Draft Environmental Assessment

Fourth Cliff Recreation Area
Road Repair and Cliff Stabilization Project

February 2023

Prepared for:
Department of the Air Force
Hanscom Air Force Base
Bedford, Massachusetts

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Letters or other written comments provided may be published in the Final Environmental Assessment (EA). As required by law, substantive comments will be addressed in the Final EA and made available to the public. Any personal information provided will be kept confidential. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final EA. However, only the names of the individuals making comments and their specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

FINDING OF NO SIGNIFICANT IMPACT

ROAD REPAIR AND CLIFF STABILIZATION
FOURTH CLIFF, HANSCOM AIR FORCE BASE
SCITUATE, MASSACHUSETTS

Pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code (U.S.C.) §§ 4321 et seq.); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations (CFR) §§ 1500–1508); and the U.S. Department of the Air Force (DAF) Environmental Impact Analysis Process (EIAP), 32 CFR § 989, the DAF has prepared an Environmental Assessment (EA) to assess the potential environmental consequences of repairing a DAF-owned road damaged by erosion from coastal storms and addressing ongoing erosion at the Fourth Cliff Recreation Area facility (Fourth Cliff), Scituate, Massachusetts.

This EA was prepared for Fourth Cliff, 56 acres of DAF-owned property on the tip of Humarock Peninsula in Scituate, Massachusetts. Hanscom Air Force Base operates the seasonal recreation facility used by Department of Defense (DoD) personnel and their families. This EA analyzes the potential environmental consequences of alternatives proposed to repair the road and address the ongoing shoreline erosion and destabilization that are threatening the facility and contributing to unsafe conditions for users of Fourth Cliff. The potential environmental consequences of not repairing the road and addressing the erosion and destabilization of the shoreline are also analyzed.

Purpose and Need for the Action (EA §§ 1.2 and 1.3, Page 1-12): The Proposed Action is to evaluate options to address historic and ongoing coastal erosion at storm-threatened Fourth Cliff in light of the DAF's responsibility to be a good steward of its real property assets.

The purpose of the Proposed Action is threefold:

1. Ensure that military service members, their families, and affiliated personnel are not subjected to unsafe or degraded conditions.
2. Protect and/or preserve DAF-owned National Register of Historic Places (NRHP)-eligible historic structures on the property.
3. Resolve impacts related to shoreline erosion as a result of major storms, assuming the DAF continues to retain ownership of the property.

The need for the Proposed Action is to address the following unacceptable conditions caused by the ongoing erosion:

- Unsafe conditions for users of the site
- Threats to the stability of the NRHP-eligible historic properties, one of which is about 20 feet from the edge of the cliff; and,
- Infrastructure failures and increasingly costly repair and maintenance of the facility by the DAF.

Therefore, the Proposed Action is needed to address existing safety concerns and threats to infrastructure at Fourth Cliff caused by erosion.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Alternative 1 (Preferred Alternative) – Retreat, Repair, and Stabilize Fourth Cliff Coastal Property (EA § 2.3, pages 2-3 through 2-8): The key principle embedded in this alternative is that of retreat, which can be defined as the "voluntary movement and transition of people and ecosystems away from vulnerable

coastal areas" (Georgetown University Law Center, Georgetown Climate Center). This alternative involves repairing and stabilizing the Fourth Cliff coastal bank to protect the DAF assets and visitors in a manner that minimizes adverse effects to coastal resources. The alternative acknowledges that the Fourth Cliff Recreation Area activities will eventually have to be relocated as the cliff continues to erode, even if the proposed repairs are implemented. This alternative would be implemented in three phases depending on the availability of resources. Phase 1 would be implemented first and would include a number of projects that would not only address the damage to the roadway caused by the erosion but would also improve a number of amenities and facilities for users of the facility. Phase 2 would stabilize the most severely impacted area of the Fourth Cliff coastal bank, approximately 450 linear feet (l.f.) at the tip of the peninsula, and build a new accessible wood ramp and stairs to the beach on the west side. Phase 3 would stabilize the rest of approximately 700 l.f. of the eastern-facing bank of Fourth Cliff. DAF will prepare a Supplemental EA when Phases 2 and 3 are funded and designed.

Alternative 2 — Divestiture of the Property (EA § 2.4, Pages 2-8 through 2-9): Alternative 2 involves the DAF declaring Fourth Cliff as excess property and proceeding to divest its ownership interest in the facility. "Excess" real property in the DAF is real property that has been screened within the DAF and with other military departments and defense agencies and that is excess to DoD requirements (Air Force Instruction (AFI) 32-9004, Disposal of Real Property). If this decision were to be made, the DAF would follow the approved DAF process for excessing real property (40 U.S.C. Subtitle I, Federal Property and Administrative Services, and the President's Asset Management Initiative, Executive Order (EO) 13327, "Federal Real Property Asset Management"). If the site is transferred out of federal ownership, the DAF would endeavor to protect/mitigate historic and cultural resources listed or eligible for listing in the NRHP (including historic districts) (36 CFR 800). Mitigation measures could include deed restrictions, data collection, photo documentation, or including other terms in property transfer or conveyance documents and would be conducted in coordination with the Massachusetts State Historic Preservation Office.

No Action Alternative (EA § 2.5, Page 2-9): The CEQ regulation 40 CFR § 1502.14(c) requires the inclusion of a No Action Alternative in the NEPA analysis. The No Action Alternative serves as the baseline against which alternatives can be evaluated to identify impacts to the natural and built environments. Under the No Action Alternative, the DAF would not address the shoreline erosion and continued storm damage at Fourth Cliff. The No Action Alternative would continue with periodic maintenance, as needed, resulting in no change to the status quo. A long-term solution to address shoreline erosion would still be needed. Fourth Cliff would continue to sustain damage, and the asset's existing roadway, parking, camping area, picnic area and fencing would be impacted. Continued erosion would eventually threaten the stability of the historic bunker and the stability of the northern observation tower.

Alternatives Eliminated From Further Consideration (EA § 2.2, pages 2-1 through 2-3, and § 2.6, pages 2-9 and 2-10)

Four other alternatives were initially considered during the environmental impact analysis process and eliminated from further consideration because they did not meet all of the criteria for the DAF selection standards as presented on EA page 2-1. The following alternatives were eliminated:

Nature-based Solution: Beach nourishment would place sand along the 1,300-foot beach to establish a wider and higher elevation beach to force incoming waves to break farther offshore, thereby reducing wave damage to the toe of the cliff during storm events. This alternative was eliminated from further consideration because it would not meet the selection standards to provide a long-term solution to reduce erosion with reasonable maintenance needs that would not cause other impacts.

Vertical Bulkhead: A vertical bulkhead wall would be built in front of the cliff parallel to the shoreline to create an armored shoreline. Hardening can interrupt natural shoreline processes, eliminate nursery habitat for marine species and foraging habitat for wading birds, and degrade water quality. Regulations

(310 *Code of Massachusetts Regulations* 10.00) administering the Massachusetts Wetlands Protection Program (Massachusetts General Law (M.G.L.) c. 131 § 40) include performance standards that require no adverse effects from projects. A vertical bulkhead wall would alter the coastal bank by impacting a sediment source, and this alternative was eliminated.

Geotextile Tubes: A geotextile tube revetment would be built to protect the cliff toe along the length of the Fourth Cliff in the offshore region. Geotextile tubes—sediment-filled sleeves of geotextile fabric—are placed on a fabric scour apron with sediment-filled anchor tubes at the edge. The tubes are filled with a water-sediment slurry. Water seeps from the geotextile fabric, leaving the sediments in the sleeve. This alternative would not meet the selection standards because it would not protect the historic tower and maintenance requirements over the long term and could affect sediment transport, beach access, habitat and other aspects. This alternative was eliminated.

Riprap Revetment with Vegetated Slope: A composite shore protection structure would be installed along 1,300 feet of coastal bank. The composite structure would be placed as far landward as possible using a riprap revetment with a 1.5:1 slope topped with a reduced-slope vegetative cover and drainage improvements. The existing, irregular slope of the coastal bank would be smoothed, and a riprap revetment would be built of armor stone weighing between 4 and 7 tons with an underlayer of various size stones. This alternative was proposed in 2019 because it would provide protection during a 100-year storm condition but has been eliminated because it would not meet the selection standards due to its incompatibility with Massachusetts Office of Coastal Zone Management guidance and Massachusetts Department of Environmental Protection regulations.

ENVIRONMENTAL CONSEQUENCES

The EA, incorporated by reference into this finding, analyzes the potential environmental consequences of activities associated with the road repair and cliff stabilization at Fourth Cliff. The EA considers all potential impacts of the three alternatives studied. The analyses of the affected environment and environmental consequences of implementing the Preferred Alternative concluded that the Preferred Alternative would not affect the following resources:

- Socioeconomic Conditions;
- Transportation; and
- Hazardous Materials and Waste

The DAF has concluded that no significant adverse effects would result to the following resources from implementation of the Preferred Alternative.

Environmental Justice (EA § 4.2, page 4-4): No environmental justice populations are found within the region of influence. No impacts would be experienced because of the Preferred Alternative.

Air Quality, Greenhouse Gases, and Climate Change (EA § 4.3, pages 4-4 through 4-8): The project would not generate emissions beyond the construction period. Air quality impacts would be limited to short-term, increased fugitive dust and mobile source emissions expected to occur during approximately five weeks of construction activities for Phase 1 of the Preferred Alternative and 12 months of cliff repair operations for Phases 2 and 3 of the Preferred Alternative.

Soils (EA § 4.4, pages 4-8 through 4-9): Phase 1 of the Preferred Alternative, road repair, would result in negligible, long-term impacts to soils at Fourth Cliff. Phases 2 and 3 of the Preferred Alternative, cliff stabilization, would have a positive direct impact.

Biological Resources (EA § 4.5, pages 4-9 through 4-14): Phase 1 of the Preferred Alternative, road repair, would have less-than-significant permanent negative impacts to vegetation and less-than-significant temporary impacts to wildlife. Phase 2 and 3 of the Preferred Alternative, cliff

stabilization, would have less-than-significant negative impacts to vegetation, wildlife, threatened and endangered species (piping plovers, red knots and least terns). The direct impact of building the ramp and stairs and the cobble berm on vegetation, common shore birds, and wildlife is expected to be less than significant. During construction, if nesting areas are observed, the environmental oversight personnel will document the location, physically stake the nesting area, and inform construction workers to avoid the area. The DAF will identify staging areas and develop a restoration plan for the construction access. Indirect impacts during construction could cause common wildlife species to be temporarily displaced from the construction area but they are expected to return after construction. Long-term preservation of locally important habitat would be advanced under the Preferred Alternative as bird nesting habitat on the west side of the cliff would likely benefit from long-term monitoring and sediment replenishment.

Noise (EA § 4.6, pages 4-15 through 4-16): The Preferred Alternative would not generate noise. Construction activities would generate temporary noise impacts at the project site. Construction would take place between April 2023 and December 2023. Noise-sensitive receptors could be affected by noise generated from the construction site as well as noise generated from construction vehicles transporting workers and materials to and from the construction area. No long-term noise impacts would be experienced because of the Preferred Alternative.

Safety and Occupational Health (EA § 4.7, pages 4-16 through 4-17): The Preferred Alternative would improve the safety of users of the property by cleaning up the damaged upland areas and would have a beneficial impact. The damaged recreational vehicle (RV) sites would be removed, and turnarounds on the east and west side for fire access would be built along with accessible parking spaces and new pedestrian paths to connect the east and west sides of the cliff, currently generally impassible due to the severe grade differential.

Cultural Resources (EA § 4.8, Pages 4-17 through 4-19): Phase 1 of the Preferred Alternative would have no permanent negative impacts and would have beneficial impacts to the Fire Control Observation Tower by improving fire truck access. Temporary impacts during construction would be less-than-significant. Battery #208, the Fire Control Observation Tower, and the Fire Control Observation Station would be protected by exclusion fencing to ensure that structures or foundations are not damaged. Any construction activities adjacent to these structures also would be monitored for unexpected discoveries. Phase 2 and 3 of the Preferred Alternative, cliff stabilization, would have a positive impact, providing protection to Fourth Cliff resources eligible for listing in the NRHP. The Preferred Alternative would slow the erosion, stabilize the shoreline, and protect the historic structures at Fourth Cliff eligible for listing in the NRHP. There would be no adverse effect, in accordance with 36 CFR § 800.5.

Utilities and Utility Infrastructure (EA § 4.9 page 4-20): Phase 1 of the Preferred Alternative would have positive impacts on utilities and infrastructure by removing approximately 6,772 square feet (s.f.) of existing asphalt and concrete pavement, removing 120 feet of concrete curb at the damaged cliff area, providing improved pedestrian access and use of the facility, recreating some of the camping amenities and safety features lost to erosion, restoring full fire department access, constructing Americans with Disabilities Act-compliant parking and access to site features, and installing a safety railing. Utilities damaged by storms would be permanently addressed, including damaged sanitary pipe, a waterline, and obsolete electrical service from the former RV sites. Phase 2 and 3 of the Preferred Alternative would have no impacts.

Geology and Topography (EA § 4.10, page 4-21). Implementation of Phase 1 of the Preferred Alternative would not substantially alter a unique or recognized geologic feature, adversely affect geologic conditions or processes, or expose people or property to geologic hazards that could result in injury or loss of use. Impacts to topography would be negligible. Implementation of Phases 2 and 3, cliff stabilization, using a cobble berm and vegetated bluff at the cliff would change the geology of a small

portion of Fourth Cliff. The material forming the toe of the cliff would become stones sized up to 10 inches and the vegetated berm would be created by backfilling and planting. The nearly vertical, exposed cliff face with no vegetation would become a sloped, partially vegetated bank. The impacts to geology and topography would be less than significant.

Land Use and Visual Resources (EA § 4.11, pages 4-21 through 4-23): Phase 1 of the Preferred Alternative would have positive impact to land use at Fourth Cliff by restoring RV pads and enabling pedestrian access from one side of the cliff to the other. The visual quality of the recreation area itself would be improved for DoD personnel. The replanted areas would restore the bucolic appearance of the recreation area. Views of the ocean would be improved by removing the chain link fence and replacing it with a low wood post and cable barrier. Phase 1 would slightly improve the appearance of the cliff from the beach by removing the unsightly chain link safety fence, sawcutting damaged pavement, and removing damaged utilities. Views from the water and the beach would be unchanged, as Phase 1 would not address cliff erosion, and the appearance of most of the damaged cliff would not change. Phases 2 and 3 of the Preferred Alternative, cliff stabilization, would change the visual character of the coastal bank along Fourth Cliff. The shoreline would change from nearly vertical, exposed cliff face with no vegetation to a sloped, partially vegetated bank. This change would be noticeable from the key viewpoints, the beach below Fourth Cliff and the water east or north of the site. There would be no change in visual quality from the buildings, RV sites, and recreational areas at the Fourth Cliff facility itself. The impacts would be less than significant.

Scenic Protected River and National Natural Landmark (EA § 4.12, pages 4-23 through 4-24): Phase 1 of the Preferred Alternative would have less-than-significant impacts to the North and South rivers, National Natural Landmarks. Phase 2 and 3 of the Preferred Alternative would have less-than-significant impacts and the long-term monitoring and sediment replenishment included in the design of the cobble berm could provide a benefit to adjacent habitat.

Massachusetts Coastal Zone Program Policies (EA § 4.13, page 4-24): The Preferred Alternative is consistent with Massachusetts Office of Coastal Zone Management policies and principles.

Water Resources (EA § 4.14, pages 4-24 through 4-34): Phase 1 of the Preferred Alternative would impact 7,400 s.f. of high-risk (AE) flood zone located along the western side of the facility, a less-than-significant impact. Temporary impacts to surface water would be minimized using temporary stormwater best management practices (BMPs). Permanent BMPs would be included at the base of the proposed turnaround on Cliff Road, grading the surface to drain as it does under existing condition—into the woods. Elevations and stormwater management currently prevent stormwater from the top of the cliff from flowing over the edge of the cliff and would continue under the Preferred Alternative. Construction stormwater and permanent stormwater would flow inland, away from the edge of the cliff, traveling a path primarily of pervious lawn or woods, before flowing into the storm catch basin or water quality swale.

Phase 1, 2, and 3 of the Preferred Alternative would impact coastal wetland as follows:

- Flood zone (79,559 s.f.)
- Coastal beach (41,606 s.f.)
- Coastal dune (43,184 s.f.)
- Barrier beach (temporary impact from barge; 11,200 s.f.)
- Coastal bank (1,436 l.f.)
- Land subject to coastal storm flowage (84.790 s.f.)

These impacts are expected to be less than significant. The Preferred Alternative is the only practicable alternative that meets the selection standards.

SCOPING AND PUBLIC REVIEW

The DAF sent scoping letters to federal and state agencies, tribes and other interested stakeholders during preparation of the EA. These letters requested that any issues or concerns relevant to the Proposed Action be provided prior to completion of the EA. Informal consultation with the U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, Massachusetts Natural Heritage and Endangered Species Program, Massachusetts Office of Coastal Zone Management and the Massachusetts Historical Commission was done early in the process via regular mail and email. The DAF published a draft EA and the draft Finding of No Significant Impact for this previous Preferred Alternative in June 2019 and accepted comments through July 8, 2019.

The DAF filed an Environmental Notification Form (ENF) for the Massachusetts Environmental Policy Act (M.G.L. c. 30 §§ 62–62L) May 31, 2022, and sent copies to 30 stakeholders soliciting comment. The Proposed Action's three-phase approach was introduced in the ENF and Supplemental Information, with review open for 50 days. A virtual public consultation session on June 16, 2022, was attended by 10 stakeholders and included a video showing the current conditions at the site and a review of three proposed phases of work. This EA incorporates comments and input from the 2019 EA effort, 2022 ENF comments and the Executive Office Energy and Environmental Affairs Secretary's Certificate on the ENF issued August 8, 2022. Correspondence in 2022 is included in Appendix A of the EA.

FINDING OF NO SIGNIFICANT IMPACT

Based upon my review of the facts and analysis summarized above and contained within the subject EA, I find Phase 1 of the Preferred Alternative and Alternative 2, Divesture, intended to ensure safety for DoD affiliate personnel and address threats to historic structures, will not have a significant impact on the natural or human environment. Because the design of Phase 2 and 3 of the Preferred Alternative has not been advanced beyond the concept stage, I cannot determine that Phase 2 and 3 will not have significant impacts without more design and environmental evaluation. This analysis fulfills NEPA; the President's CEQ 40 CFR §§ 1500–1508; the Air Force Regulation 32 CFR § 989; and EOs 11988, "Floodplain Management" and 11990, "Protection of Wetlands."

_____ _____

DATE

Command Senior Civil Engineer
Logistics, Civil Engineering and Force Protection
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Acronyms and Abbreviations

ACAM	Air Conformity Applicability Model
ADA	Americans with Disabilities Act
ARPA	Archaeological Resources Protection Act
BMP	best management practice
c.f.	cubic foot (feet)
c.y.	cubic yard(s)
CAA	Clean Air Act and Amendments
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CMR	*Code of Massachusetts Regulations*
CO	carbon monoxide
CO_{2e}	carbon dioxide equivalent
CWA	Clean Water Act
CZM	Massachusetts Office of Coastal Zone Management
DAF	U.S. Department of the Air Force
DAFI	Air Force Instruction
dBA	decibel (A-weighted scale)
DoD	U.S. Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
ENF	Environmental Notification Form
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FIRM	FEMA Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
Fourth Cliff	Fourth Cliff Recreation Area
GHG	greenhouse gas
Hanscom AFB	Hanscom Air Force Base
IAP	initial accumulation point
IPaC	Information for Planning and Consultation
kW	kilowatt(s)
l.f.	linear foot (feet)

LCS	land containing shellfish
M.G.L.	Massachusetts General Law
MassDEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
MassWildlife	Massachusetts Division of Fisheries and Wildlife
MBTA	Migratory Bird Treaty Act
MEPA	Massachusetts Environmental Policy Act
MESA	Massachusetts Endangered Species Act
MHC	Massachusetts Historical Commission
MHW	mean high water line
MLW	mean low water line
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NAVD88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NHESP	Natural Heritage and Endangered Species Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
OCC	Ocean and Coastal Consultants
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
ROI	region of influence
RV	recreational vehicle
s.f.	square foot (feet)
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SWPPP	Stormwater Pollution Prevention Plan
U.S.C.	*United States Code*
USFWS	U.S. Fish and Wildlife Service
USPS	U.S. Postal Service
VdB	vibration velocity level in decibels
VOC	volatile organic compound
WPA	Wetlands Protection Act

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1 Purpose and Need for the Proposed Action

1.1 Introduction and Background

This Environmental Assessment (EA) examines the potential impacts associated with actions by the United States Department of the Air Force (DAF) to maintain safe operations, safe conditions on the beach below, and address the shoreline erosion and continuing storm damage at the Fourth Cliff Recreation Area (Fourth Cliff) along the Atlantic shoreline in Scituate, Massachusetts. This EA responds to comments on a draft EA in 2019 from agencies and the public. To address the comments received, this EA expanded the selection criteria for alternatives and proposes a new three-phase approach to addressing the deteriorated conditions caused by shoreline erosion at Fourth Cliff. This EA also incorporates comments following review of a state environmental document, the Environmental Notification Form (ENF), which was issued a Certificate on August 8, 2022, stating the project does not need an environmental impact report.

Fourth Cliff is owned, operated, and maintained by the DAF for the purpose of providing passive and active recreational activities to military members, U.S. Department of Defense (DoD) civilian employees, and their families. Fourth Cliff consists of 56 acres on the northern tip of Humarock Peninsula in Scituate, Massachusetts, about 50 miles southeast of Hanscom Air Force Base (Hanscom AFB). Humarock Peninsula is an oblong, elevated landform comprised of dense glacial till, commonly referred to as a drumlin. The cliff rises about 20 feet from the coastal beach at the tip.

