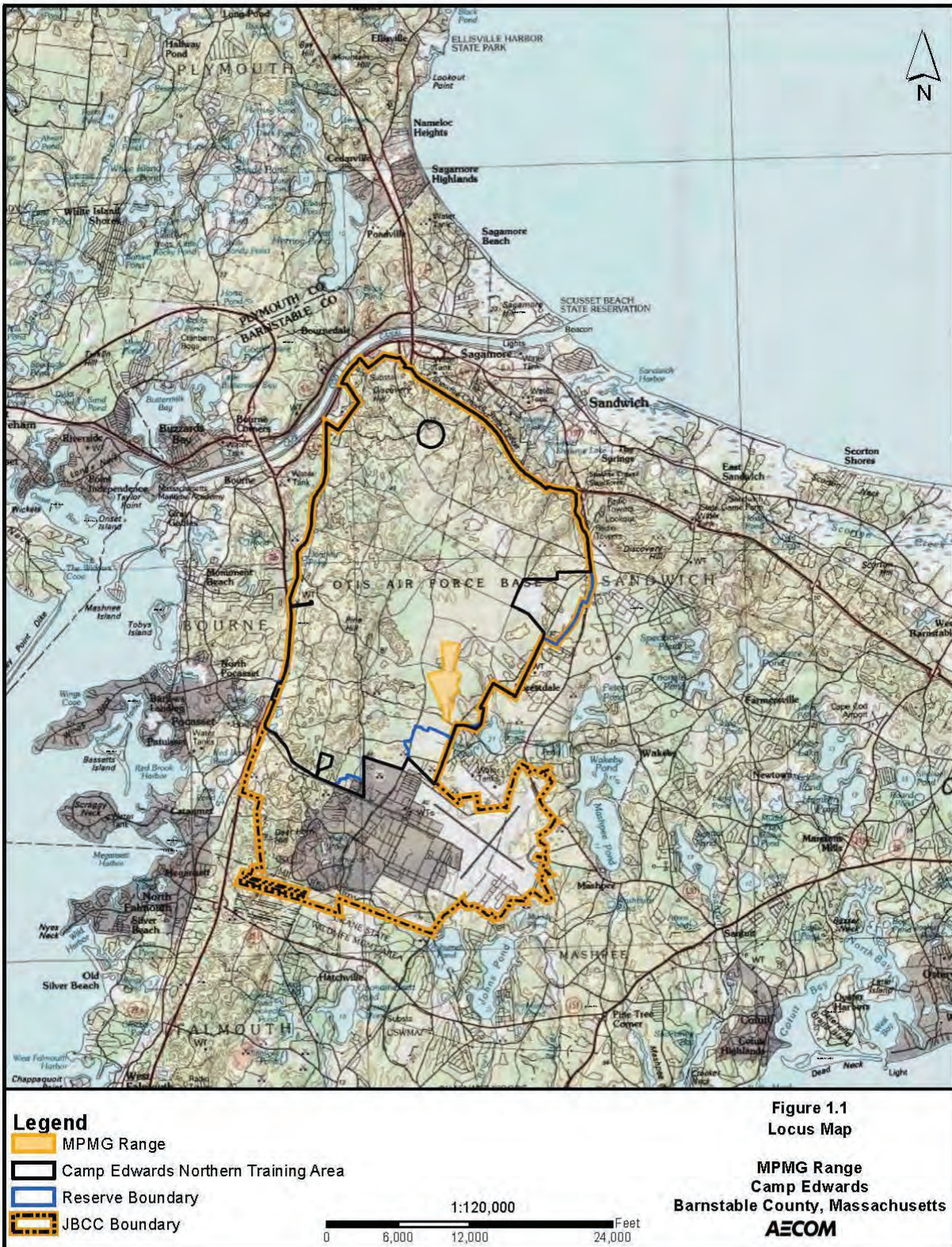
1.1 MEPA Greenhouse Gas Policy and Protocol

The Executive Office of Energy and Environmental Affairs (“EOEEA”) has established a Greenhouse Gas (“GHG”) Emissions Policy and Protocol last revised May 5, 2010 (“Policy”) in accordance with the Massachusetts Environment Policy Act (“MEPA”). The purpose of the Policy is to inform the MEPA office of the quantity of GHG associated with proposed projects, by assessing the project baseline, considering available alternatives, and evaluating the feasibility and impact of performing the alternatives.

GHGs are emitted from stationary and mobile sources, resulting in trace amounts in the atmosphere. GHGs include water vapor, carbon dioxide (“CO₂”), nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Water vapor occurs naturally and is the most abundant GHG, with CO₂ being the second most abundant. Because CO₂ constitutes an abundant amount of human-caused GHG emissions, CO₂ is used as the basis for calculating the equivalent amounts of CO₂ (i.e., CO₂e) other GHGs would emit. The carbon dioxide equivalent (“CO₂e”) is therefore used as a measurement of GHGs as a common unit and allows GHGs to be expressed as a single number (USEPA 2016h). CO₂e is an accounting measure of GHGs which takes into account Global Warming Potentials (“GWP”) for various GHG chemicals. For example, one ton of CO₂ is equivalent to one ton of CO₂e, one ton of methane (“CH₄”) is equivalent to 25 tons of CO₂e, and one ton of nitrous oxide (“N₂O”) is equivalent to 298 tons of CO₂e. The combined GHG total, represented as CO₂e, is the amount of CO₂ that has the equivalent global warming impact as the combination of different GHG species.

1.2 Description and Scope of Project

The Massachusetts Army National Guard (“MAARNG”) is proposing to construct and operate a Multi-Purpose Machine Gun (“MPMG”) Range (the Project) at the existing 600-yard Known Distance (“KD”) Range at Camp Edwards (see **Figure 1.1**). The purpose of the Project is to provide the MAARNG with a mission required, Army-standard MPMG Range to allow the MAARNG to efficiently attain required training and weapons qualifications requirements within Massachusetts. A priority for the MAARNG at Camp Edwards is the continued use and development of live-fire ranges to meet the requirement that all Soldiers qualify with their primary weapon systems annually. Currently, the three closest MPMG ranges used for training include Camp Ethan Allen in Jericho, Vermont located over 270 miles away, Fort Dix in Ocean County, New Jersey located over 300 miles away, and Fort Drum located in Jefferson County, New York located over 370 miles away (see **Figure 1.2**). Implementation of the Project would allow the MAARNG to fulfill their mission by meeting their weapons qualifications standards and training requirements using in-State facilities, and to maintain their readiness posture. Construction of the MPMG Range at Camp Edwards within Massachusetts will eliminate the out-of-state travel to the other training facilities with MPMG Ranges.



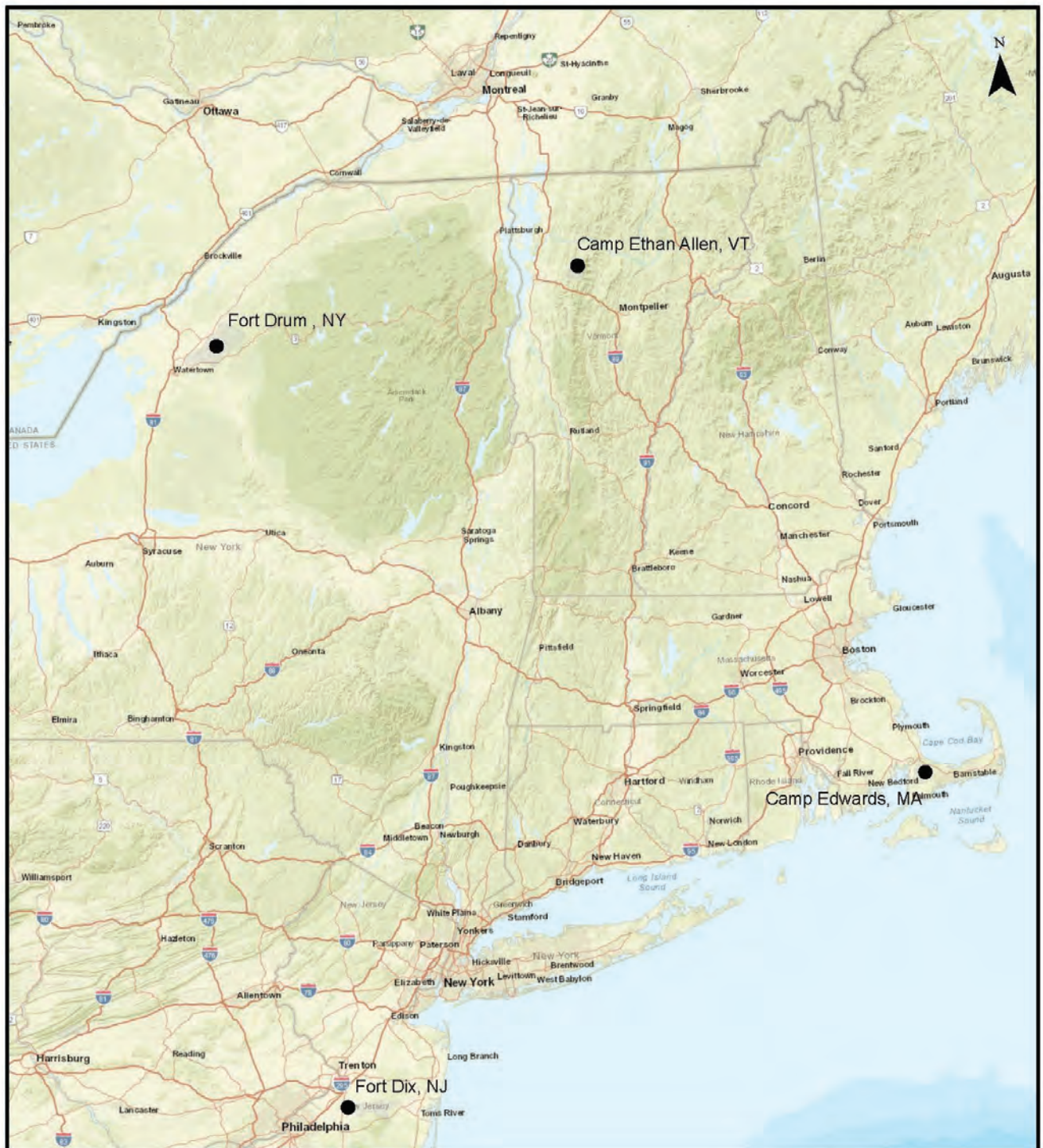


Figure 1.2
Camps of the northeast

MPMG Range
Camp Edwards
Barnstable County, Massachusetts

1:3,000,000
0 20 40 80 Miles

AECOM

The Project involves the construction of an eight lane MPMG Range with six lanes 800 meters long with a width of 25 meters at the firing line and a width of 100 meters at a distance of 800 meters. The two middle lanes (Lanes 5 and 6) will extend an additional 700 meters to a distance of 1,500 meters long to accommodate .50 caliber rifles. The proposed MPMG Range is depicted on **Figure 1.3**.

The footprint of the Project would be 209.0 acres which includes improving the existing 600-yard KD Range comprised of approximately 38.5 acres (36.0 acres managed grasslands, 2.5 acres existing range control area) and approximately 170.5 acres of vegetation clearing. The range consists of: (1) the physical range footprint, consisting of the firing positions and targetry, (2) Range Operations Control Area (“ROCA”) support structures; which includes a Range Control Tower, Ammunition Storage Building, and Covered Bleachers, and (3) approximately 10.0 acres of clearing for firebreaks. The 170.5 acres of vegetation clearing proposed includes the firebreaks.

Any new projects requiring filing of an Environmental Notification Form (“ENF”) or Notices of Project Change (“NPC”) initiates MEPA applicability review. Based on certain triggers, MEPA requires GHG analysis for projects with land alteration or clearing and forest conversion greater than 50 acres of land. The proposed MPMG Range Project will exceed the 50 acre threshold for land clearing and, therefore, is subject to MEPA requirements. The requirements include calculation of the Project baseline, estimation of emissions associated with the Preferred Alternative as well as outlining and committing to a series of mitigation measures that will help to reduce GHG emissions from the proposed Project.

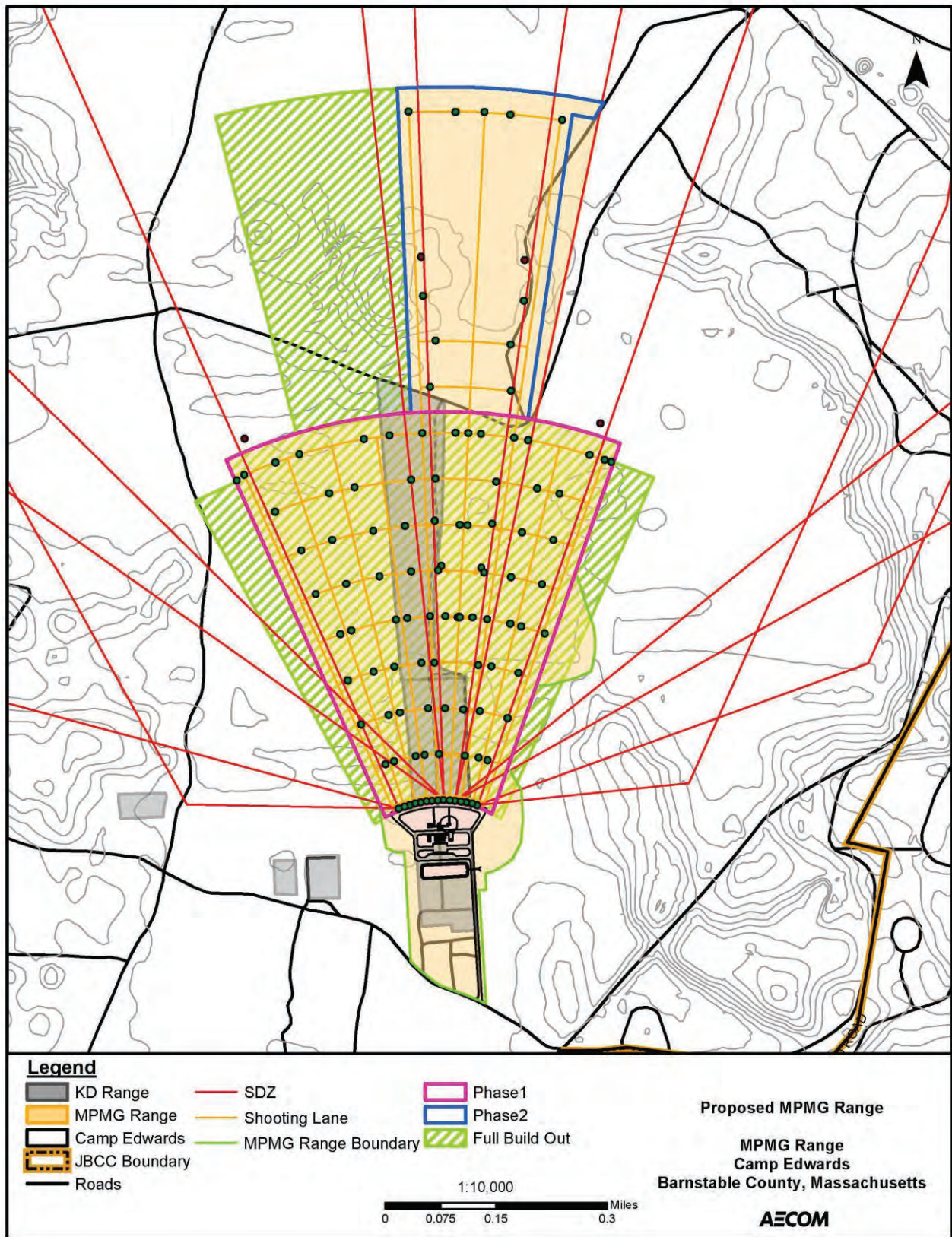
It should be noted that MEPA requires the GHG emissions to be calculated on a short ton (2,000 pounds) (hereinafter US Tons) basis which is in direct contrast with United States Environmental Protection Agency (“USEPA”) which requires GHG emissions to be calculated on a metric ton (2,200 pounds) basis (hereinafter Metric Tons). Therefore, the emissions in this report will be expressed in both Short tons and Metric tons.

1.3 Baseline

Under existing baseline conditions (No-Build Alternative), the existing KD Range would continue to be used for training operations such as unmanned aircraft systems (UAS) on the 38.5 acres (36.0 acres managed grasslands, 2.5 acres ROCA) with little or no GHG emissions. The forested areas within the proposed MPMG Range footprint will continue to be vegetated with forests or grasslands providing carbon sequestration as described in **Section 1.8**. Sources of GHG emissions under baseline conditions are primarily due to transportation to out-of-state training activities by MAARNG units as described in **Section 2.1.1**.

1.4 Alternatives

This GHG assessment includes analysis of the three proposed alternatives including the Preferred Alternative, a Reduced-Scale Alternative, and a Full Build Alternative. The No-Build Alternative is represented as a baseline (or existing) condition. The Preferred Alternative will be constructed in two phases. Phase 1 will be the Reduced-Scale Alternative, that is, the eight lanes constructed at 800 meters in length. Phase 2 will add the extension of two lanes to a length of 1,500 meters..



Both phases combined make up the Preferred Alternative. Acreages of the alternatives are provided in **Table 1**

Table 1: MPMG Range Alternatives

Alternative	800 meter lanes	1500 meter lanes	MPMG Range (acres)	Firebreak (acres)	Total Footprint (acres)	Tree clearing (acres)
Full Standard Build	10	4	294	12	306	267.5
Preferred Alternative	8	2	199	10	209	170.5
Reduced-Scale Alternative	8	0	128	10	138	99.5

1.5 Impacts

The following table summarizes the CO₂ impacts from the Proposed Project (Preferred Alternative) compared to the baseline conditions and the Reduced-Build and Full Build Alternatives. Each activity is described in other sections of this analysis along with a discussion of how the CO₂ emissions in US Tons were calculated.

Table 2: CO₂ Emissions Summary by Alternative (US Tons)

Activity	Baseline	Preferred Alternative	Reduced Build	Full Build
Transportation	724	60	60	60
Out-of-State Training	724	0	0	0
Travel of Work Crews	0	1	1	1
Within Camp Edwards after Range Construction	0	59	59	59
Construction	0	897	549	1,157
Land Clearing	0	734	430	935
Range Construction	0	129	85	189
ROCA Demolition and Construction	0	34	34	34
Land Clearing (Biomass Removal)	0	39,649	23,295	61,992
Range Operations	0.3	1.3	1.3	1.3
Firing of Weapons	0.3	0.3	0.3	0.3
ROCA Structures	0	1	1	1
CO₂ Emission Totals	724.3	40,607.3	23,904.3	63,210.3

1.6 Mitigation

Mitigation for the Proposed Project includes phasing of the construction and preservation of forested acreage within Camp Edwards. The Project will be constructed in two phases as described in Section 1.4 with the first phase being the Reduced-Build Alternative. Following the construction of the first phase, the two extended lanes will be constructed with the total impacts represented by the Preferred Alternative.

Substantial mitigation efforts are being proposed relative to impacts to rare species in consultation with the Massachusetts Natural Heritage and Endangered Species Program (NHESP) which includes the preservation of approximately 310 acres of land within Camp Edwards that is presently forested. Other management strategies includes the management of approximately 832 acres of forests through mechanical forestry.

In addition to the annual sequestration, mature forests sequester carbon throughout its life. One acre of forest provides 230 US Tons of sequestration. The estimated amount of sequestered carbon in the 13,500 acres of forest at Camp Edwards is estimated to be approximately 3,455,114 US Tons. One acre of mature grassland provides 10 US Tons of sequestration. The estimated amount of sequestered carbon in the 175 acres of grassland at Camp Edwards is estimated to be approximately 1,750 US Tons of sequestration. The annual GHG sequestration and lifetime sequestration from the mitigation acreage is summarized in **Table 3**.

Table 3: Sequestration and Mitigation

Management Action	Acreage	Annual Sequestration		Lifetime Sequestration	
		Rate*	US Tons	Rate	US Tons
Land Preservation	310	0.85 US Tons/acre/year	263.5	230 US Tons/acre	71,300
Forestry Management	832	0.85 US Tons/acre/year	707.2	230 US Tons/acre	162,012
Total Mitigation	1,142		967.3		233,312

* see Section 1.8

1.7 Sources of Greenhouse Gas Emissions

Sources of GHG emissions from the Project are primarily from following activities:

- Transportation (travel for out-of-state training, travel of work crews, travel to MPMG Range once constructed);
- Land Clearing (biomass removal)
- Construction (land clearing, range construction, ROCA demolition and construction);
- Range Operation (firing of weapons, ROCA structures)

The primary source of GHG emissions from transportation activities include personnel driving tactical and private vehicles to different training centers which are located out-of-state. GHG emissions will be emitted from diesel and gasoline fired tactical vehicles and on-road vehicles driven for travel to other out-of-state training facilities for range training purposes. GHG emissions

associated with transportation activities are CO₂, CH₄, and N₂O from internal combustion engines. The vehicle trips for training and associated GHG emissions occur annually under the existing (No-Build) conditions and will be used as the baseline for analysis of transportation generated GHG. See **Section 2.1.1** for baseline transportation conditions.

Sources of GHG emissions from transportation activities include travel for work crews during the construction period and travel within Camp Edwards during the MPMG Range operations period. Range operation emissions will be from tactical and private vehicles driven to the MPMG Range at Camp Edwards once it is constructed for training purposes. This travel is limited to within Camp Edwards as the Soldiers and units will already be at Camp Edwards for other training. See Section 2.2.1 for Preferred Alternative transportation conditions.

Sources of GHG emissions from land clearing includes CO₂ emissions through the removal of existing trees and shrubs (biomass). See **Section 2.2.2** for Preferred Alternative land clearing conditions.

Sources of GHG emissions from construction activities include diesel and gasoline fired non-road construction equipment and on-road construction vehicles during the construction period of the MPMG Range. GHG emissions associated with construction activities are CO₂, CH₄, and N₂O from internal combustion engines. The GHG emissions during construction will occur during land clearing, range construction, as well as demolition of existing structures and construction of ROCA support structures. See **Section 2.2.3** for Preferred Alternative construction conditions.

Sources of GHG emissions from range operations once the MPMG Range is constructed would include the firing of weapons which have limited CO₂ emissions. Emissions for ranges are calculated depending on the weapon being fired, rounds being fired, and number of soldiers training. It is not expected that the ROCA structures once constructed will emit any significant CO₂ as they are to be constructed without heating and cooling equipment. These buildings are used on a temporary basis while units are training which occurs primarily during the warmer months. See **Section 2.2.3** for Preferred Alternative range operations conditions.

1.8 Greenhouse Sequestration in Vegetation

Camp Edwards is comprised of 15,000 acres of land with approximately 13,500 acres of mature forest land and 175 acres of mature grasslands. The biomass within these forested lands provides carbon sequestration (capturing and storing) on an annual basis. According to USEPA, Inventory of US Greenhouse Gas Emissions and Sinks: 1990–2017, EPA 430-R-19-001, April 2019, between 2007 and 2017, the average annual sequestration of carbon in US forests was 0.23 US Tons (0.21 Metric Tons) per acre per year. This is equivalent of -0.85 US Tons (-0.77 Metric Tons) of CO₂ sequestration per acre of average US forest per year. Sequestration is shown in negative numbers because carbon is being captured or held within the biomass, acting as a sink for carbon. This is based on combustion of 1 molecule of carbon (molecular weight = 12) producing 1 molecule of CO₂ (molecular weight = 44) assuming complete combustion. The amount of carbon sequestered is multiplied by 3.67 (44/12, ratio of CO₂ to carbon) to calculate amount of CO₂ released or sequestered based on complete oxidation (combustion) of carbon. **Table 4** provides this information in table form.

Table 4: Total Sequestration of Forests - Baseline

Carbon Sequestration per acre per year	Carbon		CO ₂ *		Acres at Camp Edwards	CO ₂ Sequestration per acre per year	
	US Tons	Metric Tons	US Tons	Metric Tons		US Tons	Metric Tons
Forests	-0.23	-0.21	-0.85	-0.77	13,500	-11,475	-10,395

* 1 molecule of C (molecular weight of 44) = 1 molecule of CO₂ (molecular weight of 12)
Conversion factor C to CO₂ = 44/12 = 3.67 assuming complete combustion

Therefore, currently, at Camp Edwards, the 13,500 acres of forests provide a total of -11,475 US Tons (-10,395 Metric Tons) of CO₂ sequestered on an annual basis. A negative number indicates sequestration and a positive number indicates releases of CO₂. This represents the baseline sequestration for Camp Edwards. See **Section 2.12** for additional information. Table 4 provides sequestration amounts from proposed Mitigation

In addition to the annual sequestration, mature forests sequester carbon throughout its life. One acre of forest provides 230 US Tons of sequestration. The estimated amount of sequestered carbon in the 13,500 acres of forest at Camp Edwards is estimated to be approximately 3,455,114 US Tons. One acre of mature grassland provides 10 US Tons of sequestration. The estimated amount of sequestered carbon in the 175 acres of grassland at Camp Edwards is estimated to be approximately 1,750 US Tons of sequestration.

The emissions of net atmospheric CO₂ releases were estimated based on values obtained from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4 - Agriculture, Forestry and Other Land Use.¹ Because exact Project-specific data is not available for forest composition, appropriate values were chosen from IPCC's options, using conservative estimates in order to derive a conservative estimate of net CO₂ released due to land clearing. The total net GHG release was calculated by subtracting the CO₂ to be sequestered in grasslands from the CO₂ currently sequestered in the vegetation types described above. These CO₂ sequestration amounts were estimated by multiplying Project-specific acreage data by the IPCC inputs summarized below.

1.9 Greenhouse Emissions from Removal of Vegetation

Emissions from the removal of vegetation during land clearing activities are estimated from the amount of biomass in the above ground and below ground parts of a tree (or other vegetation). The biomass (in Metric Tons of dry matter per hectare) numbers are then converted into Metric Tons of carbon and converted to CO₂ in US Tons.

Relevant values for the CO₂ sequestration amounts from forests were obtained from IPCC's Chapter 4 - Forest Land to derive a conservative estimate of the sequestration that will be released when vegetation is cleared. The following inputs were derived from IPCC and multiplied by the Project-specific acreage values:

- Carbon rates from above-ground biomass dry matter per hectare were obtained from Table 4.7. For all vegetation types, the calculations used for this analysis included the

¹ <https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

high (conservative) end of the range provided for temperate continental forests in North America.

- A ratio of below-ground biomass to above-ground biomass was obtained from the Table 4.4 and multiplied by the above-ground biomass dry matter values to derive an estimate of total dry matter per hectare. The calculations used the conservative end of the range provided for "other broadleaf above-ground biomass >150 tonnes² per [hectare]a" temperate forests, to derive a conservative estimate of below-ground biomass.
- Carbon rates per ton of dry matter were obtained from Table 4.3. For all vegetation types, the calculations used the conservative end of the range provided for temperate and boreal forests.

Relevant values for the CO₂ sequestered in mature grasslands were obtained from IPCC's Chapter 6 - Grassland. The following inputs were derived from IPCC:

- Tonnes of dry matter per hectare were obtained from Table 6.4. The calculations used the value provided for the "Warm Temperate – Wet" climate zone.
- Tonnes C per ton of dry matter of herbaceous biomass obtained from Section 6.3.1.4.

As described in **Section 2.2.2**, the Preferred Alternative would release 39,273 US Tons of CO₂ sequestered from the forested areas during land clearing activities and removal of forest cover type. The Preferred Alternative would release 376 US Tons of CO₂ sequestered from the land clearing of the grasslands.

2 Baseline and Alternative Analysis

Pursuant to the MEPA GHG Policy, this section presents a quantification and evaluation of the Projects' baseline, and alternatives to the baseline. The following alternatives will be assessed. Primarily, the differences will be based on acreage of vegetation to be cleared, area to be graded, and the length of the construction period.

2.1 Baseline Conditions

Under existing baseline conditions (No-Build Alternative), the existing KD Range would continue to be used for training operations such as UAS on the 38.5 acres (36.0 acres managed grasslands, 2.5 acres ROCA). This range is not presently used for live-fire training. The forested and grassland areas within the proposed MPMG Range footprint will continue to be vegetated and provide carbon sequestration annually.

Sources of GHG emissions under baseline conditions are primarily transportation to out-of-state training activities. Sources of GHG sequestration include the presence of vegetated areas including grasslands and forests.

² The unit of "tonnes" is also used in place of Metric Tons

2.1.1 Transportation

The baseline condition is primarily based on the direct transportation related emissions from the trips taken by convoy for training purposes to the out-of-state locations as there is no MPMG Range in Massachusetts. Currently, the three closest MPMG ranges used for training include Camp Ethan Allen in Jericho, Vermont located over 270 miles away, Fort Dix in Ocean County, New Jersey located over 300 miles away, and Fort Drum located in Jefferson County, New York located over 370 miles away. The vehicles in the convoy deployed for travel to these out-of-state training locations include High Mobility Multipurpose Wheeled Vehicles (HMMWV), Light Medium Tactical Vehicles (LMTV), Family of Medium Tactical Vehicles (FMTV), Medium Armored Tactical Vehicles (MATV), Armored Security Vehicles (ASV), and non-military passenger vehicles.

The calculated GHG emissions for the baseline conditions are summarized in **Table 5**. **Table 6** (following page) provides a breakdown of the mileage by vehicle type from 2019 Camp Edwards data and how the GHG emissions were calculated.

Table 5: Annual Transportation Emissions from Out-of-State Travel to Training Locations from Camp Edwards - Baseline

Vehicle Types by Fuel	CO ₂ Emissions (US Tons)	CO ₂ Emissions (Metric Tons)
Diesel Vehicles	691.3	628.1
Gasoline Vehicles	32.8	29.8
Total	724.1	657.9

Annually, the mileage driven by convoy for training purposes is approximately 282,240 miles for diesel and gasoline vehicles which is converted to CO₂ emissions as noted above. **Table 6** provides a summary of mileage driven by each type of vehicle in the convoy based on mileage to different locations where MPMG ranges exist. The backup data for the mileage by facility is provided in **Appendix A**.

The estimated annual fuel consumption (based on the miles per gallon or MPG rating) for diesel vehicles is 61,595 gallons and for gasoline vehicles is 3,348 gallons as shown on **Table 6**. It should be noted that as the emission factors for convoy vehicles are not readily available, CO₂ emissions from the vehicles were based on the estimated fuel consumption provided in the **Table 6**. The Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Volume 2 (2006 IPCC) estimates that 8,887 grams of CO₂ is emitted per gallon of gasoline assuming all the carbon in gasoline is converted to CO₂. Similarly, 2006 IPCC guidelines estimates that 10,182 grams of CO₂ is emitted per gallon of diesel consumed assuming all carbon in diesel is converted to CO₂.

Table 6: Annual Fuel Consumption and CO₂ Emissions by Vehicle Type, Camp Edwards - Baseline

Fuel Consumption						CO ₂ Emissions		
Vehicle Type	Vehicle Weight (Pounds)	Fuel Type	Fuel Capacity Per Vehicle (Gallons)	Total Annual Miles Driven	Fuel Consumption (Gallons)	CO ₂ Emission Factor ¹ (grams/gallon)	US Tons	Metric Tons
HMMWV	12,100	Diesel	25	99,780	19,200	10,182	215.5	195.8
LMTV	22,904	Diesel	35	41,820	11,585	10,182	130.0	118.1
FMTV	28,889	Diesel	35	89,700	25,200	10,182	282.8	257.0
MATV	34,830	Diesel	30	3,000	750	10,182	8.4	7.6
ASV	29,000	Diesel	30	21,660	4,860	10,182	54.5	49.6
Non-military	8,000	Gasoline	18	26,280	3,348	8,887	32.8	29.8
Annual Total (Diesel)				255,960	61,595	10,182	691.3	628.1
Annual Total (Gasoline)				26,280	3,348	8887	32.8	29.8
Total Annual Miles Driven				282,240	64,943	Annual Total CO₂ Emissions	724.1	657.9

¹Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Volume 2 (2006 IPCC)

Source of Data: Camp Edwards Range Control, 2019

HMMWV High Mobility Multipurpose Wheeled Vehicle
LMTV Light Medium Tactical Vehicle
FMTV Family of Medium Tactical Vehicles
MATV Medium Armored Tactical Vehicle
ASV Armored Security Vehicle

2.1.2 Land Clearing (Biomass Removal)

Under the baseline condition (No-Build Alternative), no land clearing will occur. The vegetation at the site is presently comprised of four different cover types; three with woody vegetation:

- **Pine Oak Forest Woodland (PPOF)** - PPOF forest ranges from a low canopy with a dense shrub layer to a taller canopy with a sparser shrub layer. The pitch pine-oak forest woodland of Camp Edwards has a low canopy of pitch pine and tree oaks (black oak, scarlet oak, and white oak) and a moderately continuous shrub layer of blueberry, black huckleberry, sheep laurel, and scrub oak.
- **Pitch Pine-Scrub Oak Community (PPSO)** - PPSO overstory community is almost entirely pitch pine with an understory of sometimes very dense scrub oak which creates the pitch pine-scrub oak. The prevalent shrub species of this community are black huckleberry and blueberry which are commonly interspersed among the more dominant scrub oak. White oak is present in understory where fire has been excluded and threatens to convert the community.
- **Scrub Oak Shrubland (SOS)** - This plant community represents one of the earliest states of vegetative succession on Camp Edwards and consists primarily of scrub oak with essentially no pitch pine. Other common plants in the scrub oak barrens include black huckleberry, blueberry, cat brier, and wintergreen. The majority of SOS at Camp Edwards is at significant risk of loss due to forest (pitch pine) encroachment due to lack of fire from artillery and historic sources.
- **Grassland** - Cultural or Managed Grasslands (MG) are human created and maintained open communities dominated by grasses. Mowing is the typical maintenance, however on Camp Edwards; fire has played and is playing a more important role. The grasslands are one of the least diverse plant communities on Camp Edwards, with only 37 identified species during a floristic inventory. The community is dominated by grass species including little bluestem, big bluestem, switchgrass, etc.

Under the baseline condition (No-Build Alternative), the forested land will continue to sequester carbon. As stated in **Section 1.6**, currently at Camp Edwards, an estimated 11,435 US tons of CO₂ will be sequestered on an annual basis and will result in a net reduction of CO₂ annually.

2.1.3 Construction

Under the baseline conditions (No-Build Alternative), there will be no construction at the proposed MPMG Range and no land will be cleared or graded. Therefore, no carbon emissions or sequestration are emitted under baseline conditions relative to construction.

2.1.4 Range Operations

Under the baseline condition (No-Build Alternative), the existing KD Range would continue to be used for training operations such as UAS. This range is not presently used for live-fire training. The ROCA buildings present are not heated or cooled and are not being utilized. Therefore, no CO₂ emissions are occurring as a result of existing range operations.

2.2 Preferred Alternative

The Preferred Alternative will involve the following activities that will generate CO₂ emissions:

- Transportation (travel of work crews, travel to MPMG Range once constructed),
- Land Clearing (biomass removal)
- Construction (land clearing, range construction, ROCA demolition and construction)
- Range Operations (firing of weapons, ROCA structures)

2.2.1 Transportation

Emissions resulting from transportation for the Preferred Alternative includes travel of work crews, during land clearing, range construction, and ROCA construction, and travel for training during range operations once the MPMG Range is constructed. Travel during the construction period for work crews is provided in **Table 7** for all three alternatives based on estimated commuting mileage and length of the construction period. Numbers are rounded to 1 US Ton for each alternative for purposes of the summary table.

Table 8 provides a similar analysis as was done for the baseline conditions for transportation for training purposes but estimates travel within Camp Edwards once the MPMG Range is constructed under the Preferred Alternative. Units and Soldiers would already be at Camp Edwards for training purposes, therefore the mileage estimate is based on round-trip mileage to the MPMG Range from a muster point within Camp Edwards. This estimated amount of 59.0 US Tons would be the same under the Reduced-Build and Full Build Alternatives.

Table 7: Total CO₂ Emissions for Travel by Work Crews during Construction Period by Alternative

Alternative	Fuel Consumption		CO ₂ Emissions		
	Miles Travelled	Fuel Consumption (Gallons)	CO ₂ Emission Factor ¹ (grams/ gallon)	US Tons	Metric Tons
Preferred Alternative	3,000	100	8,887	1.0	0.9
Reduced-Build	2,000	67	8,887	0.7 *	0.6
Full Build	4,000	133	8,887	1.3 *	1.2

* Rounded to 1 in summary Table 16

Assumes standard gas driven vehicle with fuel capacity averaging 30 MPG

¹ Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Volume 2 (2006 IPCC)

Table 8: Summary of Annual Vehicle Miles and Fuel Consumption by Vehicle Type - Preferred Alternative

Fuel Consumption						CO ₂ Emmissions		
Vehicle Type	Vehicle Weight (Pounds)	Fuel Type	Fuel Capacity Per Vehicle (Gallons)	Total Annual Miles Driven	Fuel Consumption (Gallons)	CO ₂ Emission Factor ¹ (grams/ gallon)	US Tons	Metric Tons
HMMWV	12,100	Diesel	25	6,840	1,267	10,182	14.2	12.9
LMTV	22,904	Diesel	35	2,800	1,773	10,182	19.9	18.1
FMTV	28,889	Diesel	35	6,200	1,607	10,182	18.0	16.4
MATV	34,830	Diesel	30	200	50	10,182	0.6	0.5
ASV	29,000	Diesel	30	1,560	347	10,182	3.9	3.5
Non-military	8,000	Gasoline	18	1,800	240	8,887	2.4	2.1
Annual Total (Diesel)				17,600	5,044			
Annual Total (Gasoline)				1,800	240			
Total Miles Driven				19,400	5,284	Annual Total CO2 Emissions	59.0	53.6

¹Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories, Volume 2 (2006 IPCC)

HMMWV High Mobility Multipurpose Wheeled Vehicle

LMTV Light Medium Tactical Vehicle

FMTV Family of Medium Tactical Vehicles

MATV Armored Security Vehicle

ASV Medium Armored Tactical Vehicle

2.2.2 Land Clearing (Biomass Removal)

As shown on **Table 9**, the removal of the trees under the Preferred Alternative will result in the release of 39,273 US Tons of CO₂ and the alteration of grassland will result in the release of 376 US Tons of CO₂. Forests will be converted to managed grasslands as part of the range construction as the range floor will be planted with native grassland species. This will allow for the sequestration on an annual basis of 1,705 US Tons of CO₂ for 170.5 acres of grassland.

The vegetation is comprised of three different cover types with woody vegetation as described in **Section 2.1.2**, which will be cleared and graded for the range and then vegetated with native grasses to be managed as grasslands. The cleared trees and woody vegetation will be chipped on-site and removed off-site, likely to be sold to outside sources for use at biomass energy facilities as a fuel. The following table calculates the release of the CO₂ from land clearing.

Table 9: Estimated Emissions from Land Clearing Activity – Preferred Alternative

Vegetation Type	Acres	Above-Ground Biomass *	Below-Ground Biomass *	Total Biomass *	C per Metric Ton of Dry Matter	C (Metric Tons/acre)	CO ₂ (Metric Tons/acre)	CO ₂ (US Tons)	CO ₂ (Metric Tons)
PPOF	50.0	200	88	288	0.49	57	209	11,517	10,470
PPSO	55.0	200	88	288	0.49	57	209	12,669	11,517
SOS	65.5	200	88	288	0.49	57	209	15,087	13,716
Total Forested	170.5							39,273	35,703
Total Grasslands	36.0			13.6	0.47	3	9	376	341
Total Emissions	206.5							39,649	36,044

* Metric Ton of dry matter per hectare

** ROCA acreage (2.5) not included here

Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Agriculture, Forestry and Other Land Use
<https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

2.2.3 Construction

Emissions resulting from vehicles during the construction period of the Preferred Alternative include non-road equipment operation for land clearing, range construction, and ROCA demolition and construction.

2.2.3.1 Land Clearing

RSMeans Site Work Landscape Cost Data (2018) was utilized to estimate the equipment and crew needed for the land clearing and grubbing portion of the task. According to RSMeans Section 31 11 Clearing and Grubbing:

- To cut and chip medium trees up to 12” diameter, a crew of 6 members (1 foreman, 4 laborers and 1 equipment operator) can cut 0.7 acres per day. Equipment required will be one 12” brush chipper (130 hp), one crawler loader (3 CY) and two gas-fired 18” chain saws.
- To clear and grub dense brush including stumps, a crew of 3 members (1 equipment operator and 2 truck drivers) can grub and clear 1 acre per day. Equipment required will be 1 hydraulic excavator (1.5 CY) and 2-400 HP dump trucks (12 CY capacity).

Please see **Table 10** for the estimated hours of operation from the construction vehicles for land clearing. This table provides hours estimated for each of the three alternatives based on acreage to be cleared. Once the hours were determined, the next step was to identify the construction equipment to be used for the land clearing. **Table 11** provides the Project emissions of land clearing equipment by the three alternatives. Approximately 734 US Tons will be emitted during the Preferred Alternative construction period from land clearing equipment.

Table 10: Estimated Hours of Operation for Land Clearing by Alternative

Land Clearing Activity		Preferred Alternative	Reduced-Scale Alternative	Full Build Alternative
Cutting and chipping trees up to 12" diameter				
	Acres per day (one 8-hour shift)	0.7	0.7	0.7
	Acres to be cleared	170.5	99.5	267.5
	Number of days to clear all acreage	244	143	383
	Hours of Equipment Operation per day	8	8	8
Total hours for equipment operation		1,952	1,144	3,064
	Crew Round Trip Hours for Commuting	1	1	1
	Number of crews	6	6	6
	Number of commuters by crew/day/pickup truck	6	6	6
Total hours of operation of pickup trucks		1,464	858	2,298
Clear and grub dense shrubs including stumps				
	Acres per day (one 8-hour shift)	1.0	1.0	1
	Acres to be cleared	170.5	99.5	267.5
	Number of days to clear all acreage	171	100	268
	Hours of equipment operation per day	8	8	8
Total hours for equipment operation		1,368	800	2,144
	Crew round trip hours for commuting	1	1	1
	Number of crews	3	3	3
	Number of commuters by crew/day/pickup truck	3	3	3
Total hours of operation of pickup trucks		513	300	804

Table 11: Summary of Projected Emissions from Land Clearing Equipment by Alternative

Construction Equipment	Preferred Alternative		Reduced-Scale Alternative		Full Build Alternative	
	Equipment Usage	CO ₂ Emissions	Equipment Usage	CO ₂ Emissions	Equipment Usage	CO ₂ Emissions
	(hr)	(lb)	(hr)	(lb)	(hr)	(lb)
Chain saws	3,904	29,479	2,288	17,276	6,128	46,272
Dozer	1,952	276,173	1,144	161,855	3,064	141
Brush Chipper	1,952	133,750	1,144	78,386	3,064	209,944
Excavator, hydraulic, 1.5 cy	1,368	124,356	800	72,723	2,144	194,897
Dump Truck, 12 cy	2,736	347,666	1,600	203,314	4,288	544,880
Pickup Truck, 3/4 Ton	1,977	556,336	1,158	325,866	3,102	872,915
Total Emissions Pounds/year		1,467,759		859,420		1,869,050
Total Emissions US Tons/year (tpy)		734		430		935
Total Emissions Metric Tons/year		666		390		850

Source: Emission factors from USAFCEE Air Emissions Guide For Air Force Mobile Sources, July 2016, Section 4 and 5.
CO₂e = Carbon dioxide equivalent

2.2.3.2 Range Construction

To determine the amount of CO₂ produced during range construction, the number of days of construction were calculated based on acreage and amount of grading that could be completed in one day as shown in **Table 12**. The rate of CO₂ emissions from one dozer per hour would be 63.67 lbs/hr. If there are two crews working at the same time for range construction, there would be twice the emissions per hour but only half the hours would be needed, resulting in the same level of emissions. Approximately 129 US Tons of CO₂ will be emitted during the Preferred Alternative construction period from grading equipment.

Table 12: Total CO₂ Emissions from Range Construction

Alternative	Total Footprint (acres)	Total Footprint (s.y.)	Days based on 2,000 s.y. of grading*	Hours (based on an 8 hour day)	CO ₂ for Dozer at 63.67 lbs/hr	CO ₂ US Tons
Full Build	306	1,481,040	741	5,924	377,191	189
Preferred Alternative	209	1,011,560	506	4,046	257,624	129
Reduced-Scale Alternative	138	667,920	334	2,672	170,106	85

Source: Emission factors from USAFCEE Air Emissions Guide For Air Force Mobile Sources, July 2016, Section 4 and 5.
* Grading estimated at 2,000 s.y. per day for one crew with 2 crew members and one 30,000 lb grader)

2.2.3.3 ROCA Demolition and Construction

There are presently two wooden structures located at the KD Range, a tower and an ammunition building. The existing tower is approximately 400 s.f. in size. The Ammunition building is

approximately 600 s.f. in size. CO₂ will be produced from the equipment used for demolishing the existing buildings. Based on a conservative estimate of 2.5 weeks for the demolition, the CO₂ emitted would be approximately 3 US Tons.

Based on conservative estimates of six months for the construction of the ROCA, the CO₂ emitted would be approximately 31 US Tons. The proposed MPMG Range will have approximately 3,968 s.f. of new construction in the following structures:

- Range Control Tower (657 s.f.)
- Range Operations and Storage Facility (800 s.f.)
- Ammunition Breakdown Building (185 s.f.)
- Bleacher Enclosure (726 s.f.)
- Range Classroom Building (800 s.f.)
- Covered Mess Shelter (800 s.f.)

The total amount of CO₂ produced by the ROCA demolition and construction is estimated to be 34 US Tons and will be the same for each of the three alternatives.

2.2.4 Range Operations

Sources of GHG emissions from range operations and from the ROCA structures once the MPMG Range is constructed would include the firing of weapons which have limited CO₂ emissions.

2.2.4.1 Firing of Weapons

The firing of weapons during training exercises at the MPMG Range will occur once constructed. Emissions for ranges are calculated depending on the weapon being fired, rounds being fired, and number of soldiers training. **Table 13** provides estimated annual usage of the MPMG Range based on the three-year (2017-2019) average of actual rounds used at Camp Edwards and the estimate increase of training as a result of the MPMG Range. The CO₂ generated from firing of weapons at the MPMG Ranges is estimated to be 0.3 US Tons/year. This amount would be the same for all three alternatives and the baseline condition although the CO₂ from the baseline condition would be emitted in other states.

Table 13: Estimated CO₂ Emissions from Firing of Weapons at MPMG Range

Ammunition Type	Total Rounds ¹	CO ₂ lb
9 mm	139,671	28
5.66 mm	560,235	486
7.62 mm	3,002	3
40 mm	2,954	4
	Total lbs/year	521
	Total US Tons/year	0.3

¹ AP-42: Compilation of Air Emissions Factors, Environmental Protection Agency, Fifth Editions, Volume 1: Stationary Point and Areas Sources

2.2.4.2 ROCA Demolition and Construction

It is not expected that the ROCA structures once constructed will emit any significant CO₂ as they are to be constructed without heating and cooling equipment. These building are used on a temporary basis while units are training which occurs primarily during the warmer months. For the purposes of this analysis, we have assumed minimal CO₂ being produced from the ROCA Structures during operations. These structures are not heated and do not have air cooling systems and will be serviced by electric through overhead wires. For purposes of this analysis, we have assigned 1 US Ton/year for the ROCA structures.

2.3 Reduced-Scale Alternative

The Reduced-Scale Alternative will result in the following activities:

- Transportation
 - Travel of work crews would emit 1 US Ton (see **Table 7**)
 - Travel to MPMG Range once constructed would emit 59 US Tons (see **Table 8**)
- Land Clearing (biomass removal) would emit 23,295 US Tons (see **Table 14**)
- Construction
 - Land clearing would emit 430 US Tons (see **Table 11**)
 - Range construction would emit 85 US Tons (see **Table 12**)
 - ROCA demolition and construction would emit 34 US Tons (see **Section 2.2.4.1**)
- Range operations
 - Firing of weapons will emit 0.3 US Tons (see **Table 13**)
 - ROCA structures will emit 1 US Tons (see **Section 2.2.5**)

Table 14: Estimated Emission from Land Clearing Activity – Reduced-Scale Alternative

Vegetation Type	Acres	Above-Ground Biomass *	Below-Ground Biomass *	Total Biomass *	C per Metric Ton of Dry Matter	C (Metric Tons/acre)	CO₂ (Metric Tons/acre)	CO₂ (Metric Tons)	CO₂ (US Tons)
PPOF	40.0	200	88	288	0.49	57	209	8,376	9,214
PPSO	44.0	200	88	288	0.49	57	209	9,214	10,135
SOS	15.5	200	88	288	0.49	57	209	3,246	3,570
Total Forests	99.5							20,835	22,919
Total Grasslands	36.0			13.6	0.47	3	9	341	376
Total Emissions	135.5							21,177	23,295

* Metric Ton of dry matter per hectare

** ROCA acreage (2.5) not included here

Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Agriculture, Forestry and Other Land Use
<https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

2.4 Full Build Alternative

The Full Build Alternative will result in the following activities:

- Transportation
 - Travel of work crews would emit 1 US Ton (see **Table 7**)
 - Travel to MPMG Range once constructed would emit 59 US Tons (see **Table 8**)
- Land Clearing (biomass removal) would emit 61,992 US Tons (see **Table 15**)
- Construction
 - Land clearing would emit 935 US Tons (see **Table 11**)
 - Range construction would emit 189 US Tons (see **Table 12**)
 - ROCA demolition and construction would emit 34 US Tons (see **Section 2.2.4.1**)
- Range operations
 - Firing of weapons will emit 0.3 US Tons (see **Table 13**)
 - ROCA structures will emit 1 US Tons (see **Section 2.2.5**)

Table 15: Estimated Emissions from Land Clearing Activity - Full Build

Vegetation Type	Acres	Above-Ground Biomass *	Below-Ground Biomass *	Total Biomass *	C per Metric Ton of Dry Matter	C (Metric Tons/acre)	CO ₂ (Metric Tons/acre)	CO ₂ (Metric Tons)	CO ₂ (US Tons)
PPOF	78.0	200	88	288	0.49	57	209	16,333	17,967
PPSO	85.0	200	88	288	0.49	57	209	17,799	19,579
SOS	104.5	200	88	288	0.49	57	209	21,882	24,071
Total Forests	267.5							56,015	61,616
Total Grasslands	36.0			13.6	0.47	3	9	341	376
Total Emissions	303.5							56,356	61,992

* Metric Ton of dry matter per hectare

** ROCA acreage (2.5) not included here

Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4, Agriculture, Forestry and Other Land Use
<https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

2.5 Summary of Impacts

Table 16 (also included as **Table 2** but repeated here) provides a summary of all GHG emissions generated as a result of this Project compared to the baseline information and the three alternatives. Emissions are calculated by transportation, construction, land clearing, and range operations. Construction related emissions will be temporary and may produce short-term localized impacts limited to the construction period. Emissions from land clearing are also temporary but have the most impact on CO₂ emissions. Transportation related CO₂ emissions will be greatly reduced (by 82%) over existing baseline conditions. Long-term emissions would be generated from the training activities, specifically the firing of ammunition and the ROCA structures which are only estimated at 3 US Tons.

The majority of CO₂ emitted from the Project, all alternatives, is generated from the land clearing and the biomass removal. For each alternative, the biomass removal accounts for anywhere between 97.4% and 98.1% of the total CO₂ generated.

If you eliminate the land clearing (biomass removal) from the calculated totals and compare the emissions to the 726 US Tons under the baseline conditions, the Preferred Alternative results in an increase of emissions of 32%, the Full Build resulting in an increase of 68% over baseline emissions. Mitigation as discussed in the next section focuses primarily on the land clearing emissions.

Table 16: CO₂ Emissions Summary by Alternative (US Tons)

Activity	Baseline	Preferred Alternative	Reduced Build	Full Build
Transportation	724	60	60	60
Out-of-State Training	724	0	0	0
Travel of Work Crews	0	1	1	1
Within Camp Edwards after Range Construction	0	59	59	59
Construction	0	897	549	1,157
Land Clearing	0	734	430	935
Range Construction	0	129	85	189
ROCA Demolition and Construction	0	34	34	34
Land Clearing (Biomass Removal)	0	39,649	23,295	61,992
Range Operations	0.3	1.3	1.3	1.3
Firing of Weapons	0.3	0.3	0.3	0.3
ROCA Structures	0	1	1	1
CO₂ Emission Totals	724.3	40,607.3	23,904.3	63,210.3
CO₂ Emissions without Land Clearing	726	960	611	1,220

3 Mitigation

Mitigation for the Proposed Project includes phasing of the construction and preservation of forested acreage within Camp Edwards. The Project will be constructed in two phases as described in **Section 1.4** with the first phase being the Reduced-Build Alternative. Following the construction of the first phase, the two extended lanes will be constructed with the total impacts represented by the Preferred Alternative. Substantial mitigation efforts are being proposed relative to impacts to rare species in consultation with the Massachusetts Natural Heritage and Endangered Species Program (NHESP) which includes the preservation of approximately 310 acres of land within Camp Edwards that is presently forested. Other management strategies includes the management of approximately 832 acres of forests through mechanical forestry. The land preservation acreage alone provides mitigation for the impacts from the Proposed Project. Mitigation will continue each year with the annual sequestration occurring in the preserved forests. Grassland alteration during land clearing will also result in the release of CO₂ but will be mitigated by the replanting and restoration of the range floor with native grasses.

In addition to the annual sequestration, mature forests sequester carbon throughout its life. One acre of forest provides 230 US Tons of sequestration. The estimated amount of sequestered carbon in the 13,500 acres of forest at Camp Edwards is estimated to be approximately 3,105,000 US Tons. One acre of grassland provides 10 US Tons of sequestration. The estimated amount of sequestered carbon in the 175 acres of grassland at Camp Edwards is estimated to be approximately 1,750 US Tons of sequestration. The annual GHG sequestration and lifetime sequestration from the mitigation acreage is summarized in **Table 17** (also included as **Table 3**).

Table 17: Sequestration and Mitigation

Management Action	Acreage	Annual Sequestration		Lifetime Sequestration	
		Rate*	US Tons	Rate	US Tons
Land Preservation	310	0.85 US Tons/ acre/year	263.5	230 US Tons/acre	71,300
Forestry Management	832	0.85 US Tons/ acre/year	707.2	230 US Tons/acre	162,012
Total Mitigation	1,142	0.85 US Tons/ acre/year	967.3	230 US Tons/acre	233,312
Forests at Camp Edwards	13,500	0.85 US Tons/ acre/year	11,475	230 US Tons/acre	3,105,000

* see **Section 1.8**

Camp Edwards continues to provide carbon sequestration on an annual basis through maintenance of forested land. Construction of the Proposed Project would only represent 1.3% of the carbon sequestered in the forests at Camp Edwards. The release of CO₂ from the Proposed Project will be mitigated in 3.5 years based on just the annual sequestration of GHG provided by the forested land at Camp Edwards. According to the latest GHG emissions inventory by Massachusetts, in CY 2016, the state sources emitted 74,200,000 million metric tons of CO₂e emissions. This is equivalent of 81,620,000 US tons of CO₂e emissions in CY2016 where complete dataset was available. The estimated CO₂e emissions for the Preferred Alternative (immediately after project completion) represents an insignificant amount (less than one hundredth fraction of 1%). Regardless, after the completion of Project, the continued annual sequestration by forested land at Camp Edwards will make up for the release during Project construction.

APPENDIX A: Annual Vehicle Miles Travelled to Out-of-State MPMG Ranges from Camp Edwards

Training Site and Location	Vehicle Type	Vehicle Weight (Pounds)	Fuel Type	Fuel Capacity Per Vehicle (Gallons)	No. of Vehicles	Roundtrip Distance (Annual Miles per Vehicle)	Total Annual Miles Driven	No. of Times Fuel Tank Filled	Total Fuel Used (Gallons)
Camp Ethan Allen, Jericho, VT	HMMWV	12,100	Diesel	25	117	540	63,180	4	11,700
	LMTV	22,904	Diesel	35	31	540	16,740	4	4,340
	FMTV	28,889	Diesel	35	55	540	29,700	4	7,700
	ASV	29,560	Diesel	30	36	540	19,440	4	4,320
	Non-military	8,000	Gas	18	19	540	10,260	4	1,368
Subtotal					258	2700	139,320		29,428
Fort Dix, Ocean City, NJ	HMMWV	12,100	Diesel	25	24	600	14,400	5	3,000
	LMTV	22,904	Diesel	35	27	600	16,200	5	4,725
	FMTV	28,889	Diesel	35	100	600	60,000	5	17,500
	MATV	34,830	Diesel	30	5	600	3,000	5	750
	Non-military	8,000	Gas	18	23	600	13,800	4	1,656
Subtotal					179	3000	107,400		27,631
Fort Drum, Jefferson County, NY	HMMWV	12,100	Diesel	25	30	740	22,200	6	4,500
	LMTV	22,904	Diesel	35	12	740	8,880	6	2,520
	ASV	29,000	Diesel	30	3	740	2,220	6	540
	Non-military	8,000	Gas	18	3	740	2,220	6	324
Subtotal					48	2,960	35,520		7,884
Total Annual Miles By Vehicle Type	HMMWV	12,100	Diesel	25	171	1880	99,780	15	19,200
	LMTV	22,904	Diesel	35	70	1880	41,820	15	11,585
	FMTV	28,889	Diesel	35	155	1140	89,700	9	25,200
	MATV	34,830	Diesel	30	5	600	3,000	5	750
	ASV	29,000	Diesel	30	39	1280	21,660	10	4,860
	Non-military	8,000	Gas	18	45	1880	26,280	14	3,348
Total					485	8,660	282,240	68	64,943

Source: Camp Edward Range Control, 2019

HMMWV	High Mobility Multipurpose Wheeled Vehicle
LMTV	Light Medium Tactical Vehicle
FMTV	Family of Medium Tactical Vehicles
MATV	Medium Armored Tactical Vehicle
ASV	Armored Security Vehicle