

**Sole Source Aquifer Project Review of
the Multi-Purpose Machine Gun Range Proposed by
the Massachusetts Army National Guard to be
Constructed at Joint Base Cape Cod**

United States Environmental Protection Agency

Region 1

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List of Acronyms

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act

COCs – Contaminants of Concern

EA – Environmental Assessment

EEA – Executive Office of Energy and Environmental Affairs

EMC – Environmental Management Commission

EPA – United States Environmental Protection Agency

EPS – Environmental Performance Standards

JBCC – Joint Base Cape Cod

KD – Known Distance Range

MAARNG – Massachusetts Army National Guard

MassDEP – Massachusetts Department of Environmental Protection

MCL-Maximum Contaminant Level

MCP – Massachusetts Contingency Plan

MEPA – Massachusetts Environmental Policy Act

MILCON – Military Construction

MPMGR – Multi-Purpose Machine Gun Range

NEPA – National Environmental Policy Act

OMMP – Operations, Maintenance and Monitoring Plan

OUs – Operable Units

ROCA – Range Operations and Control Areas

SDWA – Safe Drinking Water Act

SARs – Small Arms Ranges

SSA – Sole Source Aquifer

SDZ – Surface Danger Zone

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 1'S SOLE SOURCE AQUIFER PROJECT REVIEW DRAFT DETERMINATION UNDER THE SAFE DRINKING WATER ACT: THE MULTI-PURPOSE MACHINE GUN RANGE PROPOSED BY MASSACHUSETTS ARMY NATIONAL GUARD TO BE CONSTRUCTED AT JOINT BASE CAPE COD (JBCC) MAY CONTAMINATE THE AQUIFER SO AS TO CREATE A SIGNIFICANT PUBLIC HEALTH HAZARD

1.0 EXECUTIVE SUMMARY

This document presents the United States Environmental Protection Agency (EPA) Region 1's Sole Source Aquifer (SSA) project review draft determination for the Massachusetts Army National Guard's (MAARNG's) proposal to construct a Multi-Purpose Machine Gun Range (MPMGR) at Joint Base Cape Cod (JBCC). This provisional determination, which was made under the Safe Drinking Water Act's (SDWA's) authority governing the protection of sole source aquifers, is based on information gathered and documented through an administrative record. The Administrative Record is available for review at:

<https://www3.epa.gov/region1/eco/drinkwater/capecod/adminrecord/>

Considering the protective orientation of provisions addressing sole source aquifers under Section 1424(e) of the SDWA, the Region has provisionally determined that the proposed project may contaminate the aquifer so as to create a significant public health hazard. The Region arrived at this conclusion after evaluating factors outlined by EPA guidance and including the following categories of information: sensitivity of the aquifer; existing environmental conditions (including cumulative impacts); scope of the proposed construction and operations; and projected long-term use and associated contaminant loading. Should this determination become final, no commitment of federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be allowed for this project, unless the funding is for plans or designs for the project that will assure that it will not contaminate the aquifer.

Release of this draft SSA determination will be followed by a 60-day public comment period. During this time, the public may submit written comments for EPA's consideration. In addition, EPA will hold a public hearing to receive oral comments. Information on registration procedures and mechanisms to submit formal comments is at:

<https://www3.epa.gov/region1/eco/drinkwater/capecod.html>

All comments timely received will be reviewed and considered by the Region, along with other available information. If, after evaluating this material, the Regional Administrator (RA) continues to believe that the proposed project may create a significant public health hazard, then he will forward the information to the EPA Administrator with a recommended conclusion that the project may contaminate the aquifer through the recharge zone so as to create a significant hazard to public health. The Administrator will then make a final determination.

EPA honors and respects the critical role of the Massachusetts Army National Guard in their mission to protect the Commonwealth against threats to citizens and their livelihood. The MAARNG is one of a number of Department of Defense (DOD) military units at Joint Base Cape Cod (the Base) that have diligently worked, over decades, to train soldiers, while, at the same time, partnered with state and federal agencies to investigate environmental conditions, assess data, and conduct clean ups, where necessary, to protect and sustain the Cape Cod Aquifer.

The Environmental Management Commission (EMC) is comprised of the commissioners of the Department of Fish and Game, the Department of Environmental Protection (MassDEP) and the Department of Conservation and Recreation. Its authority comes from Massachusetts Chapter 47 of the Acts of 2002 and a Memorandum of Agreement signed in 2001. Since 2002, the Environmental Management Commission (EMC) has effectively taken on the important dual role in permanently protecting the drinking water supply and wildlife habitat of the Upper Cape Water Supply Reserve (the Reserve), and ensuring that all military and other activities are compatible with the purpose of resource protection. The EMC accomplishes that dual role through effective oversight, monitoring, and evaluation of all military and other activities on the Reserve.

The Massachusetts Department of Environmental Protection and EPA work side by side to implement regulatory, financial, and assistance programs throughout Cape Cod, which provide overall protection of the environment and public health. Collectively, the EMC, EPA, MassDEP, MAARNG and other military units at JBCC, continue to work under Superfund and existing Safe Drinking Water Act Orders, to address existing contamination from past training and military activities at the Base, and support the legacy of investments to JBCC.

In addition to a key role in the productive partnerships of the agencies and military in conducting cleanup resulting from past activities, EPA has a very unique obligation, under the Safe Drinking Water Act, to protect sole source aquifers, like the Cape Cod Sole Source Aquifer, thus avoiding expensive and consequential environmental cleanups. The prospective and protective nature of the Sole Source Aquifer Program, along with the results of a comprehensive evaluation of the design and operations of the proposed machine gun range at JBCC, has led EPA, in this case, to provisionally determine that the proposed MPMGR has the potential to contaminate the aquifer so as to create a significant public health hazard.

Throughout the SSA project review, EPA has coordinated closely with and received input from the MAARNG, MassDEP, and the EMC.

2.0 OVERVIEW

As stated in the Environmental Assessment prepared by the MAARNG under the National Environmental Policy Act of 1969, 42 U.S.C. 4321 *et seq.*, and the Massachusetts Environmental Policy Act, MG.L. C.30, Ss.61-62H, "The purpose of the proposed MPMGR is to provide the requisite range and training facilities at Camp Edwards to allow the MAARNG to efficiently

attain small arms training and weapons qualifications requirements within Massachusetts.” The Environmental Assessment listed possible short-term and long-term adverse impacts to groundwater from potential contaminant spills during construction and from inadvertent releases during site operations and maintenance of the MPMGR. MAARNG considers these adverse impacts as insignificant. The Region, however, has provisionally concluded, pending consideration of public comment and final recommendation by the Regional Administrator, that such accidental releases and other expected contaminant releases that will occur in the ordinary course during frequent machine gun use at the proposed MPMGR have the potential to contaminate the aquifer so as to create a significant public health hazard.

With respect to the Cape Cod Sole Source Aquifer, the Region is acting proactively to prevent risks to this aquifer consistent with Section 1424(e) of SDWA. *See Miami-Dade County v. EPA*, 529 F.3d 1049, 1069–70 (11th Cir. 2008) (upholding EPA choice of the most conservative, protective assumptions when modeling the risks because of the limited data available and crediting EPA’s rationale that “it is much easier and more efficient to prevent groundwater contamination than to try to decontaminate it later.”). “[I]t is within EPA’s discretion to decide that in the wake of uncertainty, it would be better to give the values a conservative bent rather than err on the other side.”). *See Am. Iron & Steel Inst. V. EPA*, 115 F.3d 979, 993 (D.C.Cir.1997) (per curiam). And, in exercising his judgment, the Region balances the likelihood and severity of effects. Under this balance, EPA is permitted to find that the resource may be endangered. *Southeastern Legal Foundation, Inc. v. E.P.A.*, 2013 WL 2280943 (U.S.), *citing* 74 Fed. Reg. at 66,505. Finally, in *Ethyl Corp. v. EPA*, 541 F.2d 1 (D.C. Cir. 1976), the D.C. Circuit Court of Appeals aptly noted that “a determination of endangerment to public health is necessarily a question of policy that is to be based on an assessment of risks and that should not be bound by either the procedural or the substantive rigor proper for questions of fact.” *Ethyl*, 541 F.2d at 24. In view of the SDWA’s protection of sole source aquifers, EPA is entitled to act in its discretion based on “available facts, projections from those facts, and probative preliminary data not yet certifiable as ‘fact.’” *Ethyl*, 541 F.2d. at 28. Given the protective nature of Section 1424(e), the Region has provisionally determined, based on the administrative record, that neither the aquifer nor the public should bear the risk and uncertainty of a large-scale expansion of pollutant loading, the effects of which cannot be predicted with a degree of confidence sufficient to meet the precautionary standards of the SDWA.

A preventative approach is not only reasonable and appropriate given the purposes of the SDWA but is also warranted by the fact that the Cape Cod Aquifer has been significantly damaged through environmental impacts that have accrued over many decades and have not yet been fully remediated. It, in addition, continues to be threatened by new and emerging contaminants. EPA currently oversees the cleanup of numerous areas of contamination caused by training at Camp Edwards, including the area proposed for the MPMGR location. This accumulation of impacts warrants a reasonable but heightened degree of caution to avoid the possibility of further compromising a stressed resource.

Finally, EPA is mindful that it, along with the Department of Defense and other taxpayer funded entities, have expended more than one billion dollars and directed substantial technical resources towards cleaning up *past* contamination of the aquifer. One environmental policy imperative for the Region is to protect this investment and ensure that reasonable further progress is made toward cleaning up the aquifer. Adding an additional set of unknown or poorly understood risks could undercut or reverse progress that has been made to date. Again, the proposed MPMGR would be located over a sole source aquifer, and the SDWA takes a strong precautionary approach in such circumstances to prevent the contamination of Cape Cod's only source of drinking water.

Based on all the foregoing, and for reasons explained in more detail below, EPA has provisionally concluded, subject to public review and comment, that the construction and operation of the MPMGR would have the potential to contaminate the aquifer so as to create a significant public health hazard.

3.0 STATUTORY AND REGULATORY FRAMEWORK

Section 1424(e) of the SDWA grants EPA the authority to designate an aquifer as a sole source aquifer (SSA). After publication in the Federal Register of the EPA's designation of an SSA, Section 1424(e) also provides EPA authority to determine whether "any project . . . may contaminate such aquifer through a recharge zone so as to create a significant hazard to public health." EPA has interpreted "significant hazard to public health" to mean any level of a contaminant which:

- 1) causes or may cause the aquifer to exceed any maximum contaminant level provided in any national primary drinking water standard at any point where the water may be used for drinking water purposes;
- 2) may otherwise adversely affect the health of persons; or
- 3) may require a public water system to install additional treatment to prevent such adverse effect.

40 C.F.R. § 149.101. If the EPA determines that a project has the potential to contaminate an SSA in such a manner as described above, "no commitment for federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be entered into." EPA defines an SSA as an aquifer supplying "at least 50 percent of the drinking water for its service area" and for which "there are no reasonably available alternative drinking water sources should the aquifer become contaminated." EPA defines an SSA's recharge area or zone as "the surface expression of the area where the bulk of precipitation or surface water replenishes the aquifer." EPA designated the Cape Cod Aquifer as an SSA in 1982. 47 FR 30282 (July 13, 1982).

The regulation guiding EPA's process to determine whether a proposed project may contaminate an SSA as to cause a significant hazard to public health is 40 C.F.R. § 149.109. This regulation was originally promulgated for the Edwards Aquifer in Texas. EPA uses § 149.109 as

guidance for SSA determinations. Following public comments and receipt of information requested by the EPA, § 149.109(a) requires the Regional Administrator to, “review the project taking all relevant factors into account . . .” The regulation lists five factors as relevant but this list is non-exhaustive, as the word “including” precedes the list. The five factors are:

- (1) [t]he extent of possible public health hazard presented by the project;
- (2) [p]lanning, design, construction, operation, maintenance and monitoring measures included in the project which would prevent or mitigate the possible health hazard;
- (3) [t]he extent and effectiveness of State or local control over possible contaminant releases to the aquifer;
- (4) [t]he cumulative and secondary impacts of the proposed project; and
- (5) [t]he expected environmental benefits of the proposed project.

§ 149.109(b) next requires the RA, after reviewing the information to either:

- (1) [d]etermine that the risk of contamination of the aquifer through the recharge zone so as to create a significant hazard to public health is not sufficiently great so as to prevent commitment of Federal funding to the project; or
- (2) [f]orward the information to the Administrator with his recommendation that the project may contaminate the aquifer through the recharge zone so as to create a significant hazard to public health.

Congress intended the SDWA to have an essentially preventive purpose, recognizing that prevention of contamination is far less costly than remediation after the fact. *Miami-Dade County* at 1069–70. The SDWA included authority to prevent the use of federal funds for projects that might contaminate an aquifer that is designated as the sole or principal source of drinking water for an area. Attachment 1 summarizes the statutory and legislative background for this provision and the preventative approach Congress intended for evaluating projects with the potential to cause contamination of sole source drinking water aquifers.

4.0 BACKGROUND

4.1 Introduction

In 2015, the Massachusetts National Guard was authorized a MILCON (Military Construction) project to construct a MPMGR at Camp Edwards within the JBCC military base. An MPMGR is used to train and qualify soldiers in use of automatic machine guns, primarily the M249 and M240. The proposed MPMGR consists of eight firing lanes, each at 800 meters long with automated targets. Copper ammunition will be used (5.56 mm and 7.62 mm ball enhanced performance rounds with tracers); no lead ammunition will be fired. Sixty-four berms at various distances along the firing lanes will serve as the primary technology to capture bullets.

Approximately 1.3 million bullets will be fired per year. The proposed location starts with the existing Known Distance (KD) Range which was in use for many years as a small arms range and now primarily supports unmanned aerial vehicle training. The KD Range was chosen due to its flat topography and because the surface danger zone (the area that any fired bullet could possibly travel) is completely within the boundary of JBCC.

4.2 SSA Project Review Process and Timeline

EPA Region 1 has a long history of overseeing remedial clean-up actions and environmental management activities at JBCC under both the SDWA and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. §§ 9601 *et seq.* (commonly referred to as “Superfund”).

In 2021, in response to significant public concerns, including inquiries from the Massachusetts congressional delegation and a written petition from a Cape Cod resident, Region 1 considered whether to use its discretionary authority to conduct a Sole Source Aquifer project review of the proposed MPMGR. In summer 2021, given the scope of this project, public interest, and direct inquiries to EPA regarding the applicability of the review, EPA exercised its discretion under the SDWA to conduct this review.

EPA Region 1 initiated a Sole Source Aquifer project review in August 2021. The comprehensive review included evaluation of ammunition structure and composition, and all proposed range operations and maintenance procedures. The review focused primarily on the project’s potential impacts to the aquifer and is not a comprehensive review of all other potential environmental or public health impacts, such as those evaluated by other agencies through their environmental reviews and their public involvement mechanisms.

Key dates associated with EPA efforts and the SSA review are:

1989 - Present	Cleanup efforts at 45 operable units under Superfund and SDWA Administrative Orders.
August 2021	EPA informed MAARNG of plans to conduct a SSA project review.
2021 - Present	EPA and MAARNG exchanged information and documentation in response to multiple EPA inquires, including more than 60 comments to the MAARNG on draft operational and planning documents.
July 2022	EPA observed a test firing of the M249 and M240 at the Sierra Range to simulate firing at the proposed KD Range.
September 2022	R1 committed to a public hearing and comment period.
October 2022	EPA, EMC, and MAARNG met in Boston to review EPA-proposed best management practices.
April 2023	Draft determination released and start of the public comment period.

Since notifying the MAARNG and the Department of Defense of its intent to conduct an SSA review of the MPMGR, EPA has been working with both organizations to gather data and information on the project and other base environmental monitoring data. During the review, EPA utilized information available through the many military cleanup investigations and efforts overseen by EPA and other agencies and commissions, and responses from MAARNG to hundreds of EPA technical questions and comments. The materials reviewed included:

- SDWA and CERCLA decision documents for remedial actions related to the ranges as well as other cleanup decision documents overseen by EPA’s Superfund program;
- Notice of Project Change and Environmental Assessment (EA) developed under the National Environmental Policy Act/Massachusetts Environmental Policy Act (NEPA)/ (MEPA);
- Responses from MAARNG to EPA information requests concerning proposed operations, maintenance, and monitoring of the proposed MPMGR;
- Draft Operations, Maintenance and Monitoring Plan for the MPMGR;
- Operations, Maintenance and Monitoring Plans for other SARs at JBCC;
- State of the Reservation Reports issued by MAARNG through 2022;
- Design and draft final report of a MAARNG Copper Fate and Transport Study; and
- Documents pertaining to environmental conditions at other active and inactive SARs.

Following review of numerous documents, Region 1 created and completed:

- An administrative record with more than 60 documents;
- Tables and a summary of sampling data for contaminants at existing small arms ranges;
- Detailed calculations for contaminant mass balances of various components of the proposed bullets; and
- Research on best management/pollution prevention practices relating to small arms ranges.

4.3 Project & Site Description

4.3.1 Project

JBCC is a 22,000-acre military facility on Cape Cod. The Massachusetts Air National Guard and MAARNG – agencies of the Commonwealth of Massachusetts – conduct operations at JBCC. The on-base area of concern is controlled and operated by the Massachusetts National Guard in conjunction with the Army. The Army leases the land from the Commonwealth of Massachusetts.

The MAARNG component of JBCC is a 14,000-acre area known as “Camp Edwards.” Over the past 70 years, use of small arms, artillery and mortar, and detonation training for unexploded ordnance have taken place here. The area is governed primarily by four EPA administrative orders under the SDWA (SDWA 1-97-1019 (1997) (AO1), SDWA 1-97-1030 (1997) (AO2) and SDWA 1-2000-0014 (2000) (AO3) and the Resource Conservation and Recovery Act (RCRA 1-

2001-0014 (2001) (AO4). EPA oversees cleanup of 16 cleanup SDWA and CERCLA operable units (OU) within the Camp Edwards area of JBCC. Operable units are parts of an overall Superfund site and areas designated under the SDWA Orders which are selected to address certain geographic areas, specific site problems, or needed remedial action. The proposed area of the MPMGR is within two of the SDWA operable units, the SDWA Training Area and SAR OUs. Decision document for the SDWA Training Area OU specified target and munitions debris removal and follow up soil sampling for KD West, an area within the proposed footprint of the MPMGR

The MAARNG is proposing to build a MPMGR, in part, on the current KD Range due to its flat topography. The KD Range was in use for many years as a small arms and sub-caliber rocket range. It now primarily supports unmanned aerial vehicle training. The KD Range encompasses 38.5 acres, currently cleared of vegetation.

The purpose of the proposed MPMGR is to provide the requisite range and training facilities at Camp Edwards to allow the MAARNG to efficiently attain small arms training and weapons qualifications requirements within Massachusetts. A MPMGR is where soldiers train and qualify with automatic weapons, primarily the M249, M240, and M2. In the opinion of the Massachusetts National Guard, there is no current location in the Commonwealth available to meet the training policy set forth by the Department of Defense, which expresses a preference for utilizing existing bases. In the view of MAARNG, soldiers must travel to either Camp Ethan Allen in Vermont (270 miles away) or Ft. Drum in New York (385 miles away) to complete necessary training. The environmental impact analyses provided by the MAARNG limited its consideration of alternatives to locations within JBCC. In terms of greenhouse gas (GHG) emissions savings, the MAARNG noted, if constructed, the proposed MPMGR at Camp Edwards would reduce soldier travel time while maximizing the time available for conducting higher quality, mission-essential training activities at Camp Edwards. However, while not a focus of the SSA project review, there are other significant GHG impacts and potential environmental and public health impacts that have been noted by MAARNG and other interested parties and do not relate to potential aquifer impacts, but may be addressed in any decision to construct the proposed MPMGR.

Phase 1 of the 138 acre project consists of eight firing lanes, which are 800 meters (m) long with automated targets. Each firing lane is 25 m wide at the firing line and extends to 100 m wide at the end. Ammunition used on this range would be limited to copper ammunition (5.56 mm and 7.62 mm ball enhanced performance rounds with tracers); no lead ammunition will be fired. The range has been designed and will be designated as a copper ammunition-only range. Sixty-four berms at various distances along the firing lanes will serve as the primary means to capture bullets. Approximately 1.3 million bullets will be fired per year at the MPMGR. The MPMGR's site usage would show an increase of approximately 19% of soldier training days, and result in an almost 400% increase in the total number of bullets to be used annually across all ranges, compared to the number of bullets currently used in all of the active small arms ranges at JBCC.

The project also includes construction of a series of structures collectively referred to as Range Operations and Control Areas (ROCA); including a range control tower (657 sf), range operations and storage facility (800 sf), ammunition breakdown building (185 sf), bleacher enclosure (726 sf), range classroom building (800 sf), and covered mess shelter (800 sf).

This SSA project review only addresses impacts of the currently proposed Phase 1 of the MPMGR, but an adverse determination on the first phase would logically question the feasibility of Phase 2, which would also entail the risk of additional impacts. For Phase 1, in addition to the 38-acre KD range, MAARNG is proposing to clear 100 more acres of vegetation and trees to accommodate the MPMGR range footprint. Phase 2 would extend the middle two fire lanes an additional 700 meters to a total length of 1,500 meters to accommodate 0.50 caliber rifles. If both Phase 1 and 2 of the project are constructed, it will alter 209 total acres of land (38.5 of which are at the current KD range). Approximately 5,197 acres would be required for the MPMGR Phase 1 and 2 to accommodate the Surface Danger Zone associated with the proposed weapons and ammunition. The Surface Danger Zone (the area that any fired bullet could possibly travel, either by direct fire or ricochet) of the proposed MPMGR is entirely within the boundary of JBCC.

If future federal funding is pursued by MAARNG for Phase 2, a separate review and approval (both SSA and NEPA/MEPA) may be required prior to construction.

4.3.2 History of Small Arms Ranges

Small arms ranges (SARs) at JBCC were historically used for a variety of small arms training, including pistols, rifles, shotguns, sub-machine guns, and machine guns. The SARs are located around the Camp Edwards Impact Area (the central area within Camp Edwards where the primary contaminants released from munitions firing occurred), with firing generally aimed towards the Impact Area. Typical components of most SARs include one or more firing lines, a range floor, target arrays, and an earthen impact berm. The impact berms usually include the berm face frequently containing bullet pockets and a trough at the base of the berm. The types of small arms ammunition historically used at the ranges included 5.56-millimeter (mm) ball, 9 mm, .30 caliber, .45 caliber, .50 caliber, 7.62 mm ball and tracer rounds. Several of the older SARs at Camp Edwards do not include the typical range features or a formal impact berm. For these ranges, natural terrain hillsides were used as backstops in conjunction with or in place of man-made berms.

The types of SARs at JBCC are divided into three categories: operational and active, operational but inactive and non-operational ranges. There are 4 active SARs at JBCC. These are in relatively flat areas with cleared vegetation to accommodate easy acquisition of downrange targets. Potential sources of SARs contaminants include compounds related to: 1) propellants deposited on the soil surface in the vicinity of firing lines; and 2) projectiles and penetrators

deposited on the soil surface in the vicinity of range floors and backstops, and embedded in berms. Monitoring results from multi-media sampling are discussed later in this document.

Separate and distinct from this Sole Source Aquifer review, EPA has concurrently been reviewing a 2017 decision under the SDWA AO2 regarding specific small arms range activities unrelated to the multipurpose machine gun range proposal. As background, in 1997, EPA had issued AO2 to require suspension of military training activities at Camp Edwards, determining that the contamination of the Cape Cod Aquifer caused by training activities may present an imminent and substantial endangerment to public health. EPA also required, in AO3, comprehensive investigation and cleanup of conditions at Camp Edwards posing unacceptable risks to public health. During the implementation of the cleanup activities, EPA had approved, on a conditional basis, individual requests by MAARNG to conduct small arms training activities at Camp Edwards. In 2017, the Region modified AO 2's suspension of training activities to have the EMC provide primary oversight of training activities subject to AO2 ("2017 Decision"). In the 2017 Decision, the Region also allowed for limited use of small arms ranges and made the modification subject to periodic evaluations as to whether the MAARNG's small arms range activities, under the oversight of the EMC, were still providing adequate protection of public health.

This year, the Region is completing the first periodic evaluation of the 2017 Decision ("2023 First Five Year Review Report"). The periodic review is limited to the time period between 2017-2022 and to four ranges in which the MAARNG trained with lead bullets during the review period, one range where MAARNG practiced non-explosive grenades during the review period, and the use of pyrotechnic devices at other base locations during the review period. The periodic review does not evaluate the KD range proposed for the multipurpose machine gun range. The periodic review also is not looking at prospective future impacts, but only at range activities during the five-year period since the 2017 Decision. In contrast to the specific ranges evaluated in the 2023 First Five Year Review Report, the judgment the Region is undertaking under the Sole Source Aquifer Program on the MPMGR is *prospective* in nature, and as a forward-looking analysis, accordingly, carries with it a far greater degree of inherent and irreducible uncertainty over the nature and extent of future impacts, even if those impacts may take decades to fully appreciate.

In addition, the proposed activity is on a much larger scale than the activity evaluated in the First Five Year 2023 Report, rendering a one-to-one comparison unreasonable. This difference in degree—an estimated 1.3 million bullets per year to be used at the MPMGR resulting in a nearly four-fold increase in total annual bullet loads deposited on the land above the aquifer—is so great as to constitute a difference in kind, and amplifies the potential detrimental consequences associated with the proposed activity.

For the purposes of this Sole Source Aquifer review, EPA is concerned that contaminants have found their way into the soils and porewater underlying the small arms firing ranges, even with effective management of those activities. These contaminants appear at levels that currently do

not pose an imminent and substantial endangerment, but the fact that they are found at all under the circumstances indicates an even greater concern when considering a proposal that will entail vast expansion in both the amount of munitions being fired and their associated contaminants of concern.

4.3.3 Administrative Orders and Role of EMC

EPA, in conjunction with MassDEP and the EMC, continues work at JBCC under Superfund and existing Safe Drinking Water Act Orders to address existing contamination from past training and military activities at JBCC.

Under both programs, EPA oversees cleanup of 16 cleanup operable units to date caused by past training and military activities within the Camp Edwards area of JBCC, with a total of 45 cleanup operable units across all of JBCC. This includes contamination at the KD Range, the area proposed for the MPMGR location. While the Sole Source Aquifer project review is an independent review, data from Superfund and SDWA cleanup work were considered as part of the review.

The EMC serves as the oversight body for operations of active small arms ranges and approves use of additional munitions and other training devices at the Camp Edwards Training Area/Upper Cape Water Supply Reserve. The EMC is housed within the Massachusetts Executive Office of Energy and Environmental Affairs (EEA). The EMC was created to ensure the permanent protection of the drinking water supply and wildlife habitat of the Upper Cape Water Supply Reserve (the Reserve) through oversight, monitoring, and evaluation of all military and other activities on the Reserve.

Operational and active ranges are ranges where firing is currently permitted and an Operations, Maintenance and Monitoring Plan (OMMP) is in place, as required by the EMC's own statutory authority, and EPA's SDWA AO 2. The SARs are subject to state environmental performance standards overseen by the EMC under state authority and the terms of the 2017 EPA modification of the administrative order Scope of Work. The OMMPs act as the primary mechanisms by which MAARNG can demonstrate compliance with state environmental performance standards, including minimizing the release of contaminants to the maximum extent feasible.

4.3.4 The Cape Cod Aquifer and Site Hydrogeology

The Cape Cod aquifer covers 339 square miles of Cape Cod and provides drinking water to nearly all of the 220,000 year-round residents and numerous others during the peak summer tourist season. There are approximately 132 public water supply systems, using more than 333 water sources. Groundwater in the area of JBCC provides approximately 3 million gallons of drinking water per day to the 12 community public water supply systems in the towns of Sandwich, Bourne, Falmouth, and Mashpee, and the Mashpee Wampanoag Tribe. The groundwater at Camp Edwards (the northern part of JBCC) has been designated as the Upper

Cape Water Supply Reserve, the protection of which is governed under Chapter 47 of the Massachusetts Acts of 2002. The Cape Cod Sole Source Aquifer has a past history of significant groundwater pollution of public and private wells. Sand and gravel soil make the aquifer highly vulnerable. If constructed, the proposed machine gun range would be located over the Upper Cape Water Supply Reserve and the Sagamore Lens, the most productive part of the Cape Cod Aquifer.

The Sagamore Lens is underlain by low permeability crystalline bedrock, which is not a productive source of water. The source of freshwater recharge to this groundwater system is rainfall and snowmelt only. Approximately 27 inches of the average annual rainfall infiltrates the soil within JBCC, and recharges groundwater on an annual basis. The height of the water table in and around JBCC can fluctuate up to seven feet annually due to seasonal variations in groundwater recharge. Groundwater levels are highest in the spring when recharge rates are high; levels are lowest in the late summer/early autumn when rainfall is minimal.

Surface water resources on JBCC are scarce. Surface water is not usually retained due to the well-drained, sandy soils of JBCC. No surface water bodies, or wetlands are present within the boundaries of the proposed MPMGR footprint.

4.3.5 Source Water Protection

There are seven state-designated Zone II Wellhead Protection Areas (i.e. recharge areas) within 1000 feet of the proposed MPMGR boundary, associated with 21 public water supply wells in the towns of Bourne, Falmouth and Sandwich. These 21 public water supply wells range in distance between 0.7 and 6.2 miles from the center of the proposed MPMGR.

The proposed MPMGR is near the top of the groundwater lens, so flow from the area of the range may be in multiple directions. All wells protected by those Zone IIs are potentially downgradient of the range. The MassDEP Drinking Water Program defines the Zone IIs as protection areas of an aquifer that contribute water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation).

5.0 Technical Findings

5.1 Quantity, Type, and Components of Ammunition

A total of 1,312,500 copper bullets of four types is expected to be used annually in the proposed MPMGR including 5.56 MM M855A1 (770,000 bullets); 5.56 MM Tracer, M856A1 (192,500 bullets); 7.62 MM M80A1 (280,000 bullets); and 7.62 MM Tracer M62A1 (70,000 bullets). There are also alternate copper ammunitions which are slightly different in their make-up. In the ammunition, copper, manganese, lead, and chromium are present as the metallic

forms. Lead exists in the lead styphnate compound. Strontium exists as strontium peroxide, and antimony as antimony sulfide. Additional components include semi-volatile organic compounds such as nitroglycerin. In the environment, nitroglycerin may degrade into nitrates/nitrites which are therefore additional contaminants of concern (COCs).

5.2 Mass Balance of Ammunition

Table 5.1 shows the planned annual total mass (kg) of key contaminants of concern in ammunition components to be used at the proposed machine gun range. For metals, copper (4590 kg) input is the largest, followed by manganese (15.1 kg), strontium (15.0 kg), lead (6.78 kg), antimony (4.32 kg), and chromium (1.13 kg). For alternate ammunitions, chromium input is higher at 8.91 kg per year. From the annual mass loading calculation to the proposed MPMGR, both types of ammunition contain a total of about 400 kg of nitroglycerin.

Table 5.1. Proposed annual total mass (kg) of COCs input to the proposed MPMGR from regular ammunitions

	5.56 MM M855A1, 770,000 bullets	5.56 MM Tracer, M856A1, 192,500 bullets	7.62 MM M80A1, 280,000 bullets	7.62 MM Tracer M62A1, 70,000 bullets	Total Mass, 1,312,500 bullets
Antimony	2.25	0.56	1.29	0.21	4.32
Chromium	1.13	0	0	0	1.13
Copper	2140	375	1552	524	4590
Lead	3.78	0.84	1.85	0.31	6.78
Manganese	4.22	0.70	5.92	4.25	15.1
Strontium	0	3.86	0	11.1	15.0
Nitroglycerin	195	50.5	104	30.8	380

5.3 Analysis of Baseline Contaminant Conditions at the KD Range

The current KD range is the central location for the proposed machine gun range. While the KD range has been inactive for many years, in order to assess baseline contaminant conditions in media, EPA requested and received the latest monitoring data about soil, porewater, and groundwater related to the KD Range. Since the sampling was conducted at various times in the two main portions of the KD Range, the results are presented separately: the KD Range East and the KD Range West.

5.3.1 Baseline Analysis of Contaminants of Concern in Media at the KD Range East

Surface soil data were presented in the 2014 Final Small Arms Ranges Investigation Report. The latest soil investigation of 2013 in the KD Range East shows the range of concentrations of

metals in soil (mg/kg): antimony (0.75-1.6), copper (10.7-13.4), lead (41.7-49.5), and tungsten (0.54-1.1).

Porewater was not collected in sufficient amounts for analysis. One monitoring well sample was collected and analyzed in 2012. Groundwater monitoring well MW-109S sampled in 2012 showed 3 µg/L for total dissolved copper, 0.96 µg/L for total dissolved lead, and non-detect for antimony, tungsten, 2,4-dinitrotoluene, RDX, nitroglycerin, N-nitrosodiphenylamine, and perchlorate.

5.3.2 Baseline Analysis of Contaminants of Concern in Media at the KD Range West

The latest soil investigation on explosives of June 2020 in the KD Range West shows the range of concentrations of explosives in soil (µg/kg): 2-Amino-DNT (32.1-37.9), 4-Amino-DNT (26.2-31.3), RDX (60-160), and HMX (225-328). The soil investigation on explosives of February 2020 shows the range of concentrations of explosives in soil (µg/kg): 4-Amino-DNT (ND-18.7), RDX (43.3-246), and HMX (451-3690). These contaminants are not associated with the ammunitions to be used at the proposed site.

The latest soil investigation on metals of 2015 shows the range of concentrations of metals in soil (mg/kg): antimony (0.51-0.79), copper (6.8-9.1), lead (38.4-45), and tungsten (4.3-5.3).

There is no information on porewater sampling. There is no information about groundwater quality after 2014. Maximum groundwater dissolved metal concentrations at KD Range West (1999–2014) are shown in Table 5.2. They are all lower than the Maximum Contaminant Levels (MCLs) or Action Levels (ALs). Maximum groundwater concentration of manganese is higher than EPA's secondary drinking water standard of 50 ug/l.

Table 5.2. Maximum groundwater dissolved metal concentrations at the KD Range West (1999–2014) as compared to EPA national primary drinking water regulations maximum contaminant level (MCL). Data from Table4-2X_TAIR_KDMaxDetectsGW.pdf (Table 4-2X, Training Area KD West Representative Groundwater Data Maximum Detections)

COC	GW Metals Conc (µg/L)	MCL or AL (µg/L)	Secondary Standard (ug/L)
Antimony	2.3	6	
Chromium	2.5	100	
Copper	8.3	1300*	
Lead	1.5	15*	
Manganese	87.4	NA	50
Strontium	No info	NA	
Vanadium	No Info	NA	
Tungsten	No info	NA	

* These are Action Levels established under the EPA Lead and Copper Rule

5.4 Study of Fate and Transport of Copper

EPA reviewed the document titled “Draft Final Fate and Transport of Copper at Camp Edwards Small Arms Ranges” (dated February 2023) provided by MAARNG. The objective of this study was to assess the potential for copper transport at Camp Edwards Small Arms Range (SAR) as a result of using copper projectiles. Specifically, the soil adsorption and desorption behavior of copper was investigated to better understand the potential for copper transport in soils and surface water runoff at Camp Edwards SARs. A series of technical tasks were executed in this study including: 1) literature search on copper fate-and-transport, 2) soil profiling and lysimeter sampling, 3) batch experiments, and 4) column experiments. Laboratory-based column studies were planned to be conducted to investigate the potential for copper mobilization under Camp Edwards geochemical conditions. The column study approach was designed to investigate the extent to which copper can be transported in soil and surface water runoff under various solid-phase copper matrices by monitoring copper migration as a function of soil profile depth. The document funded by the MAARNG concludes that in view of “.....the limited fate-and-transport behavior of copper groundwater contamination of the aquifer is not expected.”

EPA’s review indicates uncertainty about the MAARNG’s main conclusion of their study that copper groundwater contamination of the aquifer is not expected. We acknowledge that copper has a propensity to adsorb to soil and does not easily dissolve and migrate to groundwater. However, this short-term study is inconclusive. Study uncertainties identified by EPA include short reaction times used in the batch and column experiments, missing samples, inappropriate composition of the experimental solutions, lack of a discussion on differences between laboratory and field conditions, and incomplete analyses of contaminants of concern. For example, it is unclear what electrolyte solution composition was utilized in the batch experiments to simulate representative soil pore water from the Camp Edwards site. Carbonate addition caused the test solution pH to increase to 9, which is a deviation from the overall objective of matching the experimental conditions with the geochemical conditions at Camp Edwards. Camp Edwards soils have a pH typically in the range of 5.5 to 6.0. All of these changes to the original scope of the study influence the results of the copper transport and fate analysis, thus leading to EPA’s uncertainties of the study’s conclusions.

6.0 FACTORS CONSIDERED IN THE DRAFT DETERMINATION

The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation’s public drinking water supplies and establishing Federal-State programs to protect

underground sources of drinking water. The Act was viewed by the legislature as having an “essentially preventative purpose.” In the case of a sole source aquifer, by definition, there are no reasonably alternative sources of drinking water, so preventing any potential contamination is of paramount concern. The precautionary, protective approach called for by Congress when enacting the SDWA, and by EPA when enacting and implementing regulations and guidance, informs Region 1’s review of the MPMGR proposal.

To guide the SSA project review, EPA considered the following factors identified in the Sole Source Aquifer regulations:

6.1 The Extent of Possible Public Health Hazard

6.1.1 Contaminants

- ~ Over the last 10 years, contaminants have been documented in multi-media in numerous SARs at Camp Edwards using either lead or copper bullets, showing that the berm technology does not prevent contaminant releases. Instead, the SARs OMMPs require contaminants to be monitored and managed. While in the past, soils at many SARs needed remediation due to various munitions training uses, there is no present imminent and substantial endangerment to public health from the currently active small arms ranges. All active SARs are operated by MAARNG, under the oversight of the EMC, in accordance with approved OMMPs.
- ~ Lead bullets do not have the same component structure as copper bullets, which are proposed to be used at the MPMGR. Nevertheless, by evaluating the multi-media sampling results of SARs utilizing lead bullets, some inferences can be reached about the threat of potential contaminant releases presented by the operation of the proposed MPMGR. While the contaminants generated by the lead bullets currently used at the SARs do not present an imminent and substantial endangerment to public health, the detections of contaminants in various media illustrate that contaminants will be released into the environment from ammunition firing at small arms ranges. Such contaminant releases at the active SARs at JBCC are adequately managed by the EMC. However, management of such releases at the proposed MPMGR will be greatly challenged by the scope of the 138-acre range, the utilization of 1.3 million bullets per year, and the associated and greatly increased mass loading of contaminants of concern.
- ~ Based on 2018 through 2021 sampling results, contaminants have been detected at active Small Arms Ranges (*e.g.*, Sierra and India Ranges) that only utilize copper bullets, like the bullets proposed to be used at the MPMGR. For example, lead in soils, and copper and antimony in pore water have consistently been detected at these ranges. As stated above, such contaminant releases at the active SARs at JBCC do not present an imminent and substantial endangerment to public health, as they are adequately managed by the EMC. However, management of such releases at the proposed MPMGR will be greatly challenged by the scope of the proposed 138-acre range, the utilization of

1.3 million bullets per year, and the associated and greatly increased mass loading of contaminants of concern.

~ Due to past ammunition usage, baseline contaminant conditions of the currently inactive KD Range, the central site of the proposed MPMGR, show residual contamination, including:

- Maximum dissolved antimony in groundwater (1999-2014) at one third of the EPA Drinking Water standard;
- Maximum dissolved manganese in groundwater (1999-2014) over EPA's secondary Drinking Water standard;
- Maximum lead in soil (2014) more than one half, and (2015) approaching one quarter of the Massachusetts Contingency Plan (MCP) soil cleanup level;
- Maximum chromium level in soil one half the MCP soil cleanup level.

These levels do not present a current imminent and substantial endangerment to public health. Nonetheless, any baseline contamination of media at the site of the proposed MPMGR adds to the potential for the aquifer to be contaminated once firing of the machine guns commences and associated bullet components are released.

~ Potential public health risks associated with exposure to drinking water with the above contaminants at levels above health-based benchmarks include: antimony (increased cholesterol); chromium (allergic dermatitis); copper (gastrointestinal distress); lead (physical and neurological developmental delays in children); and manganese (neurological effects).

~ As described above, EPA reviewed the draft final copy of the Copper Fate and Transport Study of Copper, funded and provided by MAARNG. EPA's technical review indicates uncertainty about the main conclusion of the MAARNG study that "Copper (Cu) groundwater contamination of the aquifer is not expected." While EPA acknowledges that copper has a propensity to adsorb to soil and does not easily dissolve and migrate to groundwater, this short-term study is inconclusive. Study uncertainties identified by EPA include short reaction times used in the batch and column experiments, missing samples, inappropriate composition of the experimental solutions, lack of a discussion on differences between laboratory and field conditions, and incomplete analyses for contaminants of concern. Furthermore, during the course of the study, copper was detected in pore water at an active SAR utilizing copper bullets, at 364 parts per billion, more than one quarter of EPA's Copper Action Level. Copper has been detected at active SARs in all media, including at low levels in groundwater. EPA remains concerned about the fate and transport of copper in the various environmental media over many decades and as a result of the proposed operations of MPMGR, including the annual use of 1.3 million bullets.

- ~ EPA identified and is investigating currently unregulated contaminants in media at JBCC. Some of these unregulated contaminants have been identified as bullet components (see below). Since this proposed machine gun range may be in operation for many decades, new drinking water or soil standards for emerging contaminants, including manganese, strontium, and Per-and Polyfluoroalkyl Substances (PFAS), may be published during that period. Additional regulations or health advisories could further define the potential risk to public health through direct or indirect exposure to these currently unregulated contaminants in media at the MPMGR and the additional burden on an already threatened aquifer.

6.1.2 Bullets

- ~ The estimated 1.3 million bullets per year at the proposed MPMGR would result in a nearly four-fold increase in the total annual bullet load currently being deposited into the berms and range floors of the active small arms training ranges.
 - In 2022, the average total annual bullet usage for all current small arms ranges was reported at around 442,000 bullets. The proposed MPMGR's annual bullet loading to the environment is almost three times higher than all active ranges combined on an annual basis.
 - From 2018 through 2022, the total number of bullets used across active copper bullet-only ranges was 1.27 million. The proposed total bullet use at the proposed MPMGR would eclipse that number in one year.
- ~ Mass balance calculations show that bullet components at the MPMGR will be annually released to the proposed gun range berms and range floor: copper- 4590 kilograms; lead- 6.8 kilograms; antimony- 4.3 kilograms; manganese- 15 – 19 kilograms; nitroglycerin- 380 – 399 kilograms; strontium- 15 kilograms; and chromium- 1 – 9 kilograms. These components total more than 5,000 kilograms (5.5 tons) per year.
- ~ There is no anticipated closing date for the proposed MPMGR. Like the other ranges, it will likely operate for many decades. Assuming a 50-year time frame, under the proposed annual loading and assuming limited range mitigation, there could be more than 252,000 kilograms (275 tons) of bullet components released to the environment.

6.1.3 Public Water Supplies

- ~ There are seven Zones IIs (recharge areas) within 1000 feet of the proposed MPMGR boundary, associated with 21 public water supply wells in the towns of Bourne, Falmouth and Sandwich, serving a population of approximately 125,000.
- ~ These 21 public water supply wells range in distance between 0.7 and 6.2 miles from the center of the proposed MPMGR.

- ~ Of the five main community public water systems in the vicinity of JBCC, two systems have some advanced treatment beyond pH adjustment (*e.g.* PFAS removal).
- ~ Groundwater underlying JBCC is classified by the Massachusetts Department of Environmental Protection (MassDEP) as GW-1 – suitable for drinking water, either currently or in the foreseeable future.
- ~ Based on studies conducted by the USGS, some groundwater from the site may flow to one of several public water supply wells downgradient. Travel times for groundwater moving from the site to these downgradient wells may be tens of years, with some estimates exceeding 100 years. It is anticipated that if constructed, the MPMGR—like other SARs at JBCC —will be operated for many decades, possible 50 to 100 years.

6.2 Planning, Design, Operations, Maintenance and Monitoring Measures

All ranges, including the proposed MPMGR, must operate under a final OMMP approved by the EMC. At the request of EPA, MAARNG developed and submitted a draft OMMP.

To better understand the proposed long-term management of the MPMGR, EPA reviewed the draft OMMP to see if it addressed EPA concerns about potential future contaminant releases from the proposed MPMGR. As part of this Sole Source Aquifer review, EPA provided more than 60 comments to the MAARNG on its proposed operation of the MPMGR as described in the draft OMMP. EPA’s unresolved major concerns include: 1) no commitment for regular bullet retrieval; 2) inadequate media monitoring; and 3) insufficient Best Management Practices to minimize the release of contaminants to the maximum extent feasible.

While it is expected that some of these concerns could be addressed during the review and approval process of the OMMP by the state EMC, they currently remain unresolved. Furthermore, EPA believes, based on its own research and current information provided by MAARNG, that it is uncertain that any combination of operations, maintenance, and monitoring can be developed in such a way as to minimize the release of contaminants to the maximum extent feasible (*i.e.*, environmental performance standard #19) and to adequately reduce the potential to contaminate the aquifer so as to create a significant public health hazard.

The management of the small arms ranges points to one way in which existing contamination might be exacerbated by a new, expanded range. The history of the smaller arms ranges on the Cape has demonstrated the need for EMC to work with the MAARNG to adjust, fine-tune or sometimes wholesale abandon certain Best Management Practices or technologies that proved ineffective in the first instance resulting in unanticipated pollutant loading into portions of the aquifer that would otherwise not be present. Here, the proposed activity at the proposed MPMGR is on a scale far greater than the current activity level at the small arms ranges, even when evaluated collectively, so the ramifications of trial and error over BMP selection, implementation and refinement would present more risk of damage. MAARNG is required by

the EMC to implement an operations, maintenance, and monitoring plan to minimize the release of contaminants to the maximum extent feasible. However, as discussed above, the Region believes, based on its own research and current information provided by the MAARNG, that it is uncertain that any combination of operations, maintenance, and monitoring practices can adequately reduce the potential to contaminate the aquifer so as to create a significant public health hazard.

6.3 Extent and Effectiveness of State and Local Control over Possible Releases to the Aquifer

The Commonwealth of Massachusetts owns JBCC, including the area of the proposed MPMGR, and leases it to the federal government. Therefore, the Commonwealth does have an approval and oversight role over the project. EPA has a separate authority under the SDWA to protect the Sole Source Aquifer. EPA issued a number of SDWA Administrative Orders requiring the MAARNG to address historic releases of contamination from military ordnance into the groundwater. The SDWA Orders also address operation of existing ranges on the Base. One requirement under the SDWA Orders is that MAARNG adhere to the oversight authorities of the EMC regarding the operation of existing ranges. MAARNG is required to meet Environmental Performance Standards (EPS) including to conduct training at SARs which "...minimizes the release of contaminants to the maximum extent feasible."

While the active SARs are effectively managed by the EMC, under the direct oversight of the JBCC Environmental Officer, it is important to note that the proposed expanded KD range, if constructed, will provide far greater challenges in terms of the scope of long-term operations, the amount of contaminants of concern released to the environment, and associated uncertainty of minimizing contaminant releases. The EMC has the authority to approve the final design and operations of the MPMGR and, if constructed, to shut down operations if any EPS is not met.

As described above, under Section 6.2, EPA believes, based on its own research and MAARNG's current information, that it is uncertain that all components of an appropriate OMMP for this proposed machine gun range can be developed to meet the standard of minimizing the release of contaminants to the maximum extent feasible and to ensure compliance with environmental performance standards over the very long term. As shown in the past, operations at other active and inactive SARs utilizing berms as the primary means of capturing bullets and associated contaminants do not ensure that contaminants will not be released.

6.4 The Cumulative and Secondary Impacts of the Project

The Cape Cod aquifer is glacial in origin and is composed of unconsolidated sand, gravel, silt, and clay deposits. As a result of its highly permeable soil characteristics, the aquifer is susceptible to contamination through its recharge zone from a number of sources, including but not limited to, chemical spills, highway runoff, septic tanks, leaking storage tanks, and leaching

from open dumps. There is present evidence of localized contamination of the aquifer from chemical spills, individual disposal systems, leaking fuel tanks, and wastewater treatment systems. Since ground water contamination can be difficult or impossible to reverse, and since this aquifer is relied on for drinking water purposes by the general population [of Cape Cod], contamination of the aquifer would pose a significant hazard to public health (Federal Register July 13, 1982. 47 FR 30282).

6.4.1 Cleanup of Contaminated Groundwater at JBCC

EPA, in conjunction with the MassDEP, continues to oversee the work of the military at JBCC under the Massachusetts Contingency Plan, Superfund and existing SDWA Orders to address existing contamination from past training and military activities at JBCC that have contaminated the soils or groundwater both on Base and in the surrounding communities.

These cleanup activities conducted at small arms ranges at Camp Edwards include:

- In 1998, MAARNG implemented a berm maintenance program to remove lead munitions from SAR berm soils and minimize the potential for lead fines to migrate to groundwater. Approximately 17,888 cubic yards of berm soils, including at E, J and K ranges, were removed and taken for chemical fixation of the lead. Over 6,500 cubic yards of fragments or soils were recycled or processed in situ.
- In 2006, MAARNG performed a berm maintenance project related to tungsten-containing bullets fired at SARs, including J, K and T Ranges. Approximately 4,615 cubic yards of soil were excavated and disposed of off-site.
- In 2007 and 2008, MAARNG excavated soil at the J, K and T Ranges to remove soils with elevated nitroglycerin levels and dispose of the contaminated soils off-site.
- Between 2009 and 2011, MAARNG removed soil at several ranges, including J and K Ranges, to remove lead projectiles and elevated levels of lead in soil. Over 4,000 cubic yards of soil were excavated and disposed off-site.
- In 2010, EPA required MAARNG to perform a long-term remedy at L Range, concluding that the soil contamination and most of the UXO had been adequately removed between 2008-2010, and requiring monitored natural attenuation and land use controls.
- In 2015, EPA required MAARNG to perform a long-term remedy at small arms ranges including J, K and T, and KD Range (East) of long-term monitoring of groundwater with land use controls to protect monitoring wells and additional action to address residual soil contamination. For E Range, no further action was required.

- In 2019, EPA required MAARNG to perform a long-term remedy at the “Training Areas” which includes KD Range (West), requiring data review and/or confirmatory sampling, as well as geophysical screening at that range. Also in 2019, soil removal was proposed for KD Range (West).
- Additionally at JBCC, since 1996, the Air National Guard has conducted several dozen cleanup actions at Otis Air Force Base, which represents the southern portion of JBCC. According to MAARNG, DOD has incurred costs greater than \$1.2 billion in responding to contamination at JBCC.

With this very significant amount of resources being spent for groundwater remediation at the Base, the cumulative impact of adding an additional contaminant source into the aquifer raises concerns regarding the ongoing groundwater restoration work being conducted.

6.4.2 Other Contaminant Threats

Source water assessments conducted by MassDEP for the drinking water districts on Cape Cod in 2002 – 2004 assigned susceptibility rankings of high to the water districts of Bourne, Falmouth, Mashpee, and Sandwich, as well as the Otis Air Force Base on JBCC, due to the potential contamination from land uses in the recharge areas (Zone IIs) of wells. Drinking water wells located in the Cape Cod aquifer are also vulnerable to contamination due to the absence of hydrogeologic barriers (*e.g.*, clay) that can prevent contaminant migration. There are significant threats to the aquifer which are already evident.

Presently, most of the public groundwater wells in Bourne, Falmouth, Mashpee and Sandwich are free from contamination and do not require advanced drinking water treatment to meet safe drinking water regulations. Notable exceptions occur, as there is a history of contaminated groundwater at the southern portion of JBCC caused by training and military activities that have required advanced drinking water treatment at public water supply systems. In 2019 and 2020, the Mashpee Water District identified elevated levels of PFAS (greater than the MA regulatory limit) in two of their drinking water wells. These wells were removed from service in Feb 2019 and July 2020, and the district is working with the Air Force to install treatment, scheduled for completion in Feb 2023. Additionally, the Mashpee Village Public Water Supply Well (PWSW) was shut down in Feb 2017 due to elevated PFAS levels above the federal health advisory. Air Force Civil Engineer Center (AFCEC)/United States Army Corps of Engineers (USACE) installed a wellhead treatment system to remove PFOS/PFOA which began operation in February 2020. The Falmouth Fresh Pond well was found to show elevated PFAS concentrations greater than the MA regulatory limit in May 2019; the well had been previously taken offline in April of 2017 for perchlorate. AFCEC completed installation of wellhead treatment on the Falmouth well and it was restarted in June of 2022.

Moreover, it is expected that new drinking water sources in these towns may not be easily found if current sources become contaminated. A study completed in 1999 to identify new drinking water sources to satisfy future demand expected for the six Upper Cape public water

systems was challenged to find suitable (i.e., reliable and uncontaminated) sources. Ten potential wells were originally considered, with nine of the ten eliminated due to proximity to: possible unexploded ordnance, known or newly identified sources of groundwater contamination (including contamination from the use, detonation, and disposal of explosive compounds), expected impacts on ongoing remediation efforts, potential impacts on nearby ponds or wetlands, and low water supply well yields. Three sites were added for consideration, with those also eliminated due to water quality concerns. It is critical to note that there are no reasonable available alternatives for drinking water for these municipalities. Installation of advanced treatment for contamination can be expensive, as evidenced by the current work done to mitigate PFAS contamination in the wells. While the 1999 study is more than 20 years old, it is expected that the search for additional water supply sources in this area would only be more challenging due to additional and emerging threats.

An additional concern, due to increased development, a growing year-round population and lack of centralized wastewater treatment systems, is the continuing increase in nitrate levels in public water system wells observed over the last two decades. Higher nitrogen loadings are attributed to septic systems, stormwater, and other sources.

While more information is known about public water supplies, about 15% of Cape Cod residents rely on private wells. Non-community and private wells are generally shallower and often are located in close proximity to on-site waste disposal and are more susceptible than deeper, public wells. Individual residences adjacent to JBCC with private wells contaminated with PFAS have been connected to municipal water supplies as part of Superfund removal actions by the military. Furthermore, the military has coordinated with the municipalities surrounding JBCC to institute restrictions on private well use over areas of the aquifer where the military is conducting ongoing Superfund groundwater cleanups.

It is expected that the population of Cape Cod will significantly grow in the future. As water quality continues to degrade, current and future populations served by the public and private wells in Cape Cod will become more dependent on the construction of new and expanded public water systems which amplify the need to protect the sole source aquifer. These examples highlight the vulnerability of the aquifer and cumulative threats that exist and may arise in the future. If the Cape Cod aquifer were to be further contaminated, residents would be impacted, and many public systems would need to pay for expensive advanced drinking water treatment.

6.4.3 Environmental Justice Considerations

The MPMGR project poses potential threats to the health and safety of several communities with environmental justice concerns that rely on the Cape Cod Sole Source Aquifer for safe drinking water. Environmental justice (EJ) considerations are at the forefront of EPA decision making and were prioritized by R1 in its review of this project. EPA is guided by Executive Order

12989, which directs the agency to “make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.” EPA has incorporated this directive into the core of its mission, defining “environmental justice” as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” EPA, EPA Policy on Environmental Justice for Working with Federally Recognized Tribes and Indigenous Peoples 1-2 (2014).

EPA first identified communities with EJ concerns that may be affected by the potential contamination of the Cape Cod Sole Source Aquifer, finding that several of such communities in the towns that border the JBCC rely on this resource and would be affected by its contamination. Twenty-five percent of the neighborhoods (U.S. Census block groups) in Bourne, Falmouth, and Mashpee, as well as seven percent of the neighborhoods in Sandwich, meet one or more EJ criteria according to the Massachusetts Department of Public Health. This represents approximately 16,500 people across these four towns alone who may be disproportionately impacted by a threat to the drinking water. Specifically, the communities neighboring the JBCC trigger the income criteria for environmental justice designation. Therefore, a threat to drinking water, which could conceivably require the construction and operation of expensive advanced drinking water systems would overburden communities that already face economic hardships.

In addition to the communities with EJ concerns already identified, the health and environment of the federally recognized Mashpee Wampanoag Tribe is also threatened by the potential contamination of the aquifer. Recognizing the potential detrimental effect on the Tribe, EPA prioritized their early and meaningful involvement on this issue. The Tribe considered the effect of the MPMGR on their community and voted to unanimously oppose the project at their Tribal Council meeting on June 9, 2022. The Tribe communicated this opposition to EPA during a consultation meeting held on November 4, 2022. At the consultation meeting, the Tribe expressed concerns for the health of their community, noting that many tribal members have already suffered from cancers and other illnesses due to exposures to environmental contamination. The MPMGR project would pose an additional contamination threat to their already burdened community. The Tribe has also publicly expressed their opposition to the project in a statement that raised concerns such as the preservation of natural habitats and the protection of the watershed for drinking water purposes.

The proposed MPMGR project poses identifiable environmental justice concerns for the communities and the Tribe that neighbor the JBCC. Region 1 afforded significant weight to these concerns in arriving at its draft determination.

6.4.4 Climate Change Impacts

Impending and uncertain climate change impacts pose a threat to the future viability of the Cape Cod SSA. The nation is guided by the Biden Administration's prioritization of climate change and its consequences to environmental resources and to the communities that rely on them. Executive Order 14008 demonstrates a commitment to a proactive and protective approach to climate change, directing the government to "organize and deploy the full capacity of its agencies to combat the climate crisis to implement a government-wide approach that ... increases resilience to the impacts of climate change; protects public health; [and] conserves our lands [and] waters." With these priorities in mind, Region 1 considered the impact of the MPMGR project to the Cape Cod SSA within the context of a changing climate.

At least three consequences of climate change—rising temperature, increased frequency of extreme precipitation events, and sea level rise—have the potential to threaten the long-term viability of the Cape Cod SSA as a source of clean drinking water. Rising temperatures cause discrete impacts that can affect the rechargeability of the aquifer. The aquifer is largely recharged through precipitation. As temperatures rise, the rates of evaporation and evapotranspiration increase, decreasing the precipitation available to enter the aquifer as a source of drinking water. Recharge is also slowed by drought, decreasing as the duration of drought periods increases. Increasing occurrence of extreme precipitation events, regardless of the presence or absence of drought, affect the resilience of the aquifer, and in turn groundwater rebound. Drought impacts coupled with operation of the firing range may also significantly increase the risk of larger and more severe fires that have the potential to negatively impact the underlying aquifer.

Rechargeability is of particular concern in the region, as the Cape Cod SSA supplies 96% of the peninsula's fresh drinking water. Compounding the issue, water supply demand is expected to increase by approximately 43.6% over the next few decades, especially as people migrate to New England from other areas of the country that are experiencing more severe climate change impacts. If groundwater supply decreases, yet demand remains the same and/or increases, the aquifer becomes more vulnerable, and protection of water supplies more critical.

Temperature and precipitation changes expected on Cape Cod will impact both the land surfaces of the MPMGR and the water quality of the aquifer. If climate impacts increase transmissivity of already highly permeable soils, there may be an increased likelihood of pollutants in soils and pore water migrating more rapidly to groundwater. Rising temperatures can also potentially affect the water quality of the aquifer. Organic matter, measured as dissolved organic compounds, may fluctuate depending upon the conditions of the soil layers. Some organic pollutants may persist in warmer temperatures. The amount of organic matter in soils affect the levels at which many contaminants adsorb to soils, or dissolve and migrate to groundwater. Aquifers recharged during a drought period can also show a higher concentration of salts, which, like changes in organic matter, may impact the chemistry and transport of contaminants in various media and ultimately the usability of a water supply.

Sea level rise is another climate change impact that has the potential to affect the Cape Cod SSA. As temperatures increase, coastal regions experience sea level rise, which can result in an

increased water table altitude as denser saltwater pushes the fresh groundwater up from below. According to a USGS report, the water table below the proposed MPMGR project is expected to rise around 0.5 feet by 2100, based on a projected sea level rise along the coast of Cape Cod of 6 feet above 2011 levels. Furthermore, the model predicts that the water table of the Sagamore Lens, as a whole, is expected to rise 1.72 feet. Sea level rise can also increase the likelihood of saltwater intrusion into groundwater, making costly treatment a potential need to ensure the usability of groundwater resources.

Future climate change impacts may also exacerbate conditions created by the proposed MPMGR project. Temperature and precipitation can affect the stability of the berms and accelerate the weathering rate of materials that accumulate in the berms at the MPMGR, as the metal components are exposed to the soil environment. There is also the concern that the copper bullets from the project may pulverize over time. Both the weathered and pulverized metals can become more soluble in precipitation and may migrate from the berms. The effects of weathering and pulverization on bullets have been demonstrated to cause the migration of contaminants to the soil and porewater at other ranges on these training facilities at Camp Edwards.

While climate change modelling must rely on assumptions used to predict the future, in general, many climate change impact predictions have already come true. The Cape Cod aquifer is a natural resource that is vital to the communities that depend on it for clean drinking water. Climate change poses potential threats to the aquifer, putting into question the long-term viability of this resource. The Cape Cod sole source aquifer is already vulnerable and will become more so as the effects of climate change continue to manifest. Within the context of an uncertain future climate, EPA concludes that the MPMGR may contaminate the aquifer so as to create a significant public health hazard.

6.5 The Expected Environmental Benefits of the Proposed Project

6.5.1 Expected Benefits to the Aquifer

EPA and MAARNG have identified no environmental benefits to the sole source aquifer from the development and operation of the MPMGR. According to the Environmental Impact Report (EIR) prepared by MAARNG as part of the Massachusetts Environmental Policy Act (MEPA) review, the purpose of the project is to "...provide the MAARNG with a mission required MPMGR to allow MAARNG to efficiently attain training and weapons qualifications within Massachusetts."

The EIR and Environmental Assessment (EA) reports developed by MAARNG briefly state that, due to the average depth of 100 feet below ground surface, "...no impacts to groundwater are anticipated during construction and operation phases of this Project." However, the MAARNG has not provided sufficient information to EPA to support this claim, nor have they proposed any effective mitigation measures to address any potential releases of contaminants to groundwater from the operation of the MPMGR. EPA concludes that given the existing

environmental conditions, the scope of the proposed construction and operations, and the projected long term-use and associated contaminant loading, the proposed project has the potential to contaminate the aquifer such as to pose a significant public health hazard.

EPA acknowledges the major set of improvements made by the MAARNG over time under the directions of the Region, MassDEP, and the EMC, in the operations of the Small Arms Ranges, including use of copper bullets over lead bullets. However, given the scope of the proposed KD range; the significant volume of potential contaminants that may be released to the environment; the lack of any proposed effective mitigation measures to address the potential contaminant releases from the range; and the fact that no environmental benefits to the aquifer have been identified by the MAARNG or EPA, EPA concludes that the proposed project may present a significant public health hazard.

6.5.2 Other Environmental Benefits or Impacts

Furthermore, as described in the MAARNG's EIR and EA, the proposed project will result in significant environmental impacts, such as impacts to rare species, noise, greenhouse gas emissions, degraded air quality, and land alteration, including the clearing of 100 acres of vegetation and trees. In response to all these impacts, MAARNG proposed a Conservation and Management Permit, and a number of best management practices and mitigative measures including preservation of 310 acres of land which were accepted under MEPA.

The Alternatives Analysis provided in the EA screened out any option that would not be placed over the Sole Source Aquifer. This was explained by MAARNG by referencing DOD policy that requires consolidation of existing bases. However, DOD policy has no bearing on whether other alternatives should have been considered that are more protective of the Sole Source Aquifer. The alternatives analysis also showed that, while there are projected to be a limited amount of greenhouse gas emissions savings by reducing out-of-state travel, other activities, including construction and biomass removal, will result in significant short- and long-term carbon dioxide emissions.

EPA concludes that information in the existing documents provided by MAARNG does not fully balance the expected benefits versus impacts of the proposed project. The most effective way to mitigate significant future impacts and maximize environmental benefits is the No Action Alternative identified in the EA, (e.g., not to construct the MPMRG).

7.0 Conclusion

This action to protect the vulnerable sole source aquifer of Cape Code is consistent with the protective approach indicated by Section 1424(e) of SDWA in light of the considerable technical and scientific uncertainty confronting EPA, relating not only to the impact this proposed project will have on the aquifer, but also to the fate of preexisting contamination that occurred over a period of many decades. EPA and other federal agencies have spent billions of dollars in

remedial actions to address this pollution problem for the Cape Cod aquifer. One environmental policy goal is to protect this investment and ensure that reasonable further progress is made to clean up the aquifer. The aquifer continues to be at risk based on emerging threats, such as PFOS/PFOA. Additionally, factors such as climate change inject further irreducible uncertainty regarding the productivity of the aquifer over the longer term. In exercising his judgment, the R1 Regional Administrator has balanced the likelihood and severity of effects. Under this balance, if the MPMGR were to be constructed, the RA has provisionally identified the potential for a public health hazard.

The Region has provisionally determined under SDWA Section 1424(e) that the proposed project may contaminate the sole source aquifer so as to create a significant public health hazard. The Region arrived at this conclusion after evaluating the following categories of information: sensitivity of the aquifer, existing environmental conditions (including cumulative impacts), scope of the proposed construction and operations, and projected long-term use and associated contaminant loading. Should this determination become final, following public review and comment on this provisional determination, no commitment of federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be allowed, except where such assistance is for the plan or design of the project to assure it will not contaminate the aquifer.

ATTACHMENT 1

RELEVANT STATUTORY AND LEGISLATIVE HISTORY

In making its determination, the EPA is guided by the purpose of the SDWA, apparent from the statute's name and the legislative intent behind it. "The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the U.S. [and] focuses on all waters actually or potentially designed for drinking use, whether from above ground or *underground sources*."¹ Alongside the States, "the Federal government also has a responsibility to ensure the safety of the water its citizens drink."²

The "SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions *to protect drinking water and its sources* [including] . . . *ground water wells*."³ It was clear to members of Congress that legislative action in this area was necessary.⁴ The SDWA was intended to require the EPA to produce regulations applicable to public water systems "to protect health to the maximum extent feasible."⁵ It was also intended to "establish Federal-State programs to protect underground sources of drinking water."⁶

¹ U.S. ENVTL. PROT. AGENCY, *Summary of the Safe Drinking Water Act*, <https://www.epa.gov/laws-regulations/summary-safe-drinking-water-act> (last updated Sept. 12, 2022) (emphasis added).

² H.R. REP. NO. 93-1185, (1974), *as reprinted in* 1974 U.S.C.C.A.N. 6454, 6461 [hereinafter HOUSE REPORT].

³ U.S. ENVTL. PROT. AGENCY, *Overview of the Safe Drinking Water Act*, <https://www.epa.gov/sdwa/overview-safe-drinking-water-act> (last updated Feb. 15, 2022) (emphasis added); *see also* 120 CONG. REC. H10803 (daily ed. Nov. 19, 1974) (statement of Rep. Fraser) ("The purpose of the Safe Drinking Water Act is to protect the public health by insuring the safety of the water we drink.") [hereinafter HOUSE DEBATE]; HOUSE DEBATE at H10803 (statement of Rep. Fraser) ("let us . . . make certain that public health objectives are paramount in the Safe Drinking Water Act.")

⁴ *See* 120 CONG. REC. S20220, 20241 (daily ed. Nov. 26, 1974) (statement of Sen. Hart); *see also* 120 CONG. REC. E6744 (daily ed. Nov. 20, 1974) (statement of Rep. Boland) (declaring that "[s]afe drinking water is a goal so basic and essential to the public health that it should be accorded the highest priority."); HOUSE DEBATE at H10799 (statement of Rep. Biaggi) (stating that he viewed passage of the SDWA as "vital if the Federal Government is to make its long overdue commitment to insuring that the drinking water from the tap will continue to be safe for our consumption."); HOUSE DEBATE at H10802 (statement of Rep. Blatnik) ("The need for more water and the increasing demand which will be put upon our present water supply must certainly cause us to ask some searching questions about further requirements and how they will be met.")

⁵ HOUSE REPORT at 6455; *see also* 120 CONG. REC. E6744 (daily ed. Nov. 20, 1974) (statement of Rep. Boland) (stating that "contaminant levels that will be established must *protect the public health to the maximum extent possible*." (emphasis added); HOUSE DEBATE at H10789 (statement of Rep. Harley Orrin Staggers) ("In general H.R. 13002 would authorize the EPA to prescribe nationwide drinking water regulations to *protect the public health to the maximum extent feasible*." (emphasis added); HOUSE DEBATE at H10802 (statement of Rep. Lehman) ("The Safe Drinking Water Act will require the Administrator of the [EPA] to set standards for maximum contaminant levels for substances which may cause harmful health effects, or if such monitoring is not feasible, to require certain kinds of treatment for the contaminant which will meet the requirements of *providing maximum feasible protection of the public health*." (emphasis added); HOUSE DEBATE at H10821 (statement of Rep. Ruppe) (declaring that the SDWA "will insure our public drinking water systems meet the highest health standards[]" and that "the paramount emphasis of the bill [is] on the protection of public health.")

⁶ HOUSE REPORT at 6455; *see also* HOUSE DEBATE at H10799 (statement of Rep. Biaggi) (stating that following passage of the SDWA, "the EPA would undertake an immediate and comprehensive program to insure that all underground sources of drinking' water are free of real or potentially hazardous materials.")

The legislature viewed the SDWA as having an “essentially preventive purpose.”⁷ In line with this preventive purpose, members of Congress recognized that science and hard evidence of harm to human health may lag behind the need to protect the public from potential contamination of sources of drinking water.⁸ Prevention of potential contamination versus remediation or repair also serves the nation’s financial interests as prevention is far less costly.⁹

In its report of the passage of the Safe Drinking Water Act, the House of Representatives mentioned explicitly the inclusion of “[a]n amendment that permits the Administrator to cut off Federal funds for any area that has a contaminated aquifer which is the sole or principal drinking water source[.]”¹⁰ The specific section of the SDWA containing the EPA’s SSA authority—Section 1424—was “intended to establish a Federal-State system of regulation to assure that drinking water sources, actual and potential, are not rendered unfit for such use by underground injection of contaminants.”¹¹

EPA regulations for State underground drinking water were intended “to prohibit underground injection if such injection may result in the presence in underground water of any contaminant which may result in any drinking water system not complying with any national primary drinking water regulation.”¹² Congress realized that “[w]here health risks are great, higher costs may be incurred, perhaps even to the point of requiring alternative sources of

⁷ HOUSE REPORT at 6463; *see also* HOUSE DEBATE at H10799 (statement of Rep. Matsunaga) (“[I]t is our goal as Representatives—and in this case, as protectors—of the American people to insure that . . . our water is *prevented* from becoming a general and universal health hazard.”) (emphasis added).

⁸ *See* HOUSE DEBATE at H10799 (statement of Rep. Biaggi) (declaring that “[a] commodity such as drinking water which every American must come in contact with on a daily basis *must be made safe from possible contaminants.*”) (emphasis added); *id.* at H10802 (statement of Rep. Blatnik) (admitting that “even our trained scientists know little about the environmental and health impacts of these chemicals, including the body’s overall ability to tolerate an accumulation of the chemicals.”); *id.* at H10802 (statement of Rep. Lehman) (“The Safe Drinking Water Act will require the Administrator of the [EPA] to set standards for maximum contaminant levels for substances which *may cause* harmful health effects . . .”) (emphasis added). Though discussing a different section of the SDWA (Section 1412) than that on SSAs, Florida Representative Paul Rogers remarks are illustrative of the preventive and cautious nature of the SDWA: “Section 1412 of the Safe Drinking Water Act does not require preponderant proof of a demonstrable health hazard as a precondition for standard setting; all it requires is a reasoned judgment by the Administrator that a contaminant *may* pose a threat to the public health.” *Id.* at H10793 (statement of Rep. Rogers) (emphasis added). Representative Rogers also said that “in my view, we cannot afford to wait 20 years for health effects research to be completed to begin controlling contaminants which there is some basis to believe endanger public health. If there are uncertainties, they must be resolved on the side of protection of health.” *Id.*

⁹ *See* HOUSE DEBATE at H10799 (statement of Rep. Matsunaga) (“[C]ommonsense also tells us that this is the most effective way to protect our financial resources since it obviously is much less costly to protect and upgrade our current supply than to try to rush in and repair a degraded water supply.”).

¹⁰ *Id.* at H10787.

¹¹ HOUSE REPORT at 6480; *see also* HOUSE DEBATE at H10793 (statement of Rep. Rogers) (identifying the “establish[ment] [of] Federal-State programs to protect underground sources of drinking water from contamination[.]” as the fourth goal of the SDWA).

¹² 120 CONG. REC. S20220, 20242 (statement of Sen. Hart).

drinking water.”¹³ However, in the case of SSAs, by definition there are no alternative sources of drinking water so preventing any potential contamination is of paramount concern.¹⁴

Of particular relevance to EPA’s SSA project determination for the Cape Cod Aquifer are the comments in the congressional record made by representatives from districts reliant on aquifers since designated as SSAs.¹⁵ Representative Henry B. Gonzalez of Texas introduced the SSA determination amendment during the House’s debate and vote on the SDWA.¹⁶ In his remarks, he stated that he could not see “anything but the highest consonance” between the SSA determination provision and the main purpose of the SDWA, “which is the protection of communities in their sources and right to good, healthy, potable, acceptable drinking water.”¹⁷ Representative Gonzalez went on to summarize his proposed amendment, to which the House agreed,¹⁸ by saying that

“where you have a community that is dependent for its water source, its principle source or exclusive source of drinking water in an aquifer—and this is true in the case of my own hometown of San Antonio—then if the [A]dministrator discovers that Federal funds are going into any particular purposes which would endanger that source of water, that he shall determine, and so does by publication in the Register, and after publication no commitment for Federal financial assistance would be entered into *unless and until it is determined that no such dangerous impact exists.*”¹⁹

Representative Gonzalez added that protecting the aquifer’s recharge zone is “essential in order to prevent possible contamination of the water.”²⁰ A year later, EPA designated the aquifer in Representative Gonzalez’ district—the Edwards Aquifer—as an SSA.²¹ Representative William M. Lehman of Florida explained the process and dangers of saltwater intrusion as a result of construction and demand on the aquifer in south Florida.²² He also identified the dangers of contaminants entering an aquifer through the process of leaching.²³ Five years after

¹³ *Id.* at S20241 (statement of Sen. Hart).

¹⁴ *See* HOUSE DEBATE at H10789 (statement of Rep. Harley Orrin Staggers) (clarifying that under the SDWA, a “court may only order a [public water] system to close down if adequate, safe alternative water supplies are available.”); *see generally id.* at H10796–10797 (statement of Rep. William Dawson Gunter Jr.) (singling out for particular focus the importance of protecting the Floridian Aquifer from contamination as an underground source of drinking water supplying most of the drinking water to the state).

¹⁵ *See generally id.* at H10786–10797 (statement of Rep. Gunter).

¹⁶ *Id.* at H10814 (statement of Rep. Henry B. Gonzalez)

¹⁷ *Id.*

¹⁸ *Id.* at H10815.

¹⁹ *Id.* at H10814 (statement of Rep. Gonzalez) (emphasis added).

²⁰ *Id.*

²¹ Edwards Underground Reservoir, 44 Fed. Reg. 58344 (Dec. 16, 1975).

²² *See* HOUSE DEBATE at H10802 (statement of Rep. Lehman) (FL) (“With [the draining of the Everglades and construction of canal dams] came what is known as saltwater intrusion, and as the freshwater level was lowered, so was the freshwater pressure pushing against the sea. In the 1950’s, permanent salinity dams on all major canals were built, and now the saltwater front remains relatively stationary. But saltwater intrusion is still a major threat. During periods of drought and/or high demand for water, the aquifer is lowered, which lowers the freshwater pressure against the sea and thus increases the danger of intrusion of saltwater.”).

²³ *Id.* (“Contaminants also enter our water supply from dumpsites in Dade County through what is known as a leaching process.”).

the passage of the SDWA, the EPA also designated the aquifer to which Representative Lehman referred, the Biscayne Aquifer, as an SSA.²⁴ Though not representing a district reliant on an SSA, Representative Harley Orrin Staggers of West Virginia added that “the amendment is worthwhile because I can understand *where there is only one source of supply[] . . . for several counties, that it would not be wise for any federally aided building to be allowed to come in.*”²⁵

²⁴ Biscayne Aquifer; Notice of Determination, 44 Fed. Reg. 58797 (Oct. 11, 1979)

²⁵ HOUSE DEBATE at H10815 (statement of Rep. Staggers) (emphasis added).

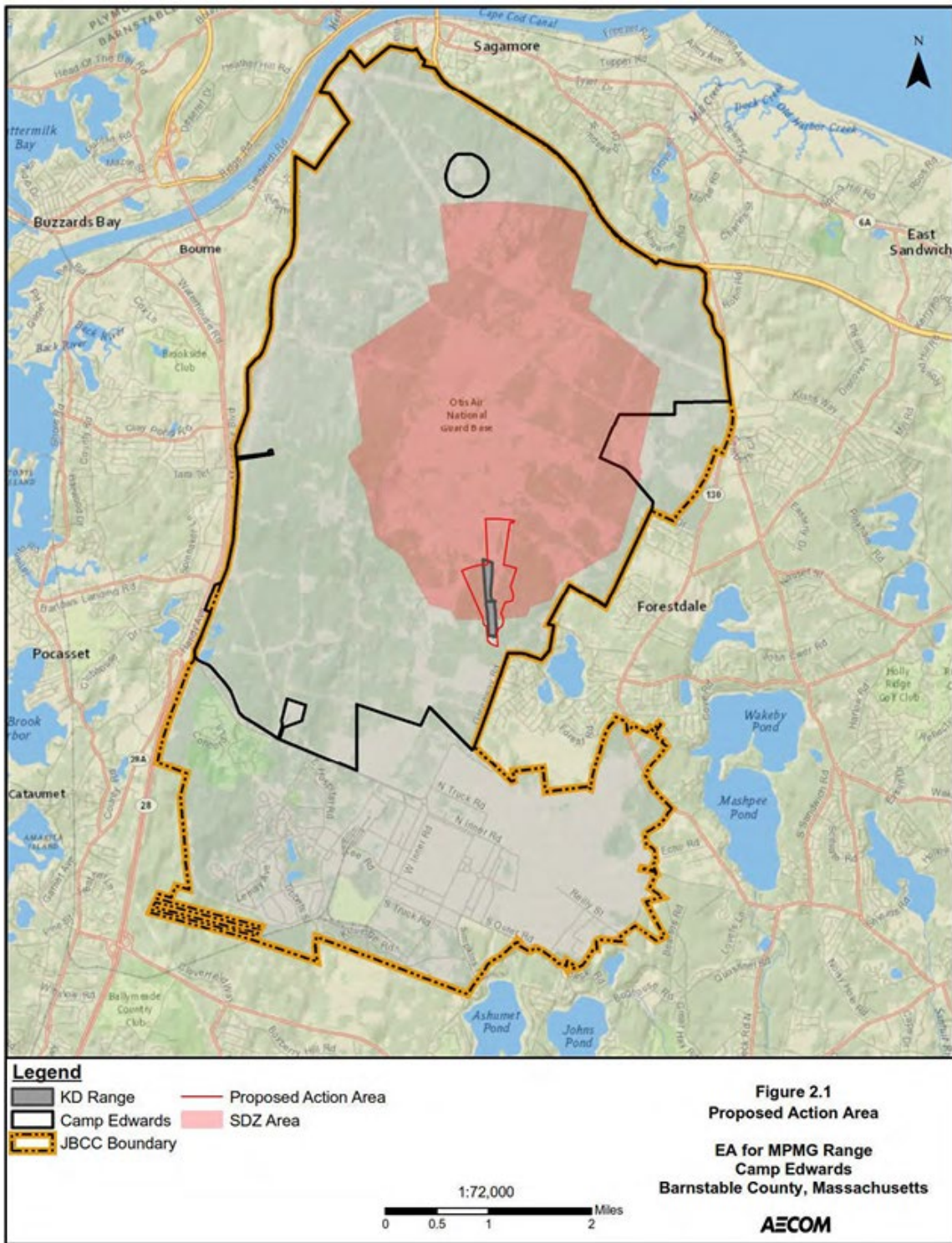
ATTACHMENT 2 – MAPS

Map 1 shows the location of the proposed MPMGR within the JBCC boundary. The proposed range would include two primary components: (1) the physical range footprint of 199 acres (including Phase I and II), represented by the red outline that is roughly five times the size of the existing KD range shown in gray and; (2) the Surface Danger Zone (SDZ), represented by shaded pink area extending approximately 5,197 acres from the MPMGR to the upper half of JBCC. (*map source: Figure 2.1 from the EA for MPMG Range - AECOM*)

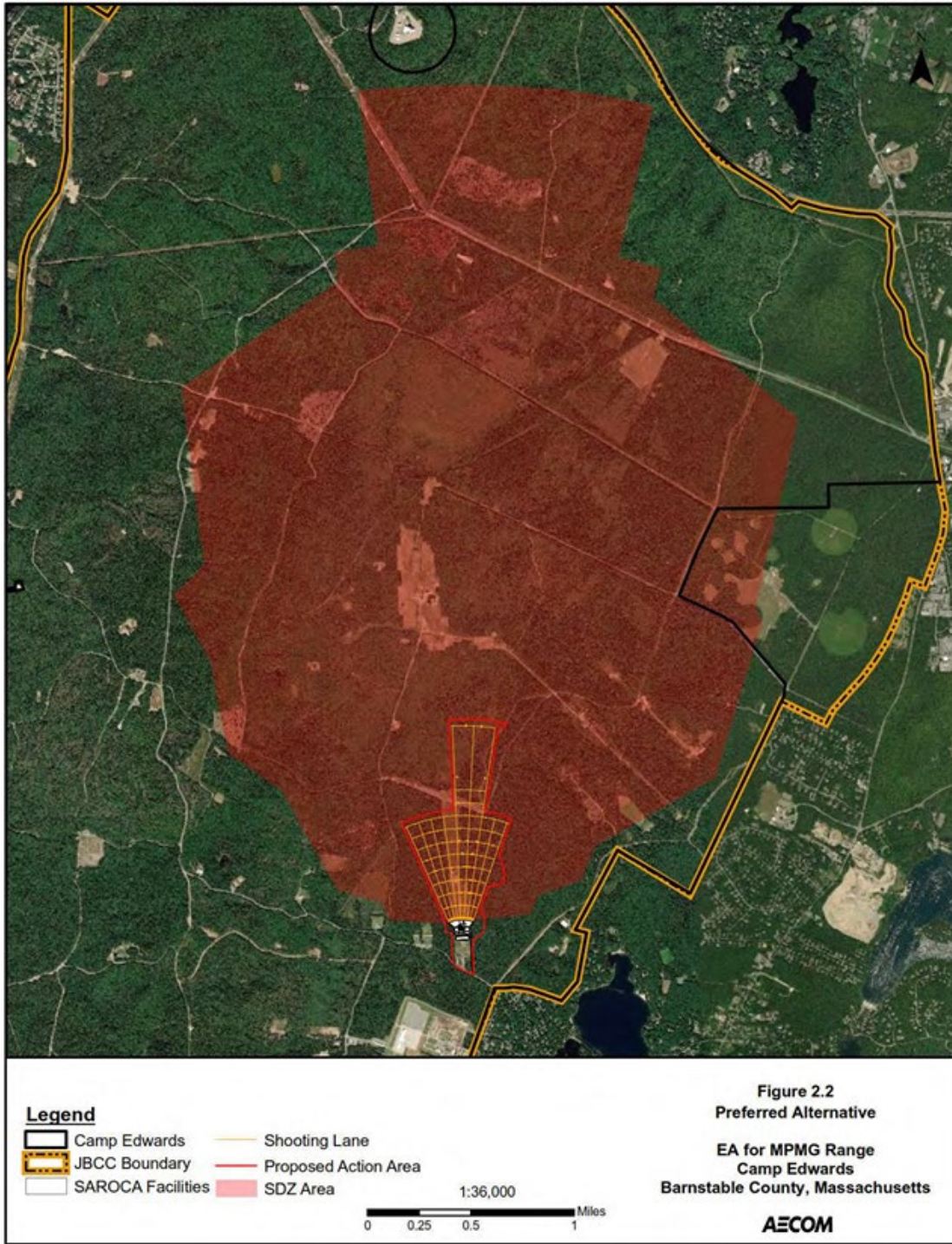
Map 2 shows a closer look at the proposed MPMGR, which consists of eight firing lanes, six of which are 800 meters long by 25 meters wide at the firing line and by 100 meters wide at a distance of 800 meters. The two middle lanes, which are part of Phase II of the project, would extend an additional 700 meters to a distance of 1,500 meters long to accommodate the use of .50 caliber rifles. Construction activities for Phase I would include up to 138 acres of disturbance and would require up to 100 acres of tree clearance to accommodate the range footprint, small arms range operations and control area (SAROCA) facilities, utility extensions, access and maintenance road development, and firebreaks. (*map source: Figure 2.2 from the EA for MPMG Range - AECOM*)

Map 3 shows the proposed MPMGR in relation to Zone II Wellhead Protection Areas, defined as the area of an aquifer that contributes water to a well under severe pumping and recharge conditions, as approved by MassDEP's Drinking Water Program pursuant to 310 CMR 22.00. The purple, green, and blue shapes represent seven Zone II's located within 1,000 feet of the proposed MPMGR. There are 21 public wells supplying drinking water to Bourne, Falmouth, and Sandwich represented by these Zone IIs. (*map source: EPA produced using MassDEP Zone II information*)

MAP 1



MAP 2



MAP 3