The cliffs on the east and north sides of Fourth Cliff are “coastal bank,” as defined by Massachusetts regulations (310 *Code of Massachusetts Regulations* (CMR) 10.30(2)), and are bordered by “coastal beach,” which on the east side meets Cape Cod Bay of the Atlantic Ocean and on the north side abuts the confluence of the North and South rivers, known as the New Inlet. On the north and east sides of the site, beyond the coastal beach, is a rocky, intertidal shore. In addition to being rocky, the waters surrounding Fourth Cliff are relatively shallow. The west side of the Fourth Cliff site is within the Riverfront Area of New Inlet (the confluence of the North and South rivers). All of Fourth Cliff’s shoreline is subjected to periodic coastal storms. Within the Fourth Cliff property, currently there are 15 cottages, a four-room motel-style complex, 11 RV camper sites (with electrical, potable water, and wastewater hookups), four tent sites, four picnic areas, a pavilion, a bath house, a recreation center (management office space, a small restaurant, a snack shop, a souvenir shop, a game room, and an observation deck), and the manager's residence. Also on site are the preserved remains of a World War II-era coastal defense battery comprised of two observation towers and a massive, reinforced-concrete and mounded earthen bunker/command post. The bunker and north observation tower are eligible for inclusion in the National Register of Historic Places (NRHP). Fourth Cliff is used year-round, but the greatest use is from mid-June to mid-September when occupancy reaches 100%.

Access to Fourth Cliff is via Central Avenue which runs along the Humarock Peninsula. Access via Central Avenue is shared by numerous year-round and seasonal homes along the peninsula. There are homes situated along the coastal bank immediately to the south of the Fourth Cliff property and near the southern end of the proposed shoreline stabilization work. Erosion concerns at Fourth Cliff have been noted as early as 1948 when the property was owned by the U.S. Army. In the years since, erosion progressed slowly but did not pose a threat to nearby structures until recently. The exposed east and north faces of Fourth Cliff are experiencing significant erosion. Between 1958 and 2000, approximately 40 linear feet (l.f.) of cliff face eroded, representing an average annual erosion of about 1,500 cubic yards (c.y.), or 1 l.f. per year (OCC 2001). In 2018, a severe coastal storm caused advanced erosion of the northern most portion of the peninsula. As a result of this single storm event, approximately 10 feet of the cliff face eroded leading to a collapse of the perimeter road and severing of underground utilities. As a result three RV pads in the toe area are closed and three pads on the eastern-facing side near the bunker have very little space around them as the cliff fence is tight to the edge of the pad. Over the years, the condition of Fourth Cliff has been a concern to military recreationists, residents, Scituate, and the members of the Commonwealth’s congressional delegation. The Scituate Historical Society has expressed concern for decades about the historic bunker and tower due to their proximity to the cliff edge.

Wave action such as that experienced in the 2018 storm resulted in the complete elimination of the perimeter road and made the RV pads at the toe unusable. Utilities were left dangling off the edge of the cliff after the 2018 storm. Recent storms have contributed to undercutting the coastal bank and leading to greater erosion rates than previously experienced. Although there have been no severe storms similar to that in 2018 in the years since, ongoing erosion continues to damage additional portions of the existing roadway, parking area, camping area, picnic area, stairway, and fencing. Continued erosion will eventually threaten the stability of the historic bunker, which is approximately 20 feet from the edge of the cliff at the closest, and stability of the northern observation tower.

The primary causes of erosion of the coastal bank at Fourth Cliff at the toe of the peninsula are wave breaking forces from significant storm events and wave runup. Sheeting rainfall may also play important roles in the erosion of the bank, particularly on the east bank.

This Environmental Assessment (EA) evaluated the potential impacts associated with the Proposed Action and Alternatives in accordance with the National Environmental Policy Act (NEPA) (42 *United States Code* (USC) §§ 4321–4347), Council on Environmental Quality (CEQ; 2022) National Environmental Policy Act Implementing Regulations (40 *Code of Federal Regulations* (CFR) §§ 1500–1508), and the DAF Environmental Impact Analysis Process (EIAP) 32 CFR §§ 989 et seq. According to these requirements, the EA is a written analysis which serves to (1) provide analysis sufficient to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI); (2) aid federal agencies in complying with NEPA when no EIS is required; and (3) to decide to do nothing (pursue the No Action Alternative). If this EA determines the Proposed Action would significantly degrade the environment, significantly threaten public health or safety, or generate significant public environmental controversy, then an EIS would be completed, or the DAF would not proceed with the Proposed Action. Alternatively, if this EA results in a FONSI, then an EIS would not be required. The EA is not intended to be a scientific document. The level and extent of detail and analysis in the EA is commensurate with the importance of the environmental issues involved and with the information needs of both the decision makers and the general public.

Photos 1 through 3 illustrate the progression of cliff erosion and damage to Fourth Cliff over the last three years. The photos were taken approximately one year apart in 2016, 2017, and 2018. In Photo 1 (2016), the road at the tip of Fourth Cliff is beginning to be undermined and yellow barriers placed at the edge.

Photo 1. Fourth Cliff, 2016

More of the road has collapsed in Photo 2 (2017), the road discontinued and the RV sites rendered unusable.

Photo 2. Fourth Cliff, 2017

By December 2018 (Photo 3), cliff erosion had destroyed the remainder of the road.

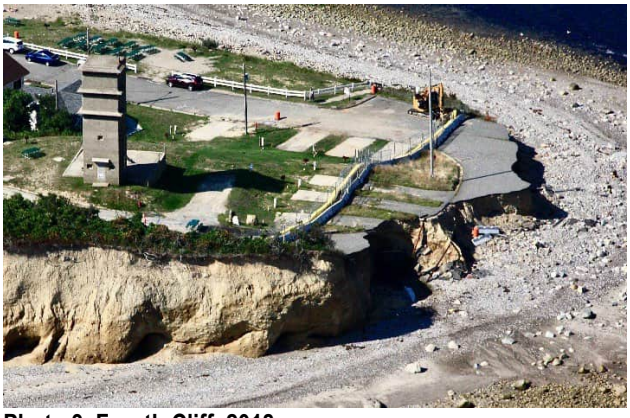

Photo 3. Fourth Cliff, 2018

Figure 1-1: USGS Locus Map

Source: MassGIS, Commonwealth of Massachusetts, Information Technology Division: USGS Cohasset, MA 7.5 MinuteTopographic Quadrangle

U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 500 1,000 2,000
Feet

FIGURE 1-1

FEB 2023

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Existing Conditions Fourth Cliff_ toe.mxd

Figure 1-2: Fourth Cliff Existing Conditions-Toe

U.S. AIR FORCE

FOURTH CLIFF RECREATIONAL AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

NOT TO SCALE

FIGURE 1-2

FEB 2023

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Existing Conditions Fourth Cliff_ toe close up.mxd

Figure 1-3: Fourth Cliff Existing Conditions-Toe Closeup

U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

NOT TO SCALE

FIGURE 1-3

FEB 2023

Figure 1-4: Fourth Cliff Existing Conditions-East Bank

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FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

NOT TO SCALE

FIGURE 1-4

FEB 2023

Location: \\BOSFIL111\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Existing Conditions Fourth Cliff_ East Bank.mxd

Figure 1-5: Fourth Cliff Existing Conditions-East Bank Closeup

U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

NOT TO SCALE

FIGURE 1-5

FEB 2023

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Existing Conditions Fourth Cliff_ East Bank close up. mxd

1.2 Purpose of the Action

The Proposed Action is to evaluate options to address historic and on-going coastal erosion at the storm-threatened Fourth Cliff Recreation Area, in light of the DAF's responsibility to be a good steward of its real property assets.

The purpose of the proposed action is threefold:

1. Ensure that military service members, their families, and affiliated personnel are not subjected to unsafe or degraded conditions.

2. Protect and/or preserve DAF-owned NRHP-eligible historic structures on the property.

3. Resolve impacts related to shoreline erosion as a result of major storms, assuming the DAF continues to retain ownership of the property.

1.3 Need for the Action

Erosion at Fourth Cliff is beginning to threaten nearby structures. The exposed east and north faces of Fourth Cliff are experiencing significant erosion and a portion of the west side has been affected in recent years. Erosion at Fourth Cliff is primarily caused by wave breaking forces from significant storm events and wave runup, particularly at the north tip area. In 2021, the cliff continued to erode without experiencing the effects of a major storm and severe wave action. Sheeting rainfall may also play a role in the erosion of the bank, particularly at the east bank. The ongoing erosion is damaging portions of the DAF-owned road, utilities, coastal bank, parking area, camping area, picnic area, stairway, and fencing

The erosion is resulting in the following unacceptable conditions:

- Unsafe conditions for users of the site;
- Threats to the stability of the NRHP-eligible historic properties, one of which is about 20 feet from the edge of the cliff; and,
- Infrastructure failures and increasingly costly repair and maintenance of the facility by the DAF.

Therefore, the Proposed Action is needed to address existing safety concerns and threats to infrastructure at Fourth Cliff caused by erosion.

1.4 Coordination and Consultation

Federal, state, and local agencies with jurisdiction that could be affected by the alternatives were notified and consulted during development of this EA and the draft EA in 2019. Appendix A contains the list of agencies consulted and copies of correspondence.

1.4.1 Interagency, Intergovernmental and the Public

The DAF provided initial scoping letters to federal and state agencies and other interested stakeholders during preparation of the EA in 2019. These letters requested that any issues or concerns relevant to the Proposed Action be provided prior to completion of the EA. Each letter included a notification that recipients could continue to comment throughout the development of the EA and during the EA public review period. Scoping input received helped expand the selection criteria for alternatives. Selected stakeholders received an updated Preferred Alternative with updated project elements in March 2022.

Informal consultation with the U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA), Massachusetts Natural Heritage and Endangered Species Program (NHESP), Massachusetts Office of Coastal Zone Management (CZM), and the Massachusetts Historical Commission (MHC) (State Historic Preservation Office [SHPO]) was done early in the process via regular

mail and email. The Proposed Action would permanently impact very-high-risk, high-risk flood zone, and coastal wetlands triggering public notice per Executive Order (EO) 11988, "Floodplain Management," and EO 11990, "Protection of Wetlands."

The DAF filed an Environmental Notification Form (ENF) for the Massachusetts Environmental Policy Act (MEPA) (Massachusetts General Law (M.G.L. c. 30 §§ 62–62L) May 31, 2022, and sent copies to 30 stakeholders soliciting comment. The ENF Proposed Action's three-phase approach was introduced in the ENF and Supplemental Information, with review open for 50 days. The ENF described and reviewed the features and impacts of Phase 1 (repair the road, improve pedestrian circulation across the peninsula and clean up the damaged cliff tip) and future Phases 2 and 3 (implement measures to address the cliff erosion using a cobble berm with a vegetated bluff) when funding becomes available. A virtual public consultation session on June 16, 2022, was attended by 10 stakeholders and included a video showing the current conditions at the site and a review of three proposed phases of work.

This EA incorporates comments and input from the 2019 EA effort, 2022 ENF comments and the Executive Office Energy and Environmental Affairs Secretary's Certificate on the ENF issued August 8, 2022.

The DAF published a Notice of Availability (NOA) of the draft EA and the draft FONSI in *The Patriot Ledger* on February 15, 2023. Comments were received through _____. The draft EA and draft FONSI were sent to potentially interested federal, state, and local agencies, as well as potentially interested Native American tribes.

1.4.2 Government to Government

The National Historic Preservation Act (NHPA), and its implementing regulations (36 CFR Part 800) direct federal agencies to consult with Native American tribal governments to identify and resolve impacts to properties of religious and cultural significance that are on or eligible for the NRHP. Hanscom AFB consulted with the Mashpee Wampanoag Tribe, the Wampanoag Tribe of Gay Head (Aquinnah), and the Narragansett Indian Tribe, federally recognized Native American tribes who are culturally affiliated with the Fourth Cliff area to obtain this information. The tribal governments that were consulted are listed in Appendix A. Hanscom AFB consulted with federally recognized Native American tribes in Hanscom AFB's geographic region via letter seeking properties of cultural, historic or religious significance to the tribes. The Native American tribal governments that were consulted are listed in Appendix A.

1.5 Regulatory Framework

Table 1-1 presents the federal and state statutes, EOs, and regulations that are potentially applicable to the alternatives analyzed.

Table 1-1. Relevant Federal and State Statutes, Executive Orders, and Regulations

Resource Area	Statute, Executive Order, or Regulation	State or Federal
Water Resources	Federal Water Pollution Control Act (Clean Water Act [CWA]) amended 1972, Section 404, 33 U*nited States Code* (U.S.C.), et seq.	Federal
	National Pollutant Discharge Elimination System, 40 *Code of Federal Regulations* (CFR) 122	Federal
	Coastal Zone Management Act, 16 U.S.C. §§ 1451, et seq. and M.G.L. c. 21A § 2, 4	Federal and State
	U.S. Coast Guard Construction Coordination	Federal
	EO 11988, "Floodplain Management," amended by EO 13690	Federal
	EO 11990, "Protection of Wetlands," 1977	Federal
	Massachusetts Wetlands Protection Act, 310 CMR § 10.00	State
	EO No. 181, "Barrier Beaches"	State
	CWA 401 Water Quality Certificate, M.G.L. c. 21, §§ 26–53	State

Table 1-1. Relevant Federal and State Statutes, Executive Orders, and Regulations

Resource Area	Statute, Executive Order, or Regulation	State or Federal
Biological Resources	Endangered Species Act of 1973 (ESA), Section 7, 16 USC §§ 1531, et seq.	Federal
	Massachusetts Endangered Species Act, M.G.L. c. 131A	State
	Migratory Bird Treaty Act (MBTA), as amended, 16 U.S.C. §§ 703–712	Federal
	Marine Mammal Protection Act, amended 1994, 16 U.S.C. §§ 1361–1407	Federal
	Magnuson-Stevens Fishery Conservation and Management Act, 1976, 16 U.S.C. § 1801	Federal
	Coastal Barrier Resources Act consultation, (16 U.S.C. 3501 et seq.)	Federal
Cultural Resources	Section 106 of the National Historic Preservation Act (NHPA) of 1966 , as amended, 36 CFR 800	Federal
	Archaeological Resources Protection Act (ARPA)	Federal
	EO 11593, “Protection and Enhancement of the Cultural Environment”	Federal
	EO 13175, “Consultation and Coordination with Indian Tribal Governments”	Federal
	Underwater Archaeological Resources, M.G.L. c. 6, §§ 179 and 180	State
Safety and Occupational Health	EO 13045, “Protection of Children from Environmental Health Risks and Safety Risks”	Federal
	Occupational Safety and Health Act, 29 U.S.C. §§ 651, et seq. of 1970	Federal
Environmental Justice	EO 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”	Federal
Hazardous and Toxic Materials	Pollution Prevention Act, P.L. 101-508, 42 U.S.C. §§ 13101–13109 of 1990	Federal
	EO 12088, “Federal Compliance with Pollution Control Standards”	Federal
Various	National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §§ 4321, et seq.	Federal
Various	Massachusetts Environmental Policy Act, M.G.L. c. 30, §§ 61–62L	State

Table 1-2 lists applicable state and federal permits, reviews, or licenses that could be required if the Proposed Action is undertaken. If the Divestiture Alternative or No Action Alternative is selected, these permits would not be required. Those with asterisk (*) are anticipated in Phases 2 and 3 only.

Table 1-2. Potential Permits, Reviews, or Licenses

Potential Permits or Reviews	Permit or Review	Issuing or Reviewing Agency
Federal Water Pollution Control Act (CWA) amended 1972, § 404, 33 U.S.C., et seq. *	Permit	U.S. Army Corps of Engineers (USACE)
National Pollutant Discharge Elimination System, 40 CFR 122	Permit	U.S. Environmental Protection Agency (EPA)
U.S. Coast Guard Construction Coordination *	Review	U.S. Coast Guard
Coastal Zone Management Act, 16 U.S.C. § 1451, et seq. and M.G.L. c. 21A § 2, 4	Review	CZM
Coastal Barrier Resources Act consultation, (16 U.S.C. §§ 3501 et seq.) *	Review	USFWS
Massachusetts Wetlands Protection Act, 310 CMR 10.00	Permit	Scituate Conservation Commission
Clean Water Act § 401 Water Quality Certificate, M.G.L. c. 21, §§ 26–53 *	Permit	Massachusetts Department of Environmental Protection
ESA Section 7, 16 U.S.C. §§ 1531, et seq. *	Review	USFWS National Marine Fisheries Service (NMFS)
Marine Mammal Protection Act, amended 1994, 16 U.S.C. §§ 1361–1407 *	Review	NMFS

Table 1-2. Potential Permits, Reviews, or Licenses

Potential Permits or Reviews	Permit or Review	Issuing or Reviewing Agency
Massachusetts Endangered Species Act, M.G.L. c. 131A	Review	NHESP, Massachusetts Division of Fisheries and Wildlife (MassWildlife)
MBTA, as amended, 16 U.S.C. §§ 703–712 *	Review	USFWS
Section 106 of the NHPA of 1966, as amended, 36 CFR Part 800	Review	DAF/SHPO
Underwater Archaeological Resources, M.G.L. c. 6, §§ 179 and 180	Review	Board of Underwater Archaeological Resources, Executive Office of Energy and Environmental Affairs
National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. §§ 4321, et seq.	Review	DAF
Council on Environmental Quality *Regulations for Implementing the Procedura Provisions of NEPA*, 40 CFR §§ 1500–1508	Review	DAF
Environmental Impact Analysis Process (EIAP), 32 CFR § 989	Review	DAF
Massachusetts Environmental Policy Act, M.G.L. c. 30, §§ 61–62L	Review	Executive Office of Energy and Environmental Affairs

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2 Description of the Proposed Action and Alternatives

2.1 Selection Standards for Alternatives

The NEPA and the CEQ regulations mandate the consideration of reasonable alternatives for the Proposed Action. Reasonable alternatives are those that are technically and economically feasible, meet the underlying purpose of and need for the Proposed Action, and would cause a reasonable person to inquire further before choosing a particular course of action. Selection standards are specific operational, technical, or environmental criteria that are used to focus the impact analyses, help develop reasonable alternatives, and help eliminate those not satisfying the purpose and need for the Proposed Action.

The following standards were used to evaluate alternatives:

- Resolve current safety concerns associated with Department of Defense (DoD) personnel, dependents, and retirees' use of the site.
- Comply with the Massachusetts Office of Coastal Zone Management (CZM) and Massachusetts Department of Environmental Protection (MassDEP) 2017 guidance document: "Applying the Massachusetts Coastal Wetlands Regulations: A Practical Manual for Conservation Commissions to Protect the Storm Damage Prevention and Flood Control Functions of Coastal Resource Areas," (Coastal Manual) in particular:
  - Do not reclaim land already lost to erosion;
  - Minimize construction of hard structures along the coastal bank;
- Satisfy the DAF obligations under the National Historic Preservation Act by ensuring the long-term preservation of the three historic facilities at Fourth Cliff; and
- Ensure maintenance requirements over the next 50 years do not impact habitat and create other negative impacts.

Resources have not been committed prejudicing the consideration of reasonable alternatives.

2.2 Proposed Action

The Proposed Action for this undertaking is to ensure safety for DoD affiliate personnel and address threats to historic properties and infrastructure. Following identification of the Proposed Action, the DAF developed a set of Selection Standards to aid in creating reasonable alternatives for the Proposed Action. The DAF is responsible for developing a full range of reasonable alternatives, in accordance with 40 CFR § 1502.14 and 32 CFR § 989.8.

2.2.1 Alternatives Eliminated From Further Consideration

In 2019, the DAF considered a number of coastal engineering techniques or alternatives to stabilize the bank including nature-based solutions, bulkhead wall, geotextile tubes, and riprap revetment with vegetated slope.

Nature-based Solution: Beach nourishment would establish a wider and higher elevation beach at Fourth Cliff to force incoming waves to break farther offshore, thereby reducing wave damage to the toe of the cliff during storm events. Beach nourishment would involve the placing of sand along the 1,300-foot length of Fourth Cliff's beach and repeating as necessary when the beach is washed away during storm events. The sand would likely be hydraulically pumped onto the beach and spread by mechanical equipment to design elevations and contours. Approximately 75,000 c.y. of sand would be required along the 1,300-foot stretch of beach, which would create a level berm 50 feet wide at an elevation of 10 feet.

Beach nourishment would protect the toe of the cliff face from wave runup but would not protect the exposed cliff face from erosion due to sheeting rain during storm events. In addition, beach nourishment

would provide only a short-term solution to ongoing erosion at Fourth Cliff, as it is not uncommon for berms placed during beach nourishment efforts along the Atlantic coast to be entirely lost during a single, large storm event. Therefore, this method would not meet the selection standards as established by the DAF to provide a long-term solution to reduce erosion with reasonable maintenance needs that would not cause other impacts. For these reasons, the beach nourishment alternative was eliminated from further analysis.

Vertical Bulkhead: A vertical bulkhead wall would be built in front of the cliffs parallel to the shoreline. The wall would be backfilled with sand and vegetation and would be planted on the landward side of the wall. The wall creates an armored shoreline. Hardening can interrupt natural shoreline processes, eliminate nursery habitat for marine species and foraging habitat for wading birds, and degrade water quality. Additionally, wave energy that encounters a seawall is not absorbed and attenuated, but is reflected. This redirection results in the unintended consequence of erosion at the toe of the wall and scouring of the seafloor (U.S. Environmental Protection Agency [EPA], 2009a). This scouring action can prevent vegetative growth, destroy habitat of fish, birds, and invertebrates, and even undermine the wall.

The Coastal Manual (CZM and MassDEP, 2017) rejects use of coastal engineering and other structures that could alter adjacent beaches and banks by increasing erosion. For these reasons, the vertical bulkhead wall alternative was eliminated from further analysis.

Geotextile Tubes: A geotextile tube revetment would be built up to protect the cliff toe along the length of the Fourth Cliff in the offshore region. Geotextile tubes are sediment-filled sleeves of heavy-duty geotextile fabric that are placed on a fabric scour apron with sediment-filled anchor tubes along each edge. The tubes are filled with a slurry of water and sediment. Water seeps from the geotextile fabric, leaving the sediments entombed in the sleeve. The tubes would be put in front of the cliff toe and the crest elevation would be +20 feet North American Vertical Datum of 1988 (NAVD88). The tube alternative would have approximately a 20-year return period.

This alternative would protect the toe of the cliff face from wave runup but it would not protect the exposed cliff face. Therefore, this alternative would not meet the selection standards as it would not protect the historic tower, and maintenance requirements over the long term could affect sediment transport, beach access, habitat etc. This alternative was eliminated from further analysis.

Riprap Revetment with Vegetated Slope: Approximately 1,300 l.f. of coastal bank would be regraded to install a composite shore protection structure. It would extend from near the southeastern corner of the Fourth Cliff property, northward along the eastern cliff face, and around the northern tip of Fourth Cliff. The composite structure would be placed as far landward as possible using a riprap revetment with a 1.5:1 slope topped with a reduced-slope vegetative cover and drainage improvements. The structure would extend seaward below the mean high water line (MHW).

The existing, irregular slope of the coastal bank would be smoothed and a riprap revetment constructed at the toe of the slope. The revetment would consist of armor stone weighing between 4 and 7 tons and an underlayer of stones weighing between 600 and 1,000 pounds and smaller core stones. The structure is designed to protect from waves during a 100-year storm condition.

A 4-inch layer of topsoil would be placed on a reduced slope above the riprap and seeded. An organic erosion control mat would be placed atop the seeded topsoil. Once grass was established, low-profile, woody shrubs would be planted for further protection. The Coastal Manual (CZM and MassDEP, 2017) rejects use of coastal engineering and other structures that could alter adjacent beaches and banks by increasing erosion. Although this method would meet the purpose of and need for the Proposed Action, it would not comply with 310 CMR 10.30(3) and guidance in the Coastal Manual. Comments from CZM, MassDEP, National Park Service, Massachusetts Division of Fisheries and Wildlife, Scituate Conservation Commission and Scituate Coastal Management Office encouraged employing a solution that would be less likely to cause sediment transfer that could potentially impact habitat. Coastal Manual performance standards discourage locating coastal engineering structures seaward of the existing bank to reclaim eroded land. Further, they call for locating coastal engineering structures as far landward as possible to minimize interaction with waves and tides and require that structures not extend farther

seaward than the existing toe of the bank. This alternative would not meet the selection standards due to its incompatibility with CZM guidance and MassDEP regulations. For these reasons this alternative was eliminated from further analysis.

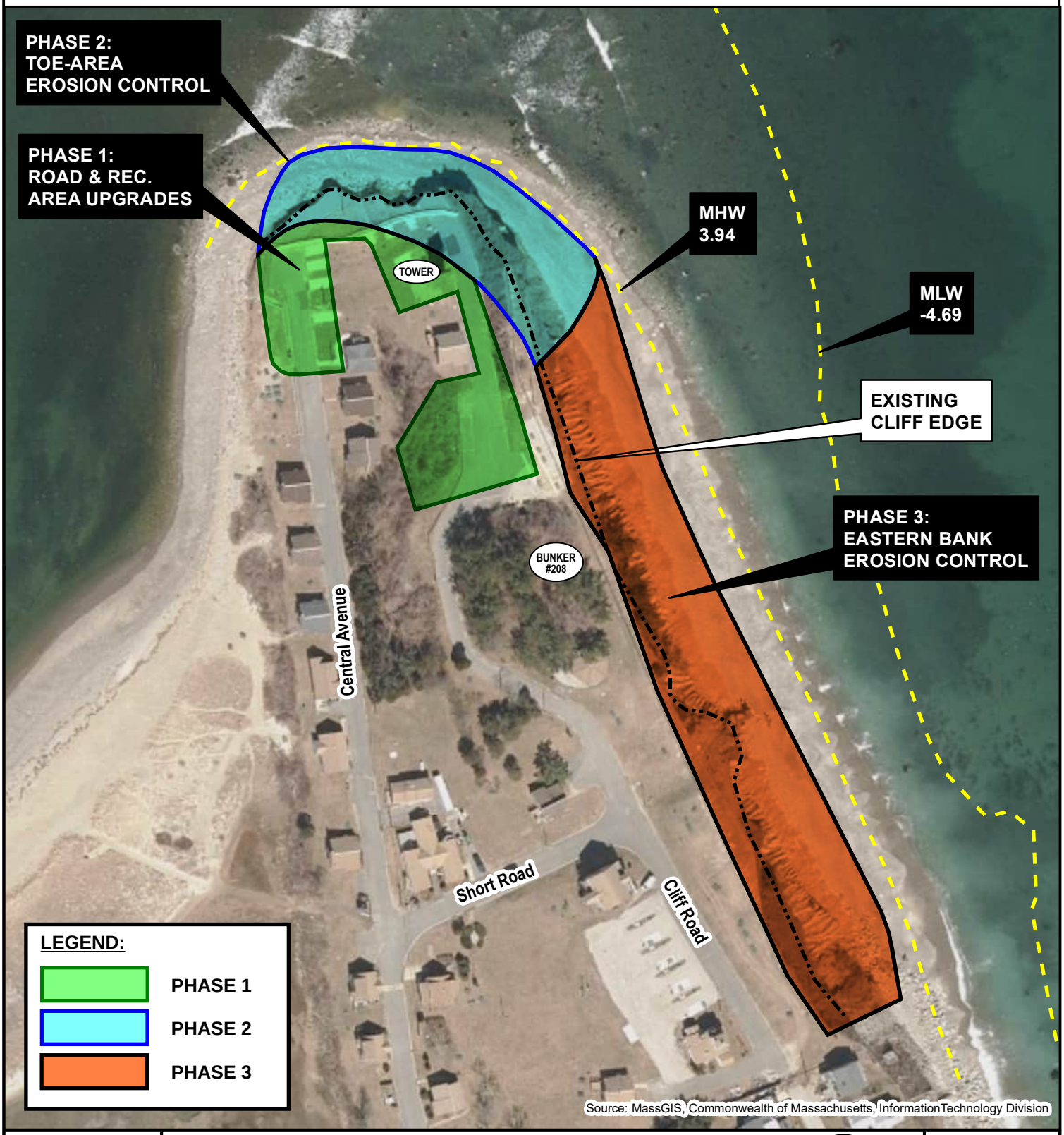
2.2.2 Alternatives Analyzed in this EA

Following this analysis, two alternatives were identified as meeting the selection criteria and were evaluated in this EA. These include retreat, repair, and stabilize Fourth Cliff coastal property (Alternative 1). Alternative 2 analyzes the DAF's divestiture of its ownership interest in the property. Although the "No Action Alternative" does not meet all the Selection Standards and does not satisfy the purpose and need for the Proposed Action, it is also evaluated in this EA as required by NEPA. Both action alternatives and the No Action Alternative are described in detail below.

2.3 Alternative 1 (Preferred Alternative) — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

The key principle embedded in this alternative is that of retreat, which can be defined as the "voluntary movement and transition of people and ecosystems away from vulnerable coastal areas" (Georgetown Climate Center). This alternative involves repairing and stabilizing the Fourth Cliff coastal bank to protect the DAF assets and visitors in a manner that minimizes adverse effects to coastal resources. The alternative acknowledges that the Fourth Cliff Recreation Area activities will eventually have to be relocated as the cliff continues to erode, even if the proposed repairs are implemented. This alternative would be implemented in three phases depending on the availability of resources (Figure 2-1). Cross sections are shown in Figure 2-2.

Figure 2-1: Cliff Stabilization and Road Phasing



Location: P:\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\UPDATED3_Fourth Cliff_Cliff stabilization with composite structure.mxd

U.S. AIR FORCE

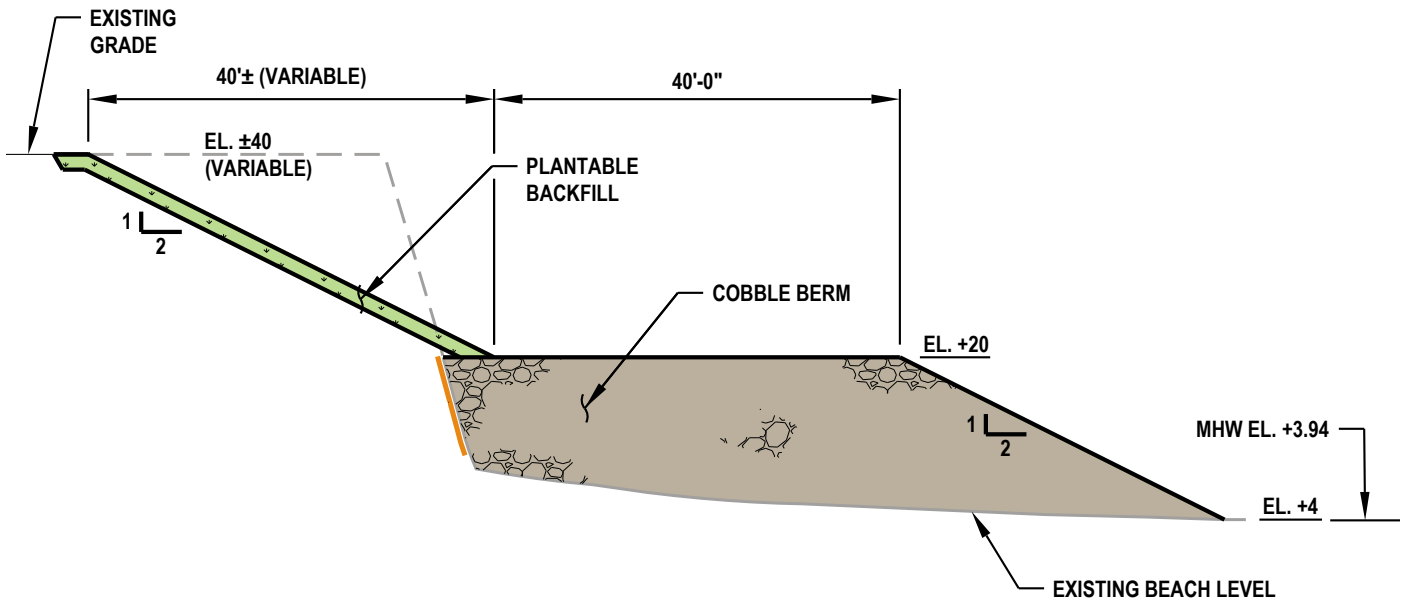
FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 30 60 120
Feet

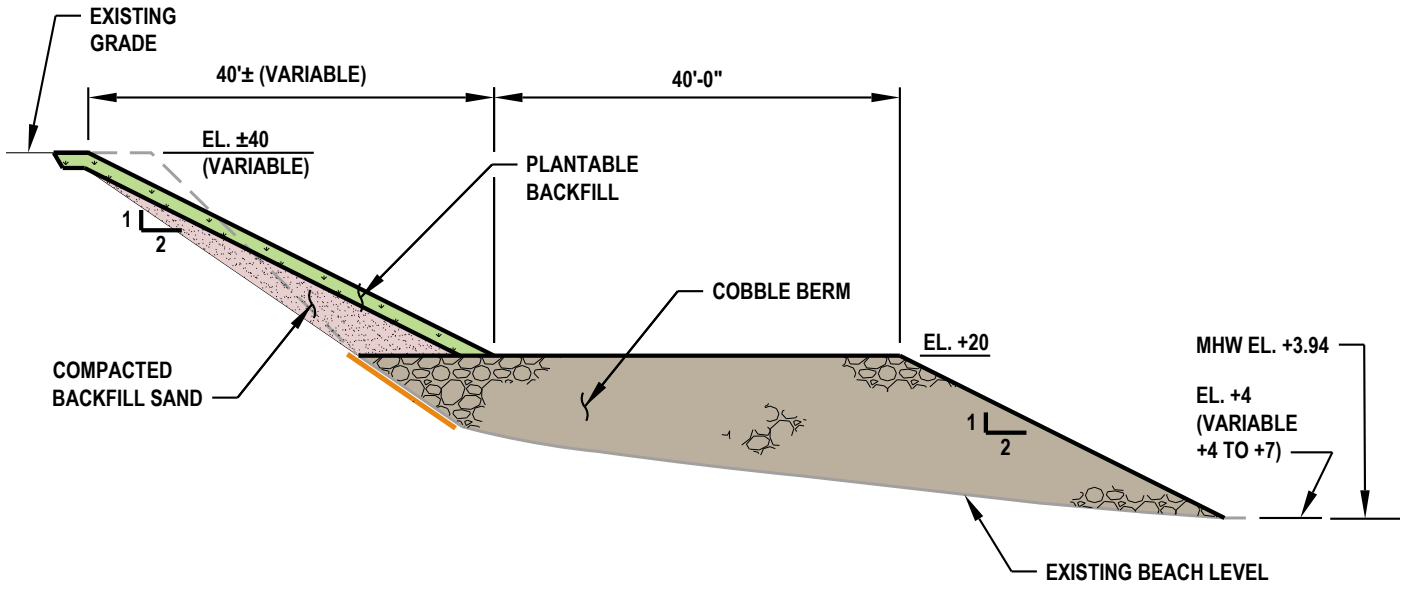
FIGURE C

FEB 2023

Figure 2-2: Proposed Cross Sections, Fourth Cliff



SECTION A - TYPICAL ROUNDHEAD SECTION (NORTH TIP)
COBBLE BERM AND VEGETATED BLUFF



SECTION B - TYPICAL SECTION
COBBLE BERM AND VEGETATED BLUFF

U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

FIGURE 2-2

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Alternative 1 would implement stabilization of the Fourth Cliff coastal bank, cut and vegetate the top of the bank above 20 feet NAVD 88, and repair recently damaged infrastructure in three phases. The elevation of +20 feet is the approximate value of the calculated 100-year wave runup height plus 1 foot.

Phase 1 would include a number of projects that would address the damage to the roadway caused by the erosion and improve a number of amenities and facilities for Active Duty Military, Reservists, Retirees, DoD Cardholders, and their families. The repairs and infrastructure improvements included in Phase 1 are currently in design development. Design of Phase 2, the erosion control measures at the tip, and Phase 3, the eastern bank erosion control measures, will begin sometime in the future as funding becomes available. The assessment of impacts and benefits of the complete project is based on 65% design plans for Phase 1 and concept plans for Phases 2 and 3. Design for Phases 2 and 3 will not begin until funding has been allocated for the design and construction of projects. Due to the continuous erosion and the changes to the cliff and beach, any design documents developed too far in advance may become obsolete.

The DAF will prepare a Supplemental EA when Phases 2 and 3 are funded and designed. At those times, the DAF will provide design plans at 30% or greater and will prepare detailed and quantified analysis of impacts to resource areas, habitat, etc.

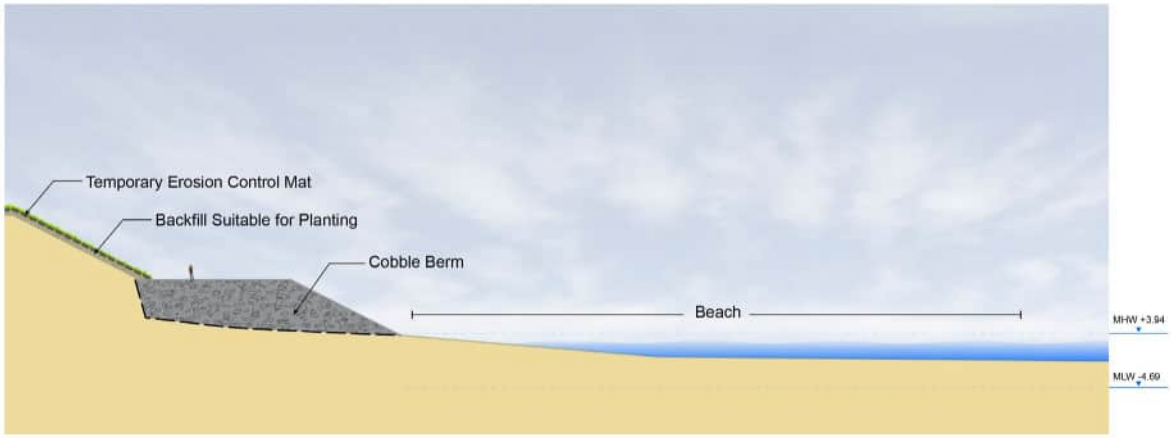
Phase 1, road repair and circulation improvements:

- Construction will occur 5’ to 10’ inland from the edge of the cliff. The edge of the cliff, the coastal bak and the coastal beach will not be touched during this phase. All construction activities and construction vehicles will be on the top of the cliff and inland from the edge of the cliff within the Phase 1 project area.
- Pavement sawcut and removal of approximately 4,000 s.f. of existing asphalt and 120 feet of concrete curb will occur. The sawcut and removal of pavement will occur 10’ from the edge of the cliff with only the pavement inland being removed. Debris on the beach and on the cliff wall will not be addressed in Phase 1 to avoid impacting the coastal bank and beach. The DAF, through separate consultation and permitting with Scituate, may remove the debris on the beach in 2023 at the completion of the Phase 1 work.
- Remove three severely damaged recreational vehicle (RV) sites at the tip and the RV site next to the tower, and an RV site on the west roadway;
- Improve three RV sites on the east side near the bunker with resurfaced asphalt while maintaining the historic pavement on which the coastal defense system’s six-inch guns, carriage and enclosure were located;
- Truncate Cliff Road north of the bunker area to terminate as a turnaround;
- Build a new gravel fire truck access turnaround on the eastern side;
- Add five standard parking spaces, two van accessible ADA parking spaces, and three parallel parking spaces on Cliff Road (three for maintenance vehicles);
- Add five open-graded aggregate standard parking spaces near the bath house,
- Add one ADA van accessible parking space
- Create new pedestrian paths near the tip of the site and around to the west of the site;
- Relocate a light pole near the tip of the cliff to closer to the pedestrian path;
- Build a short, low knee wall inland of RV sites 9, 10, and 11 for required fire truck turnaround;
- Upgrade the overhead and underground electrical infrastructure. Utilities no longer in service will be removed or abandoned in place; and
- Install a grass-lined swale along the cliff side of the pedestrian path with a settlement pond for stormwater management.

Phase 2 would stabilize the most severely impacted area of the Fourth Cliff coastal bank, approximately 450 linear feet at the tip of the peninsula, and build a new, accessible wood ramp and stairs to the beach on the west side. The erosion-control work would cut and vegetate the top of the bank above 20 feet NAVD 88. In accordance with the Massachusetts Office of Coastal Zone Management (CZM) and Massachusetts Department of Environmental Protection (MassDEP) manual, "Applying the Massachusetts Coastal Wetlands Regulations: A Practical Manual for Conservation Commissions to Protect the Storm Damage Prevention and Flood Control Functions of Coastal Resource Areas" (CZM and MassDEP, Coastal Manual) and CZM guidance, the proposed erosion-control system would be designed to minimize impacts to the coastal bank. The system would use a cobble berm for shoreline protection at the toe of the cliff at a 1:2 slope or slightly less steep and soft erosion control measures on the cliff face. The proposed cobble berm would be made of rocks larger than pebbles but smaller than boulders (2.5 inches to 10.0 inches in diameter). The proposed vegetated bluff would include natural-fiber mats and topsoil with salt-tolerant, native vegetation. The design includes long-term monitoring and a sediment replenishment program that may help adjacent habitat. The proposed structure would address concerns identified previously through discussions with the public and regulatory agencies, including the Scituate Conservation Commission, MassDEP, and CZM.

Phase 3 would stabilize the rest of approximately 700 l.f. of the eastern-facing bank of Fourth Cliff. The proposed erosion-control system would be the same as is proposed at the tip of the peninsula (second phase).

The DAF is committed to maintaining the Fourth Cliff facility for its personnel and families. The intent of the DAF is to implement phases 1, 2 and 3 in a reasonable timeframe, addressing elements sequentially as funding is made available. While a number of proposed improvements and projects are listed, funding constraints could delay implementation of some projects. If the DAF is unable to complete the projects identified in this EA within five years of the Finding of No Significant Impact being signed, the DAF will review the circumstances at the site at that time and will prepare a Supplemental EA to update the proposed action, if warranted.



2.4 Alternative 2 — Divestiture of the Property

Alternative 2 involves the DAF declaring the DAF-owned Fourth Cliff Recreation Area as excess property and proceeding to divest its ownership interest in the facility. "Excess" real property in the DAF is real property that has been screened within the DAF and with other military departments and defense agencies and that is excess to Department of Defense requirements (AFI 32-9004, Disposal of Real Property). If this decision were made, the DAF would follow the approved DAF process for excessing real property (40 SCUSC Subtitle I, Federal Property and Administrative Services and E.O.3327, "President's Asset Management Initiative"). The DAF disposes of real property by seeking public entities to acquire the property before it will consider selling to private organizations or individuals. Other DoD organizations are solicited first; followed by other federal departments, agencies, or activities, state and local agencies and finally, private organizations or individuals. Disposing of the property could take 24 months to 36 months,

depending on the complexity of facility disposal. In the event no DoD agencies are interested in the property, the General Services Administration is typically engaged to facilitate the transfer.

The DAF would be responsible for preparing an environmental baseline study to document potential environmental concerns. Regarding historic and cultural resources at the site, in the event of transfer out of Federal ownership, the DAF would endeavor to protect/mitigate resources listed in a local historic district or listed or eligible for listing in the National Register of Historic Places resources (36 CFR Part 800). Mitigation measures could include deed restrictions, data collection, photo documentation or other terms in property transfer or conveyance documents and would be conducted in coordination with the Massachusetts State Historic Preservation Office. In addition, future owners would undertake their own planning and environmental review processes.

2.5 No Action Alternative

The EIAP (32 CFR § 989.8(d)) requires consideration of the No Action Alternative. In addition, CEQ guidance recommends inclusion of the No Action Alternative in an EA to assess environmental consequences that may occur if the Proposed Action is not implemented. The No Action Alternative also provides a baseline against which the Proposed Action can be compared.

Under the No Action Alternative, the DAF would not address the shoreline erosion and continuing storm damage at Fourth Cliff. The No Action Alternative would continue with periodic maintenance on an as-needed basis, resulting in no change to the status quo. A long-term solution to address shoreline erosion would still be needed. The Fourth Cliff Recreation Area would continue to sustain damage, and the asset's existing roadway, parking, camping area, picnic area and fencing would be impacted. Continued erosion would eventually threaten the stability of the historic bunker and the stability of the northern observation tower. This alternative does not meet the purpose and need for the Proposed Action, but is retained in this analysis as required by NEPA.

2.6 Comparison of Alternatives

The DAF evaluated the alternatives considered and screened out four that did not satisfy the Selection Standards. Although the Standards are not weighted, alternatives that are not consistent with CZM policies and Massachusetts regulations were eliminated because the likelihood of being approved and receiving permits are very low. The DAF concluded that the alternative, Retreat, Repair, and Stabilize Fourth Cliff Coastal Property, meets the purpose of and need for the Proposed Action. Retreat, Repair, and Stabilize Fourth Cliff Coastal Property is therefore the DAF's Preferred Alternative

The analysis of considered approaches that meet the current purpose and need for the Proposed Action includes suggestions that various governmental agencies and members of the public recommended be considered during the previous EA drafted in 2019. Those suggestions are listed below along with criteria for assessing their ability to meet the current purpose and need for the Proposed Action.

Table 2-1: Summary of Alternatives

	Alternatives						
Selection Standard	**Nature Based**	**Vertical Bulkhead**	**Geotextile Tubes**	**Riprap Revetment with Berm**	**Retreat and Repair***	**Divest Property***	**No Action***
Safety							
Coastal Manual Consistency							
No reclamation							
Minimize hard structures							
Protect historic structures							
Storm Survivability/ Resiliency							

Notes:

*Alternative analyzed in this EA

= Meets project purpose and need
= Partially meets purpose and need
= Does not meet or is unlikely to meet purpose and need

Evaluation Criteria Explained

Safety

Fully resolves the risk of exposing of DAF personnel and authorized users of Fourth Cliff to safety issues related to the continued erosion of the cliff.

N/A.

Does not fully resolve the risk of exposing of DAF personnel and authorized users of Fourth Cliff to safety issues related to the continued erosion of the cliff.

Coastal Manual Consistency

Fully compliant with the guidance listed.

Partially compliant with the guidance, but possible to obtain a waiver.

Not compliant with the guidance and highly unlikely that obtaining a waiver is possible.

Protect Historic Structures

Reasonably expected to satisfy the DAF's obligation to protect DAF-owned historic properties under the National Historic Preservation Act (NHPA) over the medium-term (25+ years) or long-term (50+ years).

Reasonably expected to satisfy the DAF's obligation to protect DAF-owned historic properties under the National Historic Preservation Act (NHPA) over the short-term (10-25 years)

Unlikely to result in any effective protection of DAF-owned historic properties and addressing risk to those properties remains DAF obligations.

Able to Survive Storms/Resiliency

Predicted life span is approximately 50 years

Predicted life span is approximately 25 years

Predicted life span is approximately 5 years to 10 years

3 Affected Environment

This section describes the existing conditions of environmental, cultural, and socioeconomic resources that could be affected if the Proposed Action or the No Action Alternative was implemented at Fourth Cliff. Information gathered from site visits, research, and existing documentation was used to characterize the existing environment. This information provides a baseline from which potential direct, indirect, and cumulative impacts are identified that could result from implementing the Proposed Action or the No Action Alternative.

3.1 Socioeconomics

3.1.1 Definition of Resource and Regulatory Framework

Socioeconomic resources are defined as the basic attributes associated with the human environment, particularly population and economic activity. Population is described as the magnitude, characteristics, and distribution of people. Economic activity is described in terms of employment distribution, personal income, and business growth. The human environment includes the natural and physical environment and the relationship of people with that environment, including recreational and public use of the land (CEQ, 1978).

Socioeconomic impacts would be considered significant if the Proposed Action would result in a substantial shift in population trends or notably affect regional employment, earnings, or community resources.

3.1.2 Existing Environment

Scituate's population (2021 estimate, USCB) is 19,185 and there are about 12,988 members of the civilian labor force. At Fourth Cliff itself, about 25 people (about 20 part-time) are employed from May to August. Staffing levels drop between September and April to about four full-time and three part-time employees.

No shifts in population would occur due to the Preferred Alternative, and the project would require approximately 40 construction workers, expected to be available from the immediate region. This would result in minor, short-term, temporary benefits to the local economy through the generation of incidental expenditures by construction workers and any purchases of local materials and supplies. Most materials and supplies that would be needed for the Preferred Alternative would be available in the region, arriving primarily by barge and some by truck. Therefore, impacts to socioeconomic resources under the Preferred Alternative would be beneficial, short-term, and minor. There would be no adverse socioeconomic impacts.

The Divestiture Alternative would likely result in the loss of jobs for about 25 people (about 20 part-time) during the busy season and four full-time and three part-time employees in the off season. This number of jobs lost would result in a minimal change in the local economy. No construction jobs would be created. Under the No Action Alternative, the status quo would continue and there would be minimal loss of jobs. No construction jobs would be created. Therefore, socioeconomic resources are not considered further in this EA.

3.2 Transportation

3.2.1 Definition of Resource and Regulatory Framework

Transportation and associated traffic resources generally include the roadway and the street systems surrounding the affected environment.

3.2.2 Existing Environment

Access to Fourth Cliff is via Marshfield, a town of 25,869. Two bridges connect Marshfield to Scituate. The Massachusetts Department of Transportation bridge inspection reports (2017-2021) indicate both bridges are in good condition. Sea Street (Bridge AQD) is owned by Marshfield and Scituate and was built in 2010. Its condition is "good to very good" and has no weight restrictions. Julian Street (Bridge B30) is owned by Marshfield and Scituate and was built in 2010. Its condition is "good to very good" and has no weight restrictions. Central Avenue, a two-lane, two-way 50-foot-wide roadway owned by Scituate, is the primary access to Fourth Cliff. There is a sidewalk on the west side only. Central Avenue runs north-south on the west side of Humarock Peninsula. Central Avenue is shared by numerous year-round and seasonal homes along the peninsula.

Cliff Road parallels Central Avenue on the eastern side of Humarock Peninsula. Central Avenue and Cliff Road are connected by short, local, low-volume, streets—Short, Silver, and River Roads.

There are two gates to the property located on the eastern and western sides of the property at Cliff Road and Central Avenue, respectively. The gate on Cliff Road is permanently blocked off, prohibiting entry to the property at this gate. The gate on Central Avenue is the only way to enter the property.

Central Avenue has been discontinued at the northern tip of Fourth Cliff due to erosion that caused the roadway collapse. Short Road, a short connector roadway, is used by vehicles making a loop around Fourth Cliff. Traffic on Short Road, and Central Avenue and Cliff Road south of Short Road, is bi-directional.

The project area is at the dead end of the Humarock Peninsula. Central Avenue is a low-volume, two-lane paved road that serves Fourth Cliff, Humarock Village, Humarock Beach, and residential properties along Central Avenue, Cliff Road, and cross streets. Cliff Road is a low-volume, two-way roadway on the eastern side of the peninsula. These roads dead-end at the barricaded tip of the peninsula.

The Preferred Alternative would generate no local traffic. Most construction equipment, activities and materials delivery would be from a barge. Traffic using local roads would be primarily from construction workers who would park on DAF property. Approximately 25 construction workers would access the construction site at one time, resulting in a negligible increase in daily trips on the two bridges serving the peninsula and using local peninsula roads.

The Divestiture and No Action Alternatives would not result in impacts to transportation facilities.

Therefore, impacts to transportation were not analyzed further in this EA.

3.3 Hazardous Materials and Waste

3.3.1 Definition of Resource and Regulatory Framework

This section discusses hazardous materials used or stored where the Proposed Action would be implemented. As defined in 49 CFR §171.8, "hazardous material" is a "substance or material that the Secretary of Transportation has determined can pose an unreasonable risk to health, safety, and property when transported in commerce, and is designated as hazardous under 49 U.S.C. § 5103." For this EA, "hazardous material" refers to any item or agent (biological, chemical, or physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. By contrast, "hazardous waste" as defined by the Resource Conservation Recovery Act in 42 U.S.C. § 6903(5) is "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may—(A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

Issues associated with hazardous materials typically center around waste streams, underground storage tanks, aboveground storage tanks, and the storage, transport, use, and disposal of pesticides, fuels, lubricants, and other industrial substances. Improperly used materials can threaten the health and well-being of wildlife species, habitats, soil and water systems, and humans.

3.3.2 Existing Environment

Hazardous waste generated at Fourth Cliff comes from the normal operation and maintenance activities. Hazardous wastes, including adhesives, sealants, greases, waste paint and thinners, solvents, and corrosive cleaning compounds are transferred to the 90-day accumulation site, with final disposal off site.

All three alternatives would have no impact on hazardous materials. No hazardous materials have been identified within the project area. Therefore, hazardous materials are not considered further in this EA.

3.4 Environmental Justice

3.4.1 Definition of Resource and Regulatory Framework

EO 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires federal agencies to consider any potentially disproportionate human health or environmental risks their activities, policies, or programs may pose to minority or low-income populations. The EO also promotes nondiscrimination in federal programs affecting human health and the environment and ensures minority and low-income communities have access to public information and are given opportunities to participate in the decision-making process.

3.4.2 Existing Environment

Fourth Cliff recreational facilities are used by the DAF personnel and associates. The beach at Fourth Cliff is a public beach open to the public. Residents and others will benefit from the improvements. In terms of impacts to environmental justice populations, there are no low-income and minority populations present. The median household income in Scituate is $122,241 (USCB, American Community Survey, 2021), which is 31.5% higher than the Plymouth County median ($92,906); 2.6% of Scituate residents are described by the USCB as in poverty, compared to 7.2% of Plymouth County as a whole.

Scituate’s non-white population is about 7.5%, lower than the county non-white population (19.8%) (USCB, American Community Survey, 2021). As a result of this analysis, no disproportionately low-income or minority populations were identified.

EO 13045, “Protection of Children from Environmental Health Risks and Safety Risks,” states that each federal agency “(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.”

Scituate’s population of children under 18 years of age is similar to that in Plymouth County. According to the USCB American Community Survey, in 2021, about 18% of Scituate residents are under 18 years of age (USCB 2021), compared to about 21% in Plymouth County.

3.5 Air Quality, Greenhouse Gases and Climate Change

3.5.1 Definition of Resource and Regulatory Framework

The Clean Air Act and its amendments provide the primary basis for regulating air pollutant emissions. To prevent adverse health effects and protect public welfare, the EPA has established National Ambient Air Quality Standards (NAAQS) for certain pollutants, called criteria pollutants, which have been adapted verbatim by Massachusetts as state emission standards. These standards accompany a mandate for

each state to continually maintain attainment of or demonstrate progress toward attainment of the NAAQS. Areas in maintenance or nonattainment of the NAAQS are required to develop a State Implementation Plan (SIP) detailing commitments by which the state will attain the NAAQS for each violating pollutant.

The EPA has found that air quality in the area met the 1997 Ozone NAAQS. However, despite the Clean Air/Data Determination, the area retains the nonattainment status until the EPA approves a maintenance plan. “Orphan” nonattainment areas is a term the EPA and environmental groups have coined to describe areas which were designated attainment under the 2008 Ozone NAAQS, but they were never formally redesignated to attainment pursuant to 42 U.S.C § 7407(d)(3)€ for the 1997 Ozone NAAQS. Accordingly, Boston-Lawrence-Worcester (eastern Massachusetts), where Fourth Cliff is, meets the definition of an orphan area.

On February 16, 2018, the United States Court of Appeals for the District of Columbia Circuit issued a decision in the case *South Coast Air Quality Management District vs. EPA* that General Conformity applies to orphan areas. Fourth Cliff is in attainment for all other NAAQS. As such, an Air Quality EIAP Level II Quantitative Assessment of pollutant emissions related to the project using the DAF’s approved air quality assessment tool, Air Conformity Applicability Model (ACAM) was conducted. If the ACAM findings of the assessment indicate no significant impact to air quality, the findings are documented through the ACAM automated reports (see Appendix E) for inclusion in the overall EIAP document.

Climate change is associated with increases in average air temperature, changes in precipitation patterns and storm intensity. This change has been attributed to an excess of greenhouse gases (GHG), gases that trap heat in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) and hydrofluorocarbons. Carbon dioxide accounts for about 79% of all greenhouse gas emissions in the United States. Most of this comes from burning fossil fuels for energy and transportation. EO 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (2021) requires federal agencies to address actions taken in the previous four years that stymie efforts to reduce greenhouse gas emissions, among other things. The Energy Act of 2020 promotes modernizing and cleaning the United State energy network and the Inflation Reduction Act of 2022 provides incentives and funding to reduce emissions that contribute to greenhouse gases.

ACAM calculates criteria pollutants and GHG emissions for proposed DAF actions. ACAM calculates GHG emissions by converting them into one value known as a CO2 equivalent (CO_2e), using approved factors to weigh each pollutant.

3.5.2 Existing Conditions

MassDEP operates a network of 22 ambient air quality monitoring stations in 23 communities located across the state to monitor concentrations of both criteria and non-criteria pollutants as well as air toxins. MassDEP submits all ambient air quality data to the national air quality system database that is administered by EPA to verify compliance with the NAAQS and assess the effectiveness of current air pollution control regulations and initiatives. The closest air monitoring stations to Fourth Cliff are located in Brockton, Milton to the north, and Fairhaven to the south. With the exception of Dukes County, Massachusetts is currently in attainment of the NAAQS for all criteria pollutants, signifying that Plymouth County does not have any nonattainment or maintenance SIP obligations under the NAAQS.

3.6 Soils

3.6.1 Definition of Resource and Regulatory Framework

Soils are defined as “the unconsolidated mineral or organic materials on the immediate surface of the Earth that serves as a natural medium for the growth of land plants” by the Soil Science Society of America.

3.6.2 Existing Environment

Fourth Cliff at Humarock Peninsula is an oblong, elevated landform called a drumlin. According to the Natural Resource Conservation Service (NRCS) Soil Survey for Plymouth County (U.S. Department of Agriculture [USDA], 1969), Fourth Cliff is underlain by Woodbridge fine sandy loam soils with 8% to 15% slopes and very stony materials (Map Unit Symbol 311C). This soil type consists of a fine sandy loam material up to a depth of approximately 32 inches. Below that depth, the soil becomes denser and the gravel content increases. Cobbles and boulders can also be found within the deeper layers. Soils on unprotected slopes are subject to erosion.

The NRCS soil survey for the Fourth Cliff project area is shown on the soil map in the Appendix.

The eastern and northern portions of the Fourth Cliff area are underlain by Woodbridge fine sandy loam, 8% to 15% slopes, and very stony material (USDA, 2019).

3.7 Biological Resources

3.7.1 Definition of Resource and Regulatory Framework

Biological resources include native or naturalized plants and animals and the habitats, such as wetlands, forests, grasslands, and estuaries, in which these resources exist. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by the USFWS, the Commonwealth of Massachusetts, or species covered by the Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703-712). Determining which species occur in an area affected by the Proposed Action can be accomplished through literature reviews and coordination with appropriate federal and state regulatory agency representatives, resource managers, and other knowledgeable experts. In addition, the DAF contracted for ecological surveys that documented the presences of wildlife and plants at Fourth Cliff (LEC Environmental Consultants, 2008).

The DAF, in cooperation with other federal and state agencies, is responsible for the management of natural resources, including biological resources on their lands. The Massachusetts Division of Fisheries and Wildlife is responsible for the conservation of freshwater fish and wildlife in the commonwealth, including state-listed endangered plants and animals under Massachusetts Endangered Species Act (321 CMR § 10.00)

3.7.2 Existing Environment

3.7.2.1 Vegetation

Vegetation on Fourth Cliff is characteristic of most developed coastal uplands in the northeastern United States. Mowed, maintained grassed areas within the recreation area are dominated by a mix of salt-tolerant grasses including Kentucky bluegrass (*Poa pratensis*) and rye grasses (*Lolium* sp.). A narrow band of native shrubs occupies the top of the cliff edge along the east side of the project area. The band includes a mix of bayberry (*Myrica pensylvanica*), poison ivy (*Toxicodendron radicans*), arrowwood (*Viburnum dentatum*), and shadbush (*Amelanchier arborea*). A fringe of herbaceous species, outside the maintained grassed areas of the recreation site, contains a mix of blackberry (*Rubus* sp.), yarrow (*Achillea millefolium*), and various goldenrod species (*Solidago* sp.) (LEC Environmental Consultants, 2008).

The base of Fourth Cliff, within the project limits, contains coastal beach. The coastal beach does not contain any vegetation. There are no federally or state-listed plants within the Fourth Cliff project area. Areas where the majority of erosion is occurring are sparsely vegetated as the rate of erosion does not allow for the establishment of plant species. Adjacent to the project area to the west of Fourth Cliff, there are two types of plant communities: coastal dune and salt marsh (LEC Environmental Consultants, 2008).

The coastal dune is dominated by American beach grass (*Ammophila breviligulata*). Other species found on the coastal dune in sporadic patches include salt-spray rose (*Rosa rugosa*), evening primrose (*Primula laurentiana*), poison ivy (*Toxicodendron radicans*), and beach heather (*Hudsonia tomentosa*) (LEC Environmental Consultants, 2008).

The salt marsh is primarily dominated by herbaceous plants with a narrow shrub fringe. Species contained in the herbaceous layer include salt marsh cordgrass (*Spartina alterniflora*), salt meadow cordgrass (*Spartina patens*), and seashore alkali grass (*Puccinellia maritime*). As the salt marsh transitions to upland habitat, species encountered include salt grass (*Distichlis spicata*), salt worts (*Salicornia* spp.), seaside golden-rod (*Solidago sempervirens*), sea lavender (*Limonium nashii*), curly dock (*Rumex crispus*), American bittersweet (*Celastrus scandens*), orchard grass (*Dactylis glomerata*), marsh elder (*Iva frutescens*), quackgrass (*Agropyron pungens*),tatarian honeysuckle (*Lonicera tatarica*), salt-spray rose, and Terrell grass (*Elymus virginicus*) (LEC Environmental Consultants, 2008).

3.7.2.2 Wildlife

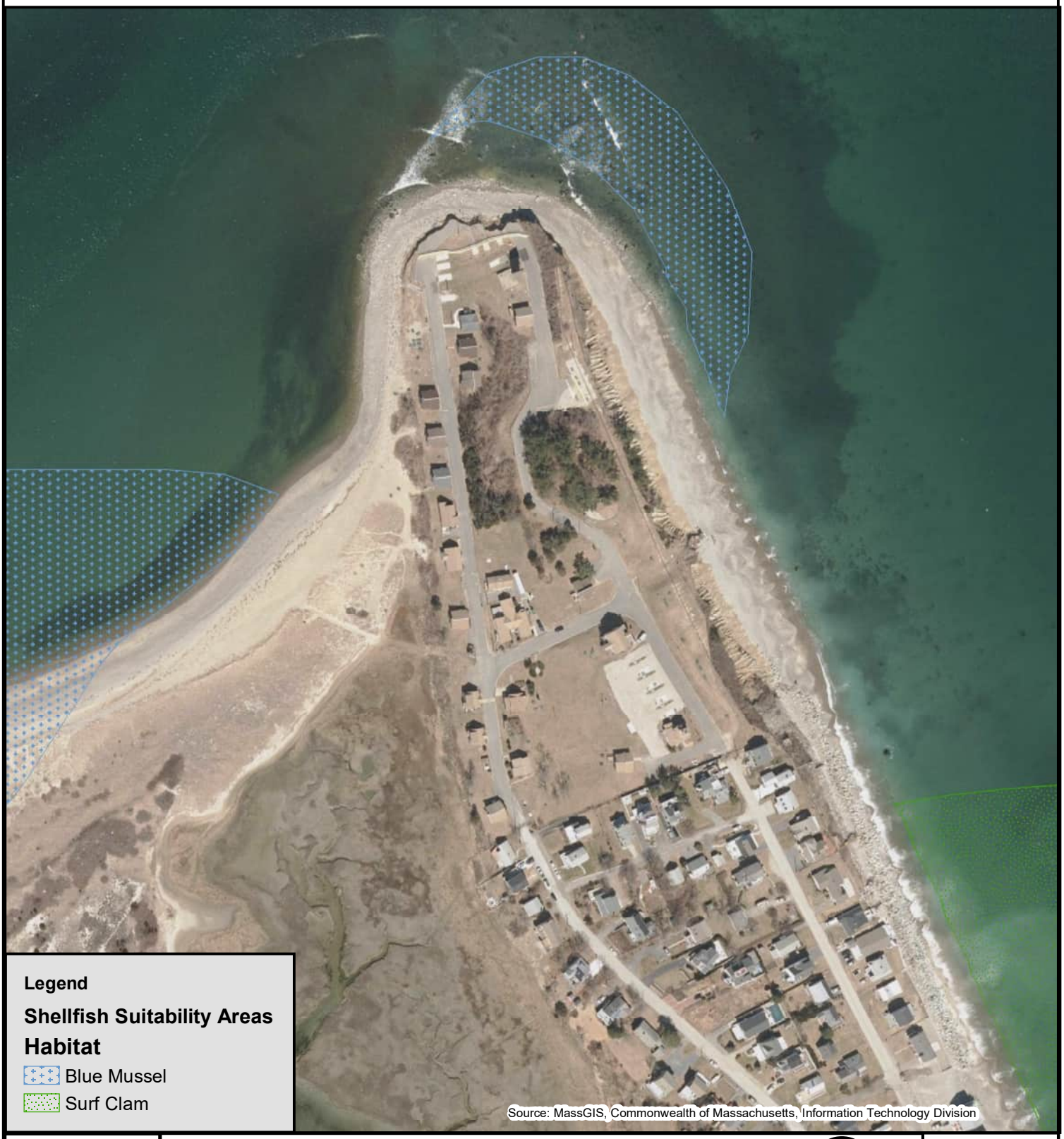
The project area at Fourth Cliff is partially developed and is considered disturbed. However, Fourth Cliff does provide suitable habitat for a variety of native, common wildlife species including skunk, opossum, raccoons, and small rodents. Vultures, seagulls, and common birds, including pigeons, doves, starlings, and crows are also prevalent within the project area.

The salt marsh area adjacent to the west side of the Fourth Cliff project area provides habitat for a variety of shellfish species. Some organisms, such as fiddler crabs (*Uca* sp.), ribbed mussels (*Geukensia demissa*), and blue mussels (*Mytilus edulis*), spend their entire life cycle within the salt marsh. Other shellfish species that can be found near Fourth Cliff include bay scallop (*Argopecten irradians*), oyster (*Crassostrea virginica*), quahog (*Nercenaria mercenaria*), razor clam (*Ensis directus*), and soft-shell clam (*Mya arenaria*). Although the Fourth Cliff project area provides habitat for a variety of shellfish species, it is not suitable to support a substantial shellfishery (LEC Environmental Consultants, 2008).

3.7.2.3 Land Containing Shellfish (Blue Mussel and Surf Clam)

MassGIS database shows LCS is located adjacent to the northern and eastern tidal areas to the Fourth Cliff project area. The LCS contains suitable habitat for blue mussels and surf clams. The blue mussel habitats are located at the intertidal zone between the mean high waterline (MHW) and the mean low waterline (MLW) on the western shore extending just around to the eastern side of the toe. The surf clam habitat is located along the southern side of the eastern bank (Figure 3-1).

Figure 3-1: MassDEP Wetlands - Shellfish Habitats



U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 62.5 125 250
Feet

FIGURE 3-1

FEB 2023

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Shellfish_Figure 3-1.mxd

3.7.2.3.1 Federally and State-listed Threatened and Endangered Species

A search of the USFWS's Information for Planning and Consultation (IPaC) database indicated that Fourth Cliff does not contain Designated Critical Habitat for any species under the USFWS jurisdiction (see Appendix B). Four listed species are known to occur within the immediate vicinity of the Fourth Cliff project area: Northern long-eared bat (*Myotis septentrionalis* – federally threatened), piping plover (*Charadrius melodus* – federally threatened), red knot (*Calidris canutus rufus* – federally threatened), and roseate tern (*Sterna dougallii* – federally endangered).

A desktop analysis using the MassGIS database indicated that Fourth Cliff is located within Natural Heritage and Endangered Species Program (NHESP) Priority Habitat and Estimated Habitat (14th Edition Natural Heritage Atlas, 2017). According to the Massachusetts *Natural Heritage Atlas*, 14th Edition (Figure 3-2), the majority of the project area is mapped as barrier and coastal beach and is located within polygons identified as Priority Habitat for Rare Species (PH 1065) and Estimated Habitat for Rare Wildlife (EH 818). Activities require review by the NHESP.

The coastal dunes to the west of the Fourth Cliff project area provide habitat for piping plover, red knot and least tern (*Sternula antillarum* – state species of concern). No other federally or state-listed species are known to use the Fourth Cliff or adjacent areas for nesting, breeding, or resting.

Endangered or threatened reptiles that may pass through the waters adjacent to Fourth Cliff include the green turtle *(Chelonia mydas),* leatherback turtle *(Dermochelys coriacea*), loggerhead turtle *(Caretta caretta)*, and the Atlantic Ridley *(Lepidochelys kempii).*

Piping Plover *(Charadrius melodus)*

The piping plover is listed as threatened in the Massachusetts list of Endangered and Threatened Wildlife and Plants and is listed as threatened in the Region 5 list of Federally Endangered and/or Threatened Species.

Piping plover nest above the high waterline in sandy beaches with sparse vegetation including marshes, ocean shores, bays, spoil islands, reservoirs, lakes, and rivers. The piping plovers are found on the outer dunes of the western shore of Fourth Cliff and can be observed from April 1 through August 15. Since 1994, 13 nesting and breeding piping plover pairs have been observed adjacent to the Fourth Cliff project area. Of these 13 pairs, only three fledglings have been observed since 1994; although in 2017 only a single nest hatched. All four chicks were lost before fledging without any overall productivity (Massachusetts Audubon Society, 2020). Habitat and predation are limiting factors for nesting and breeding piping plover pairs (Hanscom AFB, 2011).

Least Tern *(Sternula antillarum)*

The least tern is listed as a species of special concern in the Massachusetts list of Endangered and Threatened Wildlife and Plants by the Natural Heritage Program. Under the federal listing (50 CFR §§ 17.11 and 17.12, August 29, 1992), this species is not regionally identified in the Region 5 federal species list.

The least tern's preferable habitats are seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers. Least Terns prefer sandy beaches for nesting, but are also known to nest on flat gravel roofs. At Fourth Cliff, least terns are observed from May 5 through August 15 on the beach grass/beach interface of the coastal dune on the western side. Observers have recorded 149 breeding and nesting least tern pairs since 1994; however, only nine fledglings have been observed by the Massachusetts Audubon Society Coastal Water Bird Program in 2017. Extreme weather conditions and predation are limiting factors for nesting and breeding least tern pairs (Massachusetts Audubon Society, 2017).

Figure 3-2: MassDEP Wetlands- NHESP Priority Habitat

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PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 40 80 160
Feet

FIGURE 3-2

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Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_NHESP Priority Habitat_Figure 3-2.mxd

Red Knot *(Calidris canutus)*

Red knot is listed as threatened in the Massachusetts list of Endangered and Threatened Wildlife and Plants and is listed as threatened in the Region 5 list of Federally Endangered and Threatened Species. Red knots prefer intertidal habitats, especially near coastal inlets, estuaries, and bays. The mouth of North River on the west side of the Fourth Cliff provides habitat for these migrant shorebirds.

Northern Long-Eared Bat *(Myotis septentrionalis)*

The northern long-eared bat *(Myotis septentrionalis)* is federally listed as a threatened species under the Endangered Species Act (16 U.S.C. §§ 1531, et seq.*).* The Massachusetts Natural Heritage and Endangered Species Program list of Endangered and Threatened Wildlife and Plants includes the Northern long-eared bat as endangered. This species is also regionally identified in the Region 5 Federal species list.

Northern long-eared bats spend winters hibernating in caves and mines with constant temperatures, high humidity and no air currents. A desktop analysis using the USFWS Information for Planning and Consultation (IPaC) resource list for the Fourth Cliff project area revealed no critical habitat designated for this species (see Appendix B). A bat acoustic survey conducted on the Fourth Cliff project area was unable to confirm the presence of northern long-eared bat on the property (Schwab, 2018).

3.7.2.4 Subtidal Aquatic Environment

The subtidal aquatic environment is generally recognized as the area of a coastal wetland that is permanently covered by water. Many oceanic or coastal federally listed endangered or threatened species may frequent the coastal waters adjacent to Fourth Cliff during their annual migrations. It is not likely that any of these oceanic animals would use the estuarine habitat of the North and South rivers.

Under normal circumstances whales do not enter estuaries or approach the coast. However, whales may enter coastal waters adjacent to the Fourth Cliff project area. A desktop analysis using the ESA Section 7 mapper indicated that several ESA-listed species could potentially be present in the surrounding waters of the Fourth Cliff project area. The endangered or threatened species that migrate through annually and feed in Cape Cod Bay include the Atlantic large whales including the North Atlantic right whale *(Eubalaena glacialis),* and fin whale *(Balaenoptera physalus).* Fish species that might be present in the surrounding water includes Atlantic sturgeon (*Acipenser oxyrhinchus oxyrhinchus)*, shortnose sturgeon *(Acipenser brevirostrum),* and Atlantic salmon *(Salmo salar).*

Endangered or threatened reptiles that may pass through the waters adjacent to Fourth Cliff include the green turtle (*Chelonia mydas*), leatherback turtle (*Dermochelys coriacea*), loggerhead turtle (*Caretta caretta*), and the Atlantic Ridley (*Lepidochelys kempii*) (LEC Environmental Consultants, 2008).

3.7.2.5 Intertidal Aquatic Environment

There are two Rocky Intertidal Shore areas adjacent to Fourth Cliff. The first area is located northerly of the least tern nesting area parallel to the beach in an easterly direction and consists of cobble and medium-sized rocks. The second lies at the tip of the peninsula and parallels the beach in a southerly direction and consists of cobble and medium-sized rocks with large boulders scattered throughout. These Rocky Intertidal Shore areas not only provide important shelter for marine organisms, but also protect the adjacent upland from wave energy.

The Rocky Intertidal Shore areas adjacent to the Fourth Cliff project area provide substrate for many filter feeders, such as the blue mussel (*Balanus* spp.), and foraging areas for many shorebirds during low tide (Metcalf & Eddy/AECOM & LEC, 2009).

3.7.2.6 Migratory Birds

In addition to various species of common migratory birds such as the Common Loon, Ring-billed Gull and Common Elder, that could nest and forage in habitats at the site, three species of federal and/or state-listed bird species protected by the MBTA are potentially present in the North River Mouth and Corridor adjacent to the western side of the Fourth Cliff project area. The preferred habitat of the piping plover (*Charadrius melodus*) is present on the outer dune of the west shore of Fourth Cliff. Although not observed recently, the plovers may potentially use the dune for nesting from April 1 through August 15 (LEC Environmental Consultants, 2008). See Appendix B for comprehensive list of migratory birds that may be present at Fourth Cliff.

The least tern (*Sternula antillarum*) may potentially use the beach grass/beach interface of the coastal dune on the western side of Fourth Cliff (LEC Environmental Consultants, 2008).

The red knot (*Calidris canutus*) may potentially find temporary habitat and staging area at the salt marsh adjacent to the mouth of the North River on the west side of Fourth Cliff. The piping plover (*Charadrius melodus),* the least tern (*Sternula antillarum*), and the red knot (*Calidris canutus*) may potentially use the beach grass/beach interface of the coastal dune on the west side of Fourth Cliff.

3.8 Noise

3.8.1 Definition of Resource and Regulatory Framework

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with human activities. Public annoyance is the most common impact associated with exposure to elevated noise levels. The actual impact of noise is not a function of loudness alone. The frequency, content, time of day during which noise occurs, and the duration of the noise are also important factors in assessing impacts.

The physical characteristics of sound include intensity, frequency, and duration. Sound is created by acoustic energy, which produces pressure waves that travel through air and are sensed by the eardrum. As the acoustic energy increases, the intensity or amplitude of these pressure waves increase, and the ear senses louder noise. The unit used to measure the intensity of sound is the decibel.

Construction-related activities would follow the necessary guidelines present in the Plymouth County Code (120-3. Commercial Construction). The code restricts noise-generating construction activities between the hours of 7:00 p.m. and 7:00 a.m. by applying a 10-decibel (A-weighted scale; dBA) penalty to the construction activity. Any construction done outside theses time constraints would only be done with the approval with the Board of Selectmen, as stipulated by the code. Upon completion of the project, noise levels would return to their preconstruction average.

Sound levels are expressed in decibels and are usually “A-weighted” for human hearing. Construction and operation of the facility must comply with the provisions of the MassDEP Noise Control Regulations (310 CMR § 7.10). The MassDEP established a Noise Level Policy for implementing this regulation. The policy specifies that the ambient sound level, measured at the property line of the facility or at the nearest inhabited buildings, shall not be increased by more than 10 decibels weighted for the "A" scale (dB[A]) due to the sound from the facility during its operating hours. A source of sound is considered to be in compliance with the MassDEP noise regulation if the source does not increase the broadband sound level by more than 10 dB(A) above ambient or produce a pure tone condition.

3.8.2 Existing Environment

Noise-sensitive receptors can be defined as lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Noise-sensitive receptors may include residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

The closest noise receptors to the damaged cliff is the Fourth Cliff Recreation Area. In this largely suburban residential area, sound levels likely range from 42 dBA to 56 dBA, typical sound levels in an urban/suburban area (Wyle Laboratories, 1971). Bordering the recreation area there are also residential houses that could be affected by construction noise, as well as noise caused by the transportation of construction vehicles and materials. In peak season (June 15 to Labor Day) there would be a higher concentration of noise-sensitive receptors due to the outdoor activities at Fourth Cliff. Existing noise levels in the project area would be from traffic driving to Fourth Cliff as well as construction work along the cliff. There is no through traffic in this area.

3.9 Safety and Occupational Health

3.9.1 Definition of Resource and Regulatory Framework

Safety and occupational health is the promotion and maintenance of the physical, mental, and social well-being of workers by controlling risk to the highest degree protecting the safety, health, and welfare of people engaged in work or employment. DAFI 48-145, Occupational and Environmental Health (September 22, 2022) implements requirements of the Privacy Act of 1974 authorized by 10 U.S.C. § 8013, Power and Duties of the Secretary of the Air Force, 10 U.S.C., Chapter 55, Medical and Dental Care, EO 12196, “Occupational Safety and Health Programs for Federal Employees,” and EO 9397 as amended by EO 13478, Amendments to EO 9397 Relating to Federal Agency Use of Social Security Numbers.

Fourth Cliff is served by Scituate’s Station 4 Humarock fire station on Central Avenue. Scituate uses the Enhanced 911 emergency phone system that is fully teletypewriter- capable for hearing or speech-impaired persons. In case of emergency, the South Shore Hospital emergency room is the nearest full-service facility (located at 55 Fogg Rd., Weymouth, Massachusetts) about 20 miles away.

3.10 Cultural Resources (NHPA Section 106)

3.10.1 Definition of Resource and Regulatory Framework

Cultural resources include archaeological, Native American, and historic resources and properties. Archeological resources include any material remains of human life or activities which are at least 100 years of age, and which are of archaeological interest (ARPA [16 U.S.C. § 470ii]). Archaeological resources include areas where prehistoric or historic activity measurably altered the earth or produced deposits of physical remains, such as arrowheads or bottles.

Historic properties are any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the NRHP, including artifacts, records, and material remains relating to the district, site, building, structure, or object (NHPA § 1, P.L. 89-665, as amended by P.L. 96-515).

Architectural resources more than 50 years old may be considered for inclusion in the NRHP, although resources dating to other defined periods of historical significance would also be considered significant. Historic architectural resources include standing buildings and other structures of historic or aesthetic significance. Traditional (ethnic) resources are associated with a living community’s cultural practices and beliefs that are rooted in its history and are important to maintain the cultural identity of the community.

Pursuant to 36 CFR § 800.16(l), whether archaeological, architectural, or ethnic in nature, cultural resources that are included in, or eligible for inclusion in, the NRHP, are called “historic properties.” Native American resources are sites, areas, and materials important to Native Americans for religious, spiritual, or traditional reasons. These resources include villages, burial sites, petroglyphs, rock features, or springs. The belief in the sacred character of physical places, such as mountain peaks, springs, or burial sites is fundamental to Native American religions.

Section 106 of the NHPA, administered by the Advisory Council on Historic Preservation, requires federal agencies to consider the effects of their undertakings on historic properties. Section 106 and its implementing regulations require that the DAF consult with the designated SHPO.

EO 13287, “Preserve America,” directs the federal government to recognize and manage the historic properties in its ownership while contributing to the vitality and economic well-being of local communities. This includes the protection and continued use of the historic properties owned by the federal government and pursing partnerships with state and local governments, Native American tribes, and the private sector to promote the preservation of these historic resources.

3.10.2 Existing Environment

Fourth Cliff was originally developed as a summer resort community in the 1920s and was annexed by the U.S. Army in 1940 to develop a waterfront artillery battery. It was an important component of the U.S. coastal defense system during World War II. The annex contains Battery 208, one of the four 200 series battery structures built in Boston Harbor in anticipation of World War II. For concealment purposes, military facilities were designed to blend in with the existing cottage community. An underground bunker was landscaped, and the fire control tower and station were concealed within false cottages. Many of the houses were removed after World War II. The site was closed as an active military installation in the 1970s and 1980s and converted into a recreational area annexed to Hanscom AFB. New cottages and recreational facilities were constructed during this time. Currently, all but one of the original cottages and most of the World War II buildings have been removed or renovated, with most of structures and buildings having been built after 1979 (DAF, 2014).

The *Inventory of Historic and Archaeological Resources at Fourth Cliff Recreational Area, Scituate, Massachusetts*, was prepared in December 1993 (Davin et al., 1993). No archaeological resources were identified during the archaeological investigation. The historic building survey identified 21 buildings and three structures within the site. Construction dates of seven buildings and three structures ranged from c. 1920 to c. 1943; 14 buildings dated from 1979 to the present. The report concluded that three buildings, the battery, the fire-control observation tower, and the fire-control observation station, are the only World War II-era buildings left at the site. The remainder of buildings and structures has been substantially altered by the removal of original cottages and construction of new cottages, thus lacking adequate integrity for NRHP eligibility (Figure 3-3).

The Massachusetts Historical Commission (MHC)’s consideration of eligibility for the NRHP (March 16, 1994) concluded that World War II coastal defense structures (Battery #208 and the fire control observation tower and fire control station) are eligible for inclusion in the NRHP. At the time, MHC concluded the Fourth Cliff Recreational Area was eligible for listing in the NRHP as a district. However, further review by MHC in 1996 led to the conclusion that due to the level of changes to the historic environment, Fourth Cliff “no longer retains sufficient integrity for listing in the National Register as a historic district” (MHC, 1996).

Consultation with the MHC (SHPO) and concurrence with the Preferred Alternative is required. The Wampanoag Tribe of Gay Head (Aquinnah) and the Mashpee Wampanoag Tribe are two federally recognized tribes that consider Fourth Cliff an area of interest. The MHC, Massachusetts Commission of Indian Affairs, Scituate Historical Commission, Scituate Historical Society, Wampanoag Tribe of Gay Head (Aquinnah), Narragansett Indian Tribe, and the Mashpee Wampanoag Tribe have been consulted. Correspondence is included in Appendix A.

Figure 3-3: MassDEP Cultural Resources

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Cultural Resources_Figure 3-3.mxd

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FIGURE 3-3

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3.11 Utilities and Utility Infrastructure

3.11.1 Definition of Resource and Regulatory Framework

Utility infrastructure refers to the system of public works that provides the underlying framework for a community. Utilities include electric, gas, telephone, internet service, waste management, sanitary sewer, and domestic water systems.

3.11.2 Existing Facilities

The Fourth Cliff Recreation Area currently includes the following:

- 15 cottages (Buildings 1, 2, 3, 6, 8, 9, 10, 11, 12, 13, 14, 16, 18, 33, and 39)
- Four-room motel-style complex (Building 36)
- 11 RV camper sites (with electrical, potable water, and wastewater hookups)
- Four tent sites
- Four picnic areas
- Pavilion
- Bath house (Building 19)
- Recreation center (Building 7)
- Manager's residence (Building 4)

Water in Scituate is supplied primarily by groundwater wells with less than 25 percent from a reservoir. Humarock Peninsula where Fourth Cliff is located is served by groundwater sources bought from the Marshfield Water Department. The water system at Fourth Cliff provides water hookups for most of the existing support buildings, cottages, and RV sites. Approximately 1,200 feet of underground waterline runs down Central Avenue, Short Road, and Cliff Road.

Cliff erosion over time has severed utilities and forced others to be abandoned. An existing 8-inch water main pipe is exposed from under the roadway and is cantilevered out over the beach area and has been abandoned. A new water main was installed inland to the cliff when erosion threatened service. An existing fire hydrant near the toe of the cliff remains in place but its use is unknown.

Although most of Scituate is sewered, sanitary wastewater at Fourth Cliff is managed in a septic system that consists of two lift stations, a tight tank, a drainage pit, a leach field and approximately 1,000 feet of underground wastewater lines. A lower lift station (between Buildings 1 and 3) pumps sanitary waste through underground lines from Buildings 1, 3, 4, 5, 6, 7, 8, 33, 36, and 39 to the upper lift station (located north of Building 6). Sanitary waste from Buildings 9, 10, 11, 12, 13, 14 16, and 19 flows by gravity to the upper lift station through underground piping. The upper lift station pumps the sanitary waste through underground piping and drains into a drainage pit and leach field located in the area east of Buildings 4 and 2, and west of the site of the Proposed Action.

Sanitary waste from the RV sites on the northern part of the property and Building 18 flow by gravity to a tight tank near Building 19. The tight tank is not connected to other parts of septic system and is emptied periodically by contract. The sanitary wastewater system at Fourth Cliff is in good working order.

Base civil engineering oversees the solid waste/recycling support contract that supports Fourth Cliff. In addition to meeting installation recycling goals, feasible pollution prevention measures must be analyzed. Less toxic alternatives for materials used must be considered. The Hazardous Material Management Program processes requests for materials to be used and analyzes less toxic materials to reduce sources of pollution.

Most of the electrical system at Fourth Cliff is provided via underground utility lines, with the exception of a few aboveground utility lines and poles located near the site of the Proposed Action. Currently electricity is supplied to all buildings and RV sites. Eversource and National Grid supply the town. All cabins and support buildings at Fourth Cliff have telephone connections. The recreation center is the only building

with an internet connection. Building 7 has a 60-kilowatt (kW) diesel generator for back-up power during commercial power outages. The unit has an internal 100-gallon fuel tank and uses low-sulfur DF-2 fuel.

Due to erosion the footing/foundation of a streetlight on the roadway is within a few feet of the face of the exposed cliff, at risk of falling into the beach area.

3.12 Geology and Topography

3.12.1 Definition of Resource and Regulatory Framework

Geologic features include outcrops, unique rock formations, and potential mining and energy resources. Mineral ores, petroleum, natural gas, sand, and gravel are resources related to geologic features. Topography refers to the natural and artificial shapes and features of land surfaces.

3.12.2 Existing Environment

Fourth Cliff consists of 56 acres of military property owned by the DAF on the north tip of Humarock Peninsula in Scituate, Massachusetts. Humarock Peninsula is an oblong, elevated landform commonly referred to as a drumlin. Fourth Cliff is adjacent to the Atlantic Ocean along its east edge and abuts the confluence of the North and South rivers, known as the New Inlet, along the north edge. A rocky, intertidal shore abuts the beach along the north and east sides.

Fourth Cliff is one of a series of drumlins found along the shoreline and generally consists of glacial till. On the east side, the slope angles range from approximately 1.7 to 1 Horizontal to 1 Vertical, (1.7 to 1 H:1 V) along the length of the slope, in the proximity to the battery.

Subsurface conditions suggest that retreat of the cliff is the result of undercutting at the toe of the cliff due to wave action, resulting in over-steepening of the slope angle of the cliff face with surface erosion from wind and rain. The wave action not only erodes the toe of the natural slope but also removes any talus material that has developed at the toe, as the upper part of the slope erodes and flattens.

3.13 Land Use and Visual Quality

3.13.1 Definition of Resource and Regulatory Framework

This section describes general land use and aesthetics and visual quality. The term “land use” refers to human use of the land for economic production; for residential, religious, recreational, or other purposes; and/or for natural resource protection.

3.13.2 Existing Environment

Adjacent land uses are regulated in Scituate by the “Town of Scituate Zoning Bylaw” (October 24, 2022), and the ROI for land use is Scituate. Land use around Fourth Cliff is residential saltmarsh and tideland conservation land. South of Fourth Cliff on the peninsula is Humarock Village and a small neighborhood business district. Most of Humarock is in the Floodplain and Watershed Protection Overlay District.

According to the “Town of Scituate Zoning Map” (October 25, 2011), Fourth Cliff is zoned Residence R-3 with minimum lot size of 10,000 s.f. The land surrounding Fourth Cliff is similarly zoned with the small business district adjacent to Humarock Village.

The town’s Open Space and Recreation Plan update (2018) identifies the Fourth Cliff area as one of the “most prominent coastal features in Scituate” with its great views of Massachusetts Bay and the mouth of the North and South rivers. The 2018 Open Space and Recreation Plan update declares, “Fourth Cliff has long been a priority for Town acquisition. The site has been controlled by the DAF and is used as a recreation area by the DAF personnel. It could be an exceptional regional park, with its tremendous view of the Atlantic Ocean to the east and the North River and South River marshes to the west.”

The 2014 Scituate Master Plan describes Fourth Cliff as a priority for the town to acquire and suggests it could be turned into a regional park. The Scituate 2040 Master Plan Update (2021) does not specifically address the future of Fourth Cliff, but reiterates the recommendation from the 2016 *Coastal Erosion, Sediment Transport, and Prioritization Management Strategy Assessment for Shoreline Protection* to "Maintain the revetments for First Cliff, Second Cliff, Third Cliff, and Fourth Cliff."

Fourth Cliff's location on a prominent peninsula between Massachusetts Bay and the North and South rivers provides dramatic views. Views from Fourth Cliff extend across Massachusetts Bay, the Scituate mainland, North and South rivers, and beach and salt marsh west and south. The ROI for aesthetics and visual resources is Fourth Cliff and includes properties immediately south and the adjacent shoreline.

In August 2016, Scituate and the Executive Office of Environmental Affairs concluded a town-wide "optimization/prioritization shore protection" planning study to identify long-term coastal resiliency strategies. Of 15 study areas, the study ranked Fourth Cliff a relatively low priority at number 14 (priority rating value of 0.292) because the number of Fourth Cliff private properties that could be damaged with no shoreline protection is small.

The visual quality of Fourth Cliff is determined by assessing how memorable the view is, how undisturbed the landscape is and how coherent the landscapes is. The key views are from the water and the beach where the cliff rises dramatically from the beach. The cliff's existing visual quality is degraded by the jagged, deteriorating cliff with exposed pipes and debris on the beach (see Figures 1-2 and 1-3). The landscape is not intact and has been encroached upon by the elements. The destruction to the recreation facilities and to the cliff that was transformed from a natural, rounded cliff to a hollowed out, jagged cliff results in an unharmonious and disjointed pattern.

3.14 Water Resources

Water resources include waters both above and below the surface of the earth that are potentially useful to humans and the environment. The Clean Water Act of 1977 is the primary federal law that protects the nation's water resources, including lakes, rivers, aquifers, and coastal areas. Water resources relevant to the project corridor are drainage basins, floodplains, surface water, and wetlands.

Surface water is a collection of water on ground surface. It is any body of water at land surface and includes natural features such as wetlands, swamps, streams, rivers, ponds, lakes, marshes, bayous, and oceans. Man-made surface waters include impoundments, canals, drainage ditches, and stormwater retention basins.

Floodplains are lands bordering rivers and streams that are normally dry but are covered with water during times of flooding. Wetlands occur in both inland and coastal areas. Risk of flooding typically hinges on local topography, frequency and intensity of precipitation events, volume of the watershed above the floodplain, and, in the case of coastal areas, storm surge intensity. The natural function of a floodplain is to hold and absorb water and energy generated from storms. Indirect benefits include groundwater recharge from stormwater absorption, nutrient cycling, waste disposal, carbon sequestration, wildlife habitat, vegetative diversity, and aesthetic qualities.

Wetlands are transitional areas of land between well-drained uplands and permanently flooded or aquatic systems. They may be intermittently inundated with water and include swamps, marshes, and bogs and are found in both coastal and inland settings. Wetlands filter water to remove nutrients, contaminants, and sediment, thereby improving water quality. They recharge water supplies, reduce risk of flood because of storage capacity, and provide important habitat for fish and wildlife.

3.14.1 Existing Conditions

3.14.1.1 Surface Water

Fourth Cliff is bordered on the east by Cape Cod Bay in the Atlantic Ocean and on the north and west side by New Inlet, which coincides with the mouth of the North River. The water can be characterized as

estuarine and primarily saline. The waters immediately surrounding Fourth Cliff are shallow and the shoreline is subject to coastal storm flowage. Stormwater flows from the west edge of Cliff Road inland (west/northwest) toward the catch basins on the west side. The area between the road and the inlets is grassy, so stormwater infiltrates to some extent before getting to the catch basin. Near the tower pavement RV area, the pavement runoff flows west into the wooded inland area. The existing roadway pavement that is at the tip is at risk and will not be a part of the site work. Stormwater flows along the roadway southwest and into the storm system. The storm system turns west near the bath house and outlets to the cobble area via a 14-inch concrete pipe..

Figure 3-4: Flood Zone Designations

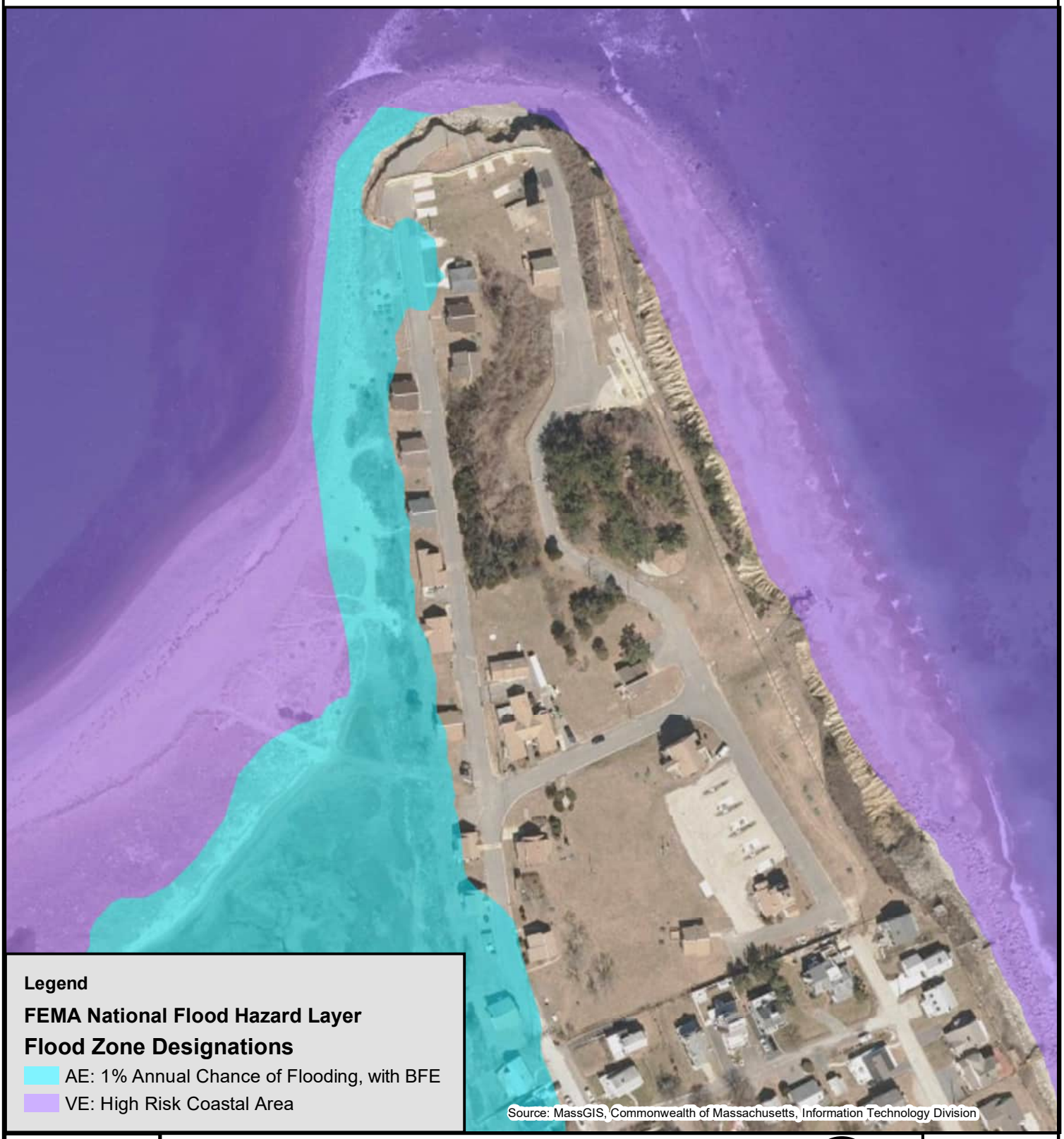

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FIGURE 3-4

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Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Flood Zones_Figure 3-4.mxd

3.14.1.2 Floodplains

FEMA has divided flood zones into four categories: moderate to low risk, high risk, high risk coastal area, and undetermined areas (FEMA, 2019).

The proposed project is mapped within and adjacent to the very high risk (VE) flood zone on the eastern side and high risk (AE) flood zone on the west side of the cliff (Figure 3-4).

EO 11988, "Floodplain Management," (May 24, 1977) requires that each federal agency "shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains." Amendments to EO 11988 in EO 13690, "Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input" (January 30, 2015) improved implementation of EO 11988. The new EO established the Federal Flood Risk Management Standard (FFRMS) that applies to all federal actions. Changes to improve EO 11988 focused on three areas:

- Encouraging use of natural features and nature-based approaches when developing alternatives for federal actions;

- Providing a higher vertical elevation and corresponding floodplain, where appropriate, to address current and future flood risks to ensure climate change uncertainties and other future changes are more adequately accounted for; and

- Describing how the elevation and corresponding floodplain of the FFRMS can be determined using three approaches.

The FEMA *Flood Insurance Rate map for the Town of Scituate, Fourth Cliff Recreation Area* (FEMA FIRM Panel No. 25023C0137K, effective date 11/4/2016) shows the beach area within the project area is located within a Special Flood Hazard Area, with a base flood elevation determined. The map indicates two separate base flood elevations within the project area; one elevation (elevation 23 feet) along the eastern side, coincident with the Bay, and a different elevation (elevation 17 feet) coincident with the north and west sides and the inlet. The project area located on top of the cliff is located within Zone X, Areas of Minimal Flood Hazard. The FEMA FIRM does not show the 500-year flood zone.

3.14.1.3 Wetlands

Wetland resources were field-delineated at the Project site in October 2021, and a desktop review of the Project area was conducted using the latest available resources such as FEMA FIRM maps and MassGIS data layers. The proposed Project will result in temporary and permanent impacts to Massachusetts Wetlands: Coastal Bank, Coastal Dune, Coastal Beach, Barrier Beach, Land Subject to Coastal Storm Flowage and FEMA VE zone.

The cliffs on the east and north sides of Fourth Cliff are "coastal bank," as defined by Massachusetts wetlands regulations (310 CMR 10.30(2)), as "…the seaward face or side of any elevated landform other than a coastal dune, which lies at the landward edge of a coastal beach, land subject to tidal action, or other wetland."

The coastal bank, as illustrated on Figure 3-5 (based on the October 2021 field delineation), on the east periphery of the property is a well-defined, nearly vertical cliff that parallels the shore to the north and continues west around the peninsula where the cliff degenerates to a moderately sloped coastal bank. The entire cliff area of the coastal bank is subject to severe erosion. The western coastal bank parallels Central Avenue and appears to have been previously altered with the installation of single family dwellings. The western coastal bank is well vegetated. The picnic area west of Central Avenue and north of Short Road is maintained as a lawn area.

The coastal bank supports species that require steep embankments and/or transitional vegetative areas. Avian and mammalian species use this area for shelter and food. These species include rabbits, bank swallows (*Riparia riparia*), and kingfishers (*Ceryle alcyonand*).

The coastal bank is bordered by “coastal dune” on the eastern side of the cliff, which is bordered by “coastal beach,” which on the east side meets Cape Cod Bay in the Atlantic Ocean and on the north side abuts the confluence of the North and South rivers, known as the New Inlet (Figure 3-6). The Wetlands Protection Act (WPA) Regulations (310 CMR 10.27) define coastal beaches as, “unconsolidated sediment subject to wave, tidal and coastal storm action which forms the gently sloping shore of a body of salt water and includes tidal flats. Coastal beaches extend from the mean low water line landward to the dune line, coastal bank line or the seaward edge of existing constructed-made structures, when these structures replace one of the above lines, whichever is closest to the ocean.”

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Figure 3-5: 2021 Survey- Coastal Bank

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Coastal Bank_Figure 3-5.mxd

U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 40 80 160
Feet

FIGURE 3-5

FEB 2023

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Figure 3-6: 2021 Survey- Coastal Beach

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Coastal Beach_Figure 3-6.mxd

U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 40 80 160
Feet

FIGURE 3-6

FEB 2023

Also, on the north and east sides of the site, beyond the coastal beach, is a rocky, intertidal shore. In addition to being rocky, the waters surrounding Fourth Cliff are shallow, with barrier beach habitat located on the west side of Fourth Cliff (Figure 3-7).

“Coastal dune” is found between the coastal bank and the coastal beach on the east side of Fourth Cliff. (Figure 3-8). The Wetlands Protection Act (WPA) Regulations (310 CMR 10.28) define coastal dunes as, “any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dune also means sediment deposited by artificial means and serving the purpose of storm damage prevention or flood control.” The dune does not play a role in storm damage prevention.

EO 11990, “Protection of Wetlands,” requires that each federal agency “shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.” Federal, state, and local wetland construction permits are required for any construction within the wetland and coastal zone management areas. The Commonwealth of Massachusetts requirements applicable to actions in the coastal zone, wetlands, and floodplains are managed under the Massachusetts WPA Regulations (310 CMR 10.00). Fourth Cliff project area includes four resource areas defined in the WPA: Coastal Beach, Coastal Bank, Coastal Dune and Barrier Beach (Figures 3-5 through 3-8).

3.14.1.4 Scenic Protected Rivers and National Natural Landmarks

The North River is located west of the project area. In 1978, the Massachusetts Legislature acknowledged that the North River is a significant recreational and scenic resource and adopted regulations to preserve the natural resource. The North River was the first Massachusetts river designated a scenic river under the Scenic and Recreational River Protective Order. The regulations restrict use and development within 300 feet of the River corridor. The Protective Order is administered by the North River Commission (established pursuant to 1978 Massachusetts Acts § 62) in association with the Department of Conservation and Recreation (under M.G.L. c. Chapter 21A § 11C) and the Massachusetts Attorney General.

The North River and the South River are National Natural Landmarks, designated by the National Park Service and the Secretary of the Interior in 1977. National Natural Landmarks are selected for their outstanding condition, illustrative value, rarity, diversity and value to science and education. This program recognizes and encourages conservation of sites with outstanding biological and geological resources, regardless of landownership type. North and South rivers is a large and diverse estuarine wetland system containing salt, brackish and freshwater marshes. The two rivers are classic examples of drowned, river-mouth estuaries and support many bird and fish species,

Figure 3-7: MassDEP Wetlands- Barrier Beach

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Barrier Beach_Figure 3-7.mxd

U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 40 80 160
Feet

FIGURE 3-7

FEB 2023

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Figure 3-8: 2021 Survey- Coastal Dune

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Coastal Dune_Figure 3-8.mxd

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FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 40 80 160
Feet

FIGURE 3-8

FEB 2023

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4 Environmental Consequences

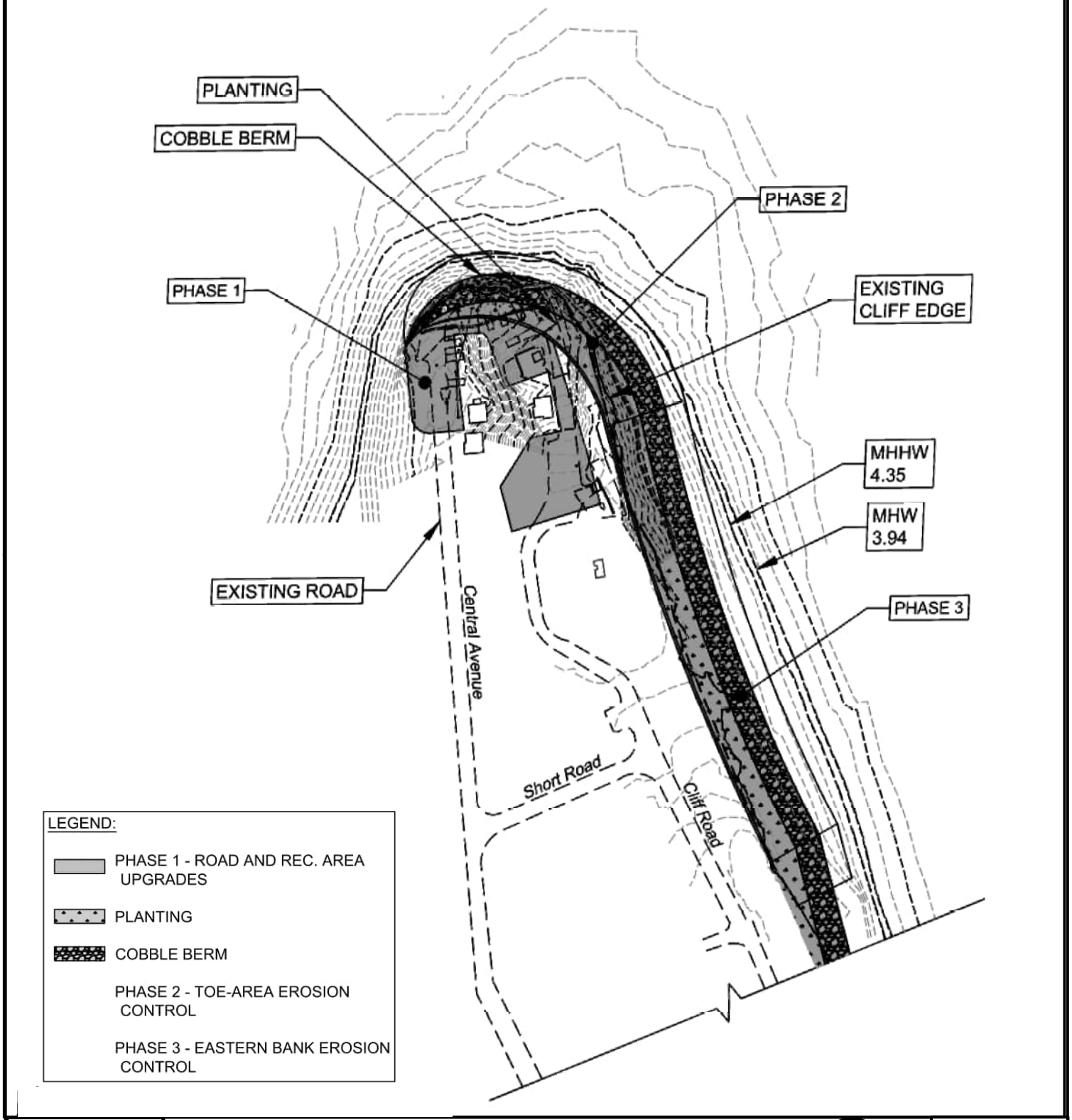
4.1 Introduction

CEQ regulations (40 CFR § 1508.1(q)) require environmental impacts resulting from federal actions to be analyzed for three types of effects—direct, indirect, and cumulative. A direct effect is caused by the action and occurs at the same time and place. An indirect effect is caused by the action but occurs later in time or farther removed in distance and is reasonably foreseeable. A cumulative effect results from the "incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (federal or nonfederal) or person undertakes such other actions." (40 CFR § 1508.1(g)).

Short-term or temporary effects (construction phase) versus long-term effects (operations phase) under the context of direct, indirect, and cumulative effects are also analyzed. Effects are quantified as much as possible and are identified as no impact, less than significant, or significant. Less-than-significant impacts can be reduced through implementation of best management practices (BMPs). If an impact is determined to be significant, mitigation would be required.

The EIAP (32 CFR § 989.22) requires EIAP documents to indicate clearly whether BMPs and mitigation measures need to be implemented for the selected alternative. The preferred alternative for Fourth Cliff is shown in Figures 4-1 and 4-2 while the plans can be found in Appendix F.

Figure 4-1: Preferred Alternative Plan



U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

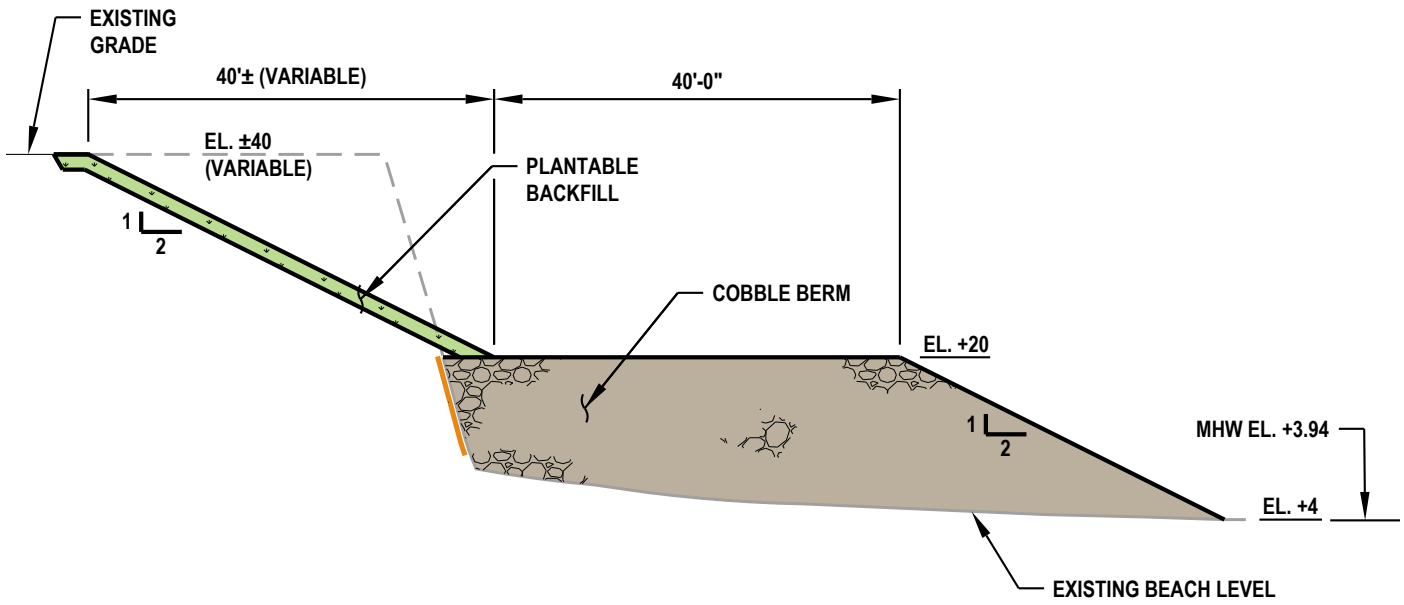
0 50 100 200
Feet

FIGURE 4-1

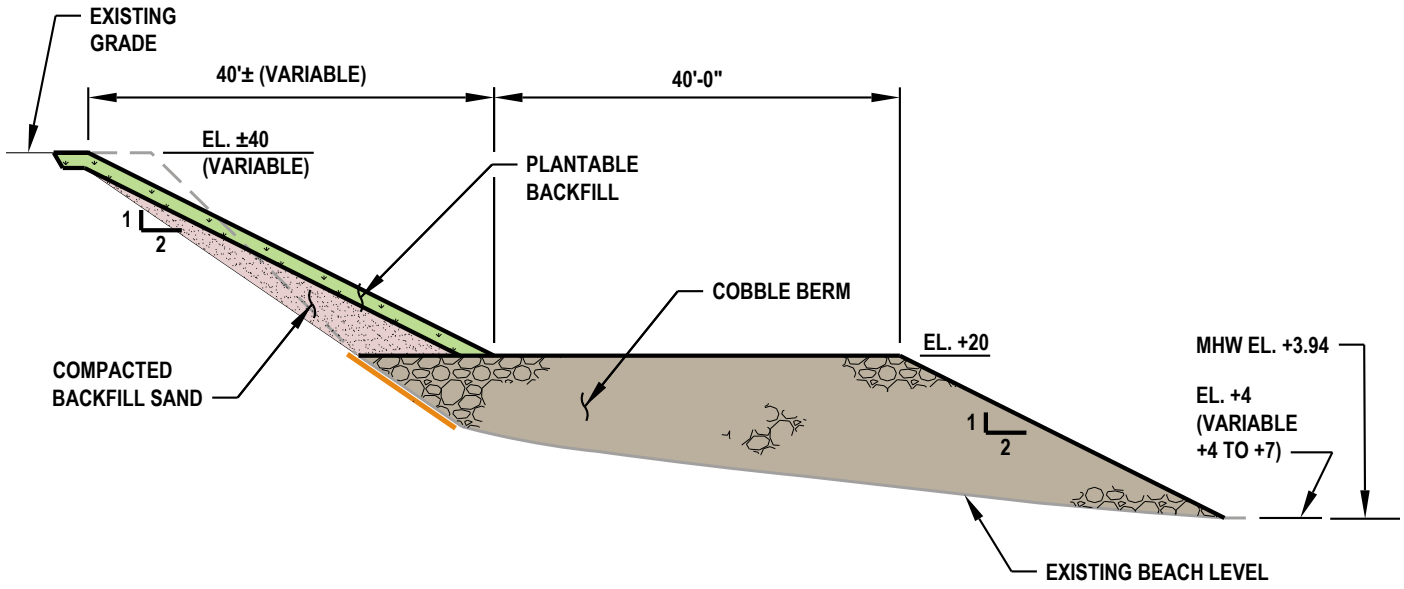
FEB 2023

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Preferred Alternative Plan_Figure 4-1_V1.mxd

Figure 4-2: Preferred Alternative Cross Sections



SECTION A - TYPICAL ROUNDHEAD SECTION (NORTH TIP)
COBBLE BERM AND VEGETATED BLUFF



SECTION B - TYPICAL SECTION
COBBLE BERM AND VEGETATED BLUFF

U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

FIGURE 4-2

FEB 2023

4.2 Environmental Justice

4.2.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Preferred Alternative Phase 1, 2 and 3

No environmental justice populations were identified in a five-mile radius of Fourth Cliff. Therefore, no disproportionate impacts will occur. No human populations, including low income, minority, or otherwise would be negatively impacted as a result of the Preferred Alternative. In accordance with EO 13045, Protection of Children From Environmental Health Risks and Safety Risks," which states federal agencies "shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children," children would not be exposed to increased health and safety risks.

The road repair and cliff stabilization projects are not expected to adversely impact any human populations in the region. Construction-related noise impacts are expected to be less than significant and would cease once the construction period is complete. Any impacts to traffic would be negligible and are not expected to impact any nearby communities. Standard construction site safety precautions would be implemented to ensure there would no increased health or safety risks as a result of the Proposed Action. Therefore, no human populations, including low income, minority, or otherwise would be negatively impacted as a result of the Preferred Alternative.

4.2.2 Alternative 2 — Divestiture of the Property

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. No environmental justice populations were identified in a five-mile radius of Fourth Cliff. Therefore, no disproportionate impacts will occur. In accordance with EO 13045 which states federal agencies "shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children," children would be removed from threats to health and safety risks.

Impacts to DAF visitors, beach users, and children would be minimal as they would no longer use the site. Public users of the beach could be threatened as erosion might not be addressed.

4.2.3 No Action Alternative

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance as needed, resulting in no change to the status quo. No environmental justice populations were identified in a five-mile radius of Fourth Cliff. Therefore, no disproportionate impacts will occur.

Impacts to DAF visitors, beach users, and children, albeit not disproportionately, would increase over time as ongoing erosion would not be addressed. Public users of the beach could be threatened as erosion would not be addressed.

4.3 Air Quality, Greenhouse Gases and Climate Change

This section evaluates potential short- and long-term air quality impacts of the analyzed alternatives.

A quantitative estimate of the annual net total direct and indirect emissions of pollutants related to the project was estimated using the ACAM for the Preferred Alternative in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention (February 4, 2020); the EIAP (32 CFR 989); and the General Conformity rule (42 U.S.C. § 7506). Note that the ACAM analysis location is listed as the Hanscom AFB due to limitations in the model but Fourth Cliff is in Plymouth County. Project-related emissions would not exceed annual de minimis criteria per the General Conformity rule established in 40 CFR 93 Subpart B.

Fourth Cliff, formerly in a nonattainment area, is in an area referred to as orphan nonattainment area by EPA and environmental groups and is an area designated attainment under the 2008 Ozone NAAQS but was never formally redesignated to attainment pursuant to 42 U.S.C § 7407(d)(3)(E) for the 1997 Ozone NAAQS. On February 16, 2018, the United States Court of Appeals for the District of Columbia Circuit issued a decision in the case S*outh Coast Air Quality Management District vs. EPA* (882 F.3d 1138) that General Conformity applies to orphan areas. Fourth Cliff is in attainment for all other NAAQS

4.3.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Preferred Alternative Phase 1, 2 and 3

The Preferred Alternative is a phased approach to cliff stabilization. Phase 1 involves cleaning up the site and providing for safe and functional pedestrian and vehicular circulation. The project would not generate emissions beyond the construction period. The repairs are an earthworks project and the potential of the project to emit criteria pollutants would be limited to the construction period, beyond which there would be no long-term direct or indirect emissions associated with the project.

For the purposes of the Level II Quantitative Assessment, construction and marine transport activities and cliff repair operations for all three phases have been compressed to occur within a calendar year 2023. This allows a conformity assessment of annual pollutant emissions that provided cumulative analysis for all phases of proposed work. The project would consist of demolition and removal of the existing asphalt pavement and utilities, followed by trenching activities to install new utilities, stormwater management facilities, and gravel parking, and then concluding with construction of the fire truck turnarounds and pedestrian paths, RV site reconstruction and cliff repair operations. An approximate total of 216 construction equipment operating hours, or five weeks of total construction activity, would be phased between April 2023 and December 2023. In addition to land-based construction activity, 45,449 c.y. of materials for the erosion control berm would be transported via tugboats and barges up to a maximum of 41 trips or 2,100 tug-miles traveled then removed from the barges by a bulldozer fleet capable of moving 57 c.y. per hour (included in the ACAM Paving module) over a 12-month period.

For detailed descriptions of construction activities and a manifest of construction equipment and operating hours associated with the project, refer to the attached ACAM Detailed Report and Construction Impact Estimate documentation in Appendix E.

Repairs to the cliff will require barges to deliver materials. Marine-based transport emissions were calculated per the September 2020 EPA guidance *Port Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions* with the following assumptions:

- Pollutants Emitted (tons) = Tiered Emission Factor (kW/hour) x Engine Load Factor x Activity (hours x days)
- EPA Category 2 engine power, emission factors and load factor typical of oceangoing tugboats: 1,000 kW to 3,000 kW with displacement of between 5 liters and 30 liters per cylinder.
- Tier 0 non-road marine diesel oil engine with no pre-control emission technology installed.
- Engines at maximum power for eight continuous hours on each trip (includes concurrent emissions from one 225 kW auxiliary engine).

Table 4-1 summarizes the Preferred Alternative's (all phases) projected total air emissions from construction activities. Total marine-based pollutant emissions were then added to the land-based ACAM pollutant inventory. These emissions are shown separately for reference in Table 4-2. The total annual project-related emissions would be below de minimis for all pollutants of concern. As such, the proposed project and construction activities would comply with NEPA as it would not have the potential to create new violations of the NAAQS, affect emission control commitments to the northeast Ozone Transport Region or otherwise result in any significant long-term impact on air quality.

Table 4-1. Preferred Alternative Construction Emissions

Pollutant	2023 Action Emissions (tons/yr.)*	General Conformity Rule	
		De Minimis Threshold (tons/yr.)	Exceedance (Yes or No)
Boston-Lawrence-Worcester (E. MA), MA			
Volatile organic compound (**VOC**)	0.5	50	No
NO_x (Nitrogen Oxides)	2.6	100	No
CO (Carbon Monoxide)	2.1	100	No
SO_x (Sulfur Oxides)	0.01	100	No
PM_{10} (Particular Microbes <10 µm in diameter)	0.2	100	No
$PM_{2.5}$ (Particular Microbes <2.5 µm in diameter)	0.1	100	No
Pb (Lead)	0.0	25	No
NH_3 (Ammonia)	0.001	100	No
CO_2e (Carbon Dioxide Equivalent)	882	N/A	N/A

N/A = not applicable

*Includes marine-based emissions from 41 tugboat and barge trips up to 2,100 miles traveled

Table 4-2. Preferred Alternative Construction Barge Emissions

Pollutant		Main Engine (Category 2)		Auxiliary Engine			Engine Emissions		Total Emissions	
		Emission Rate (gram/ kW/hr.)	Load Factor	Emission Rate (gram/ kW/hr.)	Load Factor	Activity	Main	Auxiliary	Grams	Tons
VOC		0.5	0.85	0.27	0.56	2,100 miles traveled over 41 trips for 12 hours per roundtrip	209.1	74.4	283.5	0.00031
NO_x		13.2		10			5,520.2	2,755.2	8,275.4	0.00912
CO		1.1		1.5			460.0	413.3	873.3	0.00096
SO_x		1.3		1.3			543.7	358.2	901.8	0.00099
PM_{10}		0.72		0.3			301.1	82.7	383.8	0.00042
$PM_{2.5}$		0.02		0.02			8.4	5.5	13.9	0.00002
CO_2e		690		690			288,558.0	190,108.8	478,666.8	0.52764

Air quality impacts would be limited to short-term, increased fugitive dust and mobile source emissions expected to occur during approximately 5 weeks of construction activities and 12 months of cliff repair operations. No greenhouse gas (GHG) emissions will be released by the Preferred Alternative when complete. GHG emissions released during the 10 month to12-month construction period would be minute compared to the current human-induced releases within the region and state. Further, the resulting GHG emissions would be significantly under federal reporting thresholds. Because the amount of GHG

generated is extremely small relative to the emissions from regional and statewide sources, this project would have a negligible impact to GHGs and climate change.

Fugitive dust is airborne particulate matter, generally of a relatively large particulate size. Construction-related fugitive dust is generated by concrete demolition, haul trucks, concrete trucks, delivery trucks and earth-moving vehicles operating around the project area. Construction activities cause particulate matter to become resuspended (“kicked-up”) due to various activities including vehicle movement over paved and unimproved surfaces, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from areas of exposed soils.

Carbon monoxide is a principal pollutant of concern when considering localized construction-induced air quality impacts from vehicles. Although the presence of construction trucks and equipment would elevate CO concentrations in the area, these emissions are temporary.

The Preferred Alternative, when complete, will not release GHG emissions. GHG emissions released during the 10 month to 12 month construction period would be minute compared to the current human-induced releases within the region and state. ACAM calculated CO_{2e} 882 tons/year for the construction phase of this project. The resulting GHG emissions would be significantly under federal reporting thresholds (25,000 metric tons CO_{2e} per year for federal, 5,000 metric tons CO_{2e} per year for State). Because the amount of GHG generated (CO_{2e}) is extremely small relative to the emissions from regional and statewide sources, this project would have a negligible impact to GHGs and climate change.

The Preferred Alternative will not create significant GHG emissions in the short-term or long-term. In addition to not significantly contributing to climate change, The Preferred Alternative is not considered vulnerable to the effect of climate change (i.e. increasing sea level, drought, extreme weather, ecological change, etc.). The project will be designed to withstand increasing sea level, extreme winds, and extreme weather.

Several measures may be utilized to minimize or eliminate temporary air quality impacts created during the construction phase. As practicable, the application of various best practice control measures during construction would be employed to minimize the amount of construction dust generated, through measures including applying water or other soluble moisture-retaining agents to exposed dirt areas; cleaning construction equipment and adjacent paved areas that may be covered with dirt or dust; covering haul trucks carrying loose materials to and from construction sites; use of cleaner fuels in construction equipment; using clean diesel construction equipment (new, retrofit, rebuilt or repowered), and the implementation of anti-idling practices at construction sites.

4.3.2 Alternative 2 — Divestiture of the Property

Phase 1, 2 and 3

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. Since it is unknown if the future owner's actions would include construction, potential air quality impacts could not be assessed.

4.3.3 No Action Alternative

Phase 1, 2 and 3

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance as needed, resulting in no change to the status quo. No construction would take place and air quality would not be impacted.

4.4 Soils

This section provides an analysis of impacts to soils associated with the analyzed alternatives.

4.4.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Phase 1, Road Repair and Circulation Improvements

The Preferred Alternative is a phased approach to cliff stabilization. Phase 1 involves cleaning up the site and providing for safe and functional pedestrian and vehicular circulation. No important soil resources are present in the ROI of the Preferred Alternative.

During Phase 1 construction, temporary stormwater BMPs would be installed. This would include silt fence, erosion control tubes, and inlet protection on all sides of project work that involves earth disturbance. Because most of the project is pavement removal and surface restoration, there is little risk of the indented areas of missing pavement to allow soil or water to escape. Specifications will provide for contractor instructions on managing the Storm Water Pollution Prevention Plan (SWPPP) on site and checking, cleaning, repairing, and replacing BMPs throughout construction and after every rain event.

A key component of the site work is that the proposed grading allows stormwater to flow inland and down the slope to the existing catch basins as it does now. The erosion on the face of the cliff is from driving rain during storm events. Due to elevations and stormwater management described herein, stormwater from the top of the cliff does not flow over the edge of the cliff onto the cliff face. Construction stormwater and permanent stormwater would flow inland, away from the edge of the cliff, traveling a path of primarily pervious lawn or woods, before flowing into the storm catch basin or water quality swale.

Phases 2 and 3, Cliff Stabilization

Cliff stabilization, Phases 2 and 3, would have a positive direct impact on Fourth Cliff (Appendix G). The erosion-control system would use a cobble berm for shoreline protection at the toe of the cliff at a 1:2 slope or slightly less steep and soft erosion-control measures on the cliff face. The proposed cobble berm would be made of rocks larger than pebbles but smaller than boulders (2.5 inches to 10.0 inches in diameter). The proposed vegetated bluff would include natural-fiber mats and topsoil with salt-tolerant, native vegetation. The cobble berm system would provide moderate protection to the bank for approximately 20 years.

4.4.2 Alternative 2 — Divestiture of the Property

Phase 1, 2 and 3

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. It is unknown what actions, if any, potential future owners would undertake under the Divestiture Alternative. Potential impacts to soils could not be assessed. If no construction is done, the coastal bank would continue to erode. Wave action would continue to erode the toe of the natural slope and would continue to remove talus material at the toe as the upper part of the slope erodes and flattens. If there is no construction taking place, there would be no temporary construction impacts.

4.4.3 No Action Alternative

Phase 1, 2 and 3

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance as needed, resulting in no change to the status quo. No major construction would take place and the coastal bank would continue to erode. Wave action would continue to erode the toe of the natural slope and remove talus material at the toe as the upper part of the slope erodes and flattens. With no construction taking place, there would be no temporary construction impacts.

4.5 Biological Resources

This section provides an analysis of impacts to vegetation, wildlife, sensitive species, and threatened and endangered species associated with the analyzed alternatives.

Potential impacts to biological resources related to implementation of the Preferred Alternative would be associated with ground disturbance during construction. Impacts to biological resources are considered significant if one or more of the following criteria are met with the implementation of the Proposed Action:

- Loss of individuals or populations of a federally listed or proposed endangered or threatened species or its habitat;
- Loss of critical habitat and/or declining wildlife habitat that is sensitive or rare to the region;
- Loss of at least 5 percent of undisturbed habitats within a biogeographic region;
- Loss of regional natural vegetation communities; and
- Loss of regional native plant or animal species or reduction of regional community diversity.

4.5.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

4.5.1.1 Vegetation and Wildlife

Phase 1, Road Repair and Circulation Improvements

The Preferred Alternative is a phased approach to cliff stabilization. Phase 1 involves cleaning up the site and providing for safe and functional pedestrian and vehicular circulation. Phase 1 would have less-than-significant permanent negative impacts to vegetation and less-than-significant temporary impacts to wildlife. The direct impact of the road repair and paving activities on vegetation, birds, and wildlife is expected to be less than significant. During construction, if migratory bird nesting areas are observed, the environmental oversight personnel would document the location and physically stake the nesting area and inform construction workers to avoid the area. Indirect impacts during construction could cause wildlife to be temporarily displaced from the construction area. These species would be expected to return soon after construction activities have been completed. The Preferred Alternative would result in long-term preservation of locally important habitat for vegetation and wildlife.

Phase 1 involves uplands only with no impacts to Land Containing Shellfish (Blue Mussel and Surf Clam).

Phases 2 and 3, Cliff Stabilization

Phases 2 and 3 would have less-than-significant permanent negative impacts to vegetation and wildlife. The direct impact of building the ramp and stairs and the cobble berm on vegetation, common shore birds, and wildlife is expected to be less than significant. Indirect impacts during construction could cause common wildlife species to be temporarily displaced from the construction area. These species would be expected to return soon after construction activities have been completed.

Phase 2 and 3 would include replenishing sediment that is critical to the long-term preservation of locally important habitat. Bird nesting habitat on the west side of the cliff is likely to benefit from long-term monitoring and sediment replenishment as needed.

Land Containing Shellfish would experience less-than-significant impacts as the resource area is beyond the limit of work. The blue mussel habitat is located at the intertidal zone between the mean high waterline (MHW) and the mean low waterline (MLW) on the western shore extending just around to the eastern side of the toe. The surf clam habitat is located along the southern side of the eastern bank, about 400 feet from the construction area (Figure 4-3).

4.5.1.2 Threatened and Endangered Species

Phase 1, Road Repair and Circulation Improvements

The DAF has conducted annual monitoring of the three listed shore bird species during the migratory season (piping plovers, red knots and least terns) for 20 years. Habitat for these listed species exists on the west side of Fourth Cliff. The dune on the east side of Fourth Cliff has been visually surveyed as part of the annual survey effort and no habitat for listed species was observed. Fourth Cliff contains no known critical habitat for the northern long-eared bat.

Phase 1 activities are a relatively small roadway and path project and impacts from it will be confined to the uplands on the DAF property with no impacts to nesting areas. Short-term impacts from construction that “may affect, not likely to adversely affect” would occur throughout the project area due to noise and human activities. Disturbance of feeding adult birds would be temporary and limited to the area immediately surrounding the project area. Comments on the May 2022 Environmental Notification Form from the Massachusetts Division of Fisheries and Wildlife include that “the Division does not anticipate this phase [Phase 1] of the project will result in a prohibited Take and any state-listed species concerns can be addressed during the MESA review process.”

Phases 2 and 3, Cliff Stabilization

Permanent impacts from the Preferred Alternative Phases 2 and 3 to Priority and Estimated Habitat at the toe area and the eastern bank are estimated at 82,333 s.f. Early scoping coordination for the EA with the Massachusetts Division of Fish and Wildlife’s NHESP provided comments (February 28, 2019 and March 14, 2019) including the suggestion, which was adopted, to include a long-term beach replenishment program as part of the Proposed Action and referenced comments provided in 2002 on a proposal to address erosion at Fourth Cliff. It reiterated these suggestions in comments on the Environmental Notification Form July 27, 2022. DAF will continue coordination with NHESP for MESA review to ensure compliance with the state-listed rare species protection provisions per 321 CMR 10.00 and 310 CMR 10.00. Early scoping coordination with USFWS began informal Section 7 consultation to assess impacts of the alternatives.

The Massachusetts Audubon Society’s February 21, 2019, comments included requests to analyze the potential impacts of a hard structure on the need for future maintenance dredging in nearby channels; potential impacts to bird breeding and foraging habitats and the potential loss of sediment deposited on adjoining areas. Input received from these and other agencies at various points helped change the Preferred Alternative from a hard revetment to the proposed cobble berm with vegetated bluff.

The cobble berm would not directly affect the beach and dune habitat on the west side of Fourth Cliff used as nesting habitat by piping plovers, least terns and red knots due in part to the sediment replenishment program that would add sediment to compensate for the fact that the composition of the cliff has been changed. Design of the ramp and stairs on the west side of the site would begin as part of Phase 2 and would include features promoted by CZM to protect plants that stabilize the shoreline. The stairs and ramp would be located to encourage pedestrian access at one location and allow for natural sand movement.

The DAF will complete consultation with USFWS with the expected determination of "may affect, not likely to adversely affect" which requires USFWS consultation and written concurrence. The DAF is committed to continuing its annual monitoring and will do a rare species survey on the property before design of Phases 2 and 3 begins. Short-term impacts that "may affect, not likely to adversely affect" would occur throughout the project area due to noise and human activities of construction (Figure 4-4). Disturbance of feeding adult birds would be temporary and limited to the area immediately surrounding the project area.

Construction activities that take place within the nesting seasons for piping plovers, least terns, and red knots would not directly affect the beach and dune habitat on the west side of Fourth Cliff. Possible indirect affects to beach or dune habitat due to the proximity of construction would be minimized by employing environmental oversight personnel on site and on-call throughout all operations daily. These personnel would educate the contractor about potential nesting areas and be trained in what to do if they encounter a nesting area. During construction, if nesting areas are observed, the environmental oversight personnel would document the location and physically stake the nesting area and inform construction workers to avoid the area. The DAF would identify staging areas and develop a restoration plan for the construction access to the beach.

The Preferred Alternative would not result in permanent impacts to endangered or threatened whales that annually migrate through and feed in Cape Cod Bay (North Atlantic right whale and fin whale). Whales that enter coastal waters adjacent to the Fourth Cliff project area would potentially be impacted by barges entering and leaving the project area. Early coordination with NMFS resulted in comments on February 22, 2019, and March 4, 2019, indicating the Proposed Action would encroach into the water near the toe of the peninsula, up to approximately 50 feet outward from the current MHW line and proposed use of barges. NMFS requested the DAF analyze potential impacts using NMFS ESA Section 7 Mapper, the results of which suggested to the DAF that informal Section 7 consultation would continue and conclude with a "may affect, but not likely to adversely affect" determination. The NMFS posited that consultation would not be undertaken. Consequently, the DAF advised NMFS on March 11, 2019, that it would not initiate consultation or determination at this time. It committed to re-engaging if the design of the project changes and impacts to coastal resources are beyond currently expected and ensuring the construction documents include required avoidance measures.

Potential impacts would be temporary, constructed-related impacts and would be mitigated to the extent possible. The following measures would be required to be implemented:

- Shallow draft vessels that maximize the navigational clearance between the vessel and the river bottom should be used where possible.
- Vessels should operate at speeds of less than 10 knots in areas where whales or sea turtles are expected to be present at that time of year.
- Whenever operating in areas where whales or sea turtles are present, a competent person should be posted and measures taken to slow down and avoid any whales or sea turtles spotted. If a whale is sighted when the barge is in transit, the competent person would require the barge operator to steer away and adhere to NMFS regulations for approaching whales (50 CFR § 224.103). If a whale is sighted when the barge is grounded, the competent person would stop work immediately until the dangers of stress are eliminated.
- The competent person would report whale sightings within 24 hours to the NMFS Marine Animal Response Hotline and NMFS Habitat and Protected Resources Division.
- An NMFS Marine Mammal Observation Report will be completed for every whale sighting.

4.5.2 Alternative 2 — Divestiture of the Property

4.5.2.1 Vegetation and Wildlife; Threatened and Endangered Species

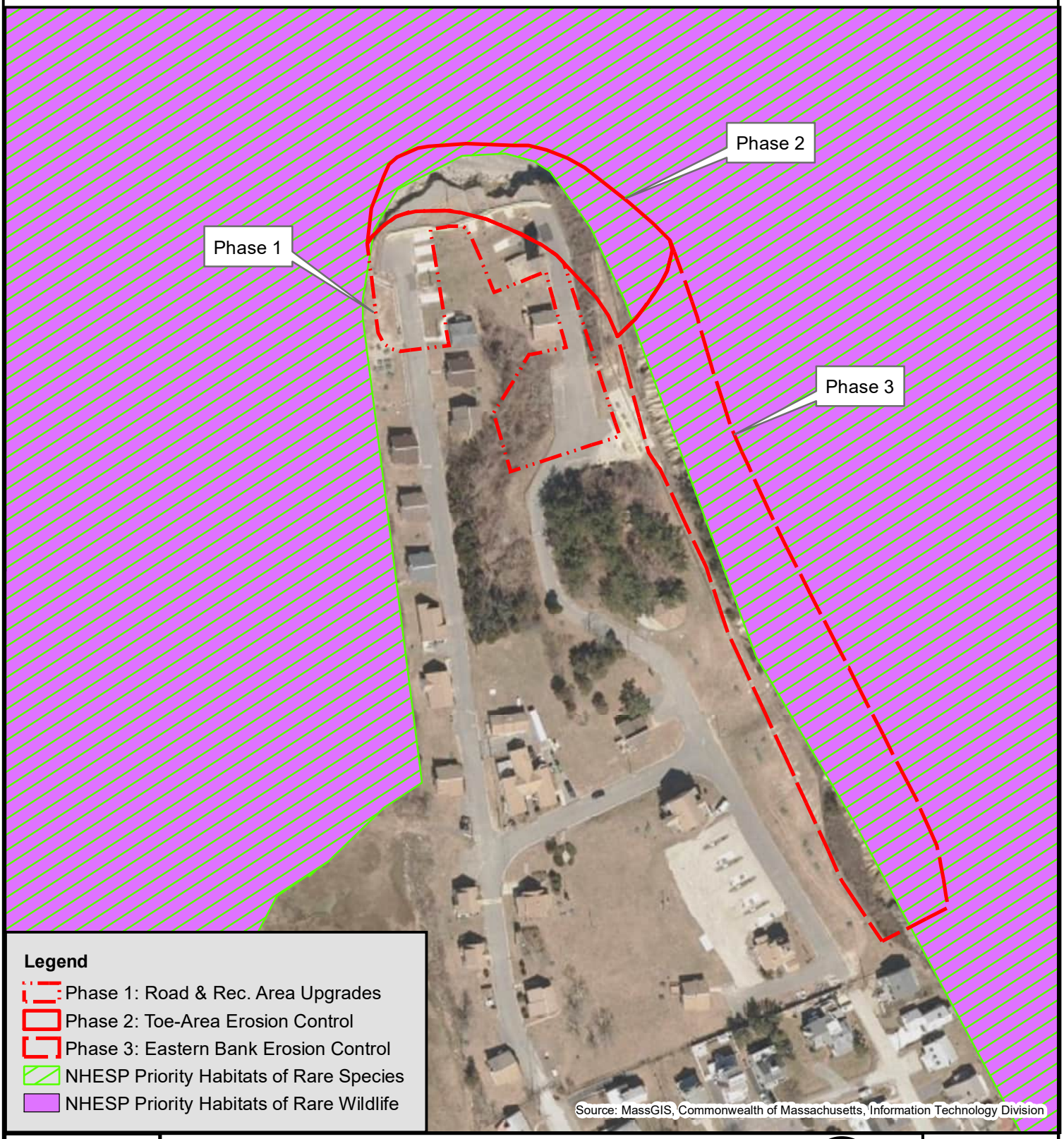
Under the Divestiture Alternative, no construction would take place. Continued cliff erosion would likely impact habitat over time. Sediment from the cliff would continue to infill the South River and potentially impact piping plover, red knot and least tern nesting beach habitat to the west of Fourth Cliff. No barges would be operating and there would be no impact to whales.

4.5.3 No Action Alternative

4.5.3.1 Vegetation and Wildlife; Threatened and Endangered Species

Under the No Action Alternative, no construction would take place. Continued cliff erosion would impact habitat used by listed species over time. Sediment from the cliff would continue to infill the South River and potentially impact piping plover, red knot and least tern nesting beach habitat to the west of Fourth Cliff. No barges would be operating and there would be no impact to whales.

Figure 4-3: NHESP Priority Habitat Impacts



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Feet

FIGURE 4-3

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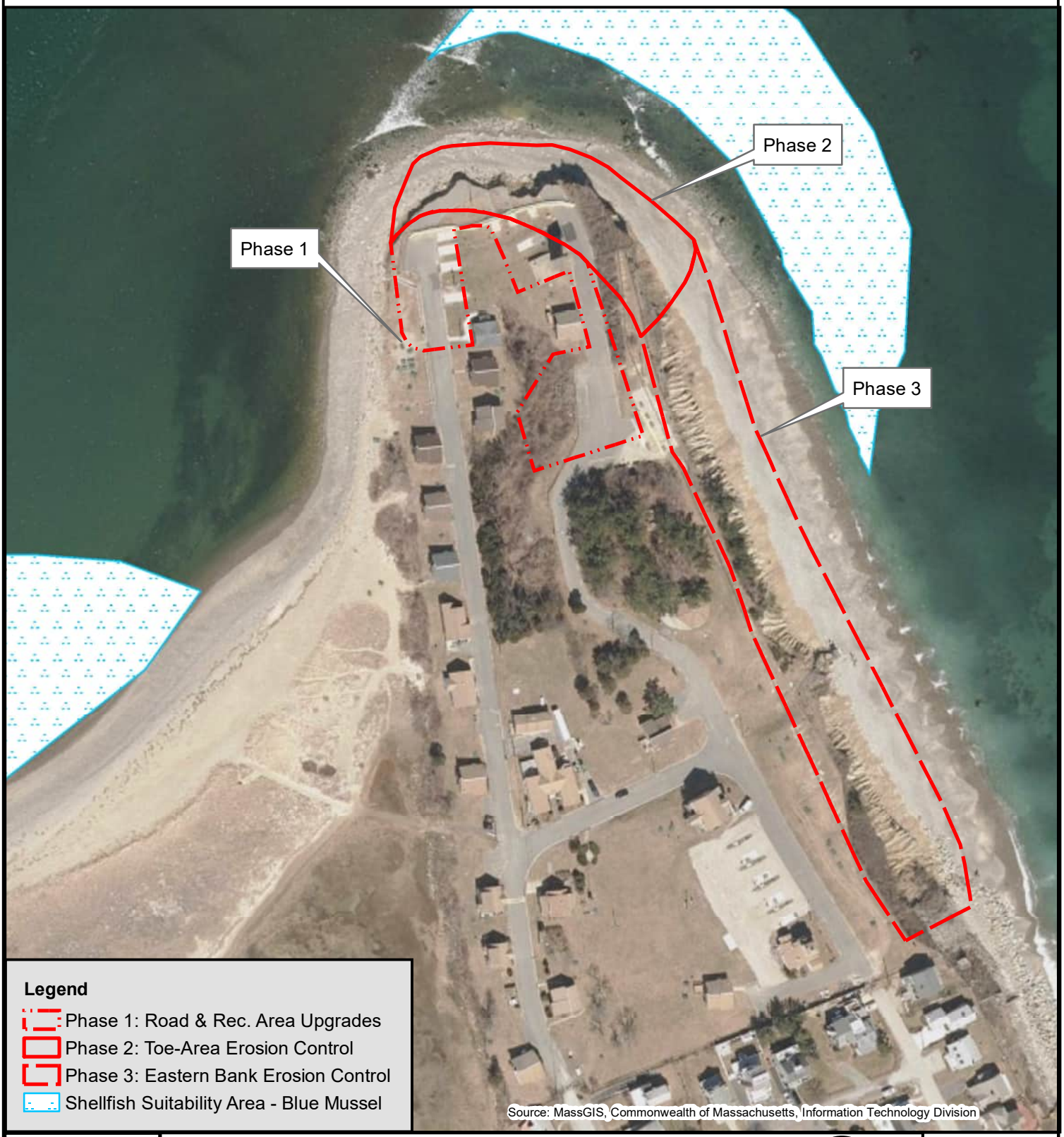
Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_NHESP Priority Habitat_Figure 4-3.mxd

Figure 4-4: Land Containing Shellfish Impacts



Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Shellfish Impacts_Figure 4-4.mxd

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FIGURE 4-4

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4.6 Noise

This section describes potential short-term, construction-period impacts and potential long-term operations noise impacts.

4.6.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Phase 1, Road Repair and Circulation Improvements

The Preferred Alternative would not generate noise. Phase 1 construction activities would generate temporary noise impacts at the project site. Construction would take place between April 2023 and December 2023. Noise-sensitive receptors could be affected by noise generated from the construction site as well as noise generated from construction vehicles transporting workers and materials to and from the construction area.

Noise levels from demolition and construction activities would vary depending on the type of activity, the location of activities, and the number and types of equipment used. Construction activities would generate noise from diesel-powered earth-moving equipment, such as dump trucks, excavators, backhoes, and bulldozers, as well as from back-up alarms on certain equipment. Pile driving is not anticipated for the proposed improvements. Construction noise at offsite receptor locations would be dependent on the loudest piece of equipment operating at the time. According to the Federal Highway Administration (FHWA) *Construction Noise Handbook* (FHWA, 2006), noise levels from diesel-powered equipment range from 80 to 95 dBA at a distance of 50 feet. Table 4-3 summarizes the pieces of construction equipment that would operate during each construction phase and the maximum noise levels at 50 feet. There would be no long-term operations noise impacts from the Preferred Alternative. Temporary construction-related noise impacts would be associated with operation of equipment and vehicles. Potential noise impacts from construction activities were assessed using a standard reference for construction noise, which is shown in Table 4-2. Noise-sensitive receptors in the project area are the cottages and the picnic areas. People at the Recreation Hall adjacent to the project area would likely experience a short-term increase in noise during construction.

Phases 2 and 3, Cliff Stabilization

The Preferred Alternative Phases 2 and 3, cliff stabilization, would involve similar construction equipment as in Phase 1 for a longer period (10–12 months). Because Phases 2 and 3 would involve installation of the cobble berm and vegetated bluff at the tip, potential vibration impacts were considered. The Federal Transit Administration (FTA) sets vibration limits for potential vibration damage to neighboring buildings in the *Transit Noise and Vibration Impact Assessment* (FTA 2006). Buildings considered “extremely susceptible to vibration damage” could be damaged with a vibration level of 90 vibration velocity level in decibels (VdB; FTA 2006).

The project will not include pile driving, an activity that generates high vibration levels. Most of construction equipment that will be on the project site typically produce measured vibration levels less than the most stringent criteria for potential structural damage of 90 VdB. Large bulldozers, loaded trucks, and jackhammers have vibration levels less than 90 VdB; vibratory rollers produce vibration levels higher than 90 VdB (94 VdB) (FTA 2006). Structural problems with susceptible buildings may occur when the ground experiences continuous excitation when some pile drivers operate continuously, not when construction equipment is operated with sufficient time between impacts (FTA 2006). Construction at Fourth Cliff is not likely to involve highly repetitive actions producing high vibration levels. Although the fire tower is historic and could respond differently to vibrations from other Fourth Cliff structures, the magnitude and frequency of vibration generated will be low and vibration is not likely to create an adverse effect.

Table 4-3. Noise Levels of Construction Equipment at 50 Feet and 100 Feet

Equipment	Noise Level at 50 Feet (dBA)	Noise Level at 100 Feet (dBA)
Earthmoving		
Front Loaders	79	73
Backhoes	85	79
Dozers	80	74
Tractors	80	74
Graders	85	79
Pavers	89	83
Trucks	82	76
Materials Handling		
Concrete Mixers	85	79
Concrete Pump	82	76
Crane	83	77
Concrete Crushers	85	79
Stationary		
Pumps	76	70
Generators	78	72
Compressors	81	75
Impact		
Jackhammers	88	82
Pneumatic Tools	86	80

Source: EPA, 1971.

4.6.2 Alternative 2 — Divestiture of the Property

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. It is not likely that construction would take place; therefore, no noise impacts would occur.

4.6.3 No Action Alternative

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance as needed, resulting in no change to the status quo. It is not likely that construction would take place; therefore, no noise impacts would occur..

4.7 Safety and Occupational Health

This section describes the impacts on safety, occupational health, and the protection of children for the three alternatives analyzed. Impacts to Fourth Cliff visitors, employees, and beach users were assessed, and the results are presented herein.

4.7.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Preferred Alternative, Phase 1, 2 and 3

Phase 1 would improve the safety of users of the property by cleaning up the upland areas that were damaged and where amenities were destroyed by storms over time. The severely damaged RV sites would be removed, turnarounds on the east and west side for fire access would be built, and accessible parking spaces and new pedestrian paths would be installed to connect the east and west sides of the cliff, which is currently generally impassible due to the severe grade differential.

For all phases of the Preferred Alternative, impacts to traffic from construction activities would be negligible and not expected to impact any nearby communities. Therefore, repair and stabilization of Fourth Cliff would not be expected to adversely impact any human populations.

During construction, the Preferred Alternative could pose health and safety issues for personnel during construction. The Preferred Alternative would expose workers to increased noise levels during construction that may be greater than acceptable levels established by federal and state Occupational Safety and Health Administration (OSHA) regulations. Construction workers would be required to follow OSHA standards to establish and maintain applicable safety procedures to mitigate noise impacts. These are expected to be less-than-significant and would cease once construction is complete. Local traffic impacts would be negligible. Standard construction site safety precautions would be implemented to ensure children would not be exposed to increased health or safety risks from the Preferred Alternative.

4.7.2 Alternative 2 — Divestiture of the Property

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The long-term safety of the DAF visitors, beach users, and children would be protected as they would no longer use the site. Public users of the beach could be threatened as erosion might not be addressed.

The safety of Fourth Cliff employees at the site would be guaranteed as they would no longer work at the site following divestiture. It is unknown what actions, if any, potential future owners would undertake.

4.7.3 No Action Alternative

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance as needed, resulting in no change to the status quo. No construction would likely take place. The long-term safety of Fourth Cliff employees at the site, the DAF visitors, beach users, children, and the public would be threatened, as erosion would not be addressed and the cliff would continue to recede.

4.8 Cultural Resources (National Historic Preservation Act Section 106)

This section discusses the potential impacts of the alternatives to historic and cultural resources at Fourth Cliff.

4.8.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Phase 1, Road Repair and Circulation Improvements

The Preferred Alternative is a phased approach to cliff stabilization. Phase 1 involves cleaning up the site and providing for safe and functional pedestrian and vehicular circulation. Phase 1 would have no permanent negative impacts and would have beneficial impacts on the Fire Control Observation Tower by improving fire truck access.

Temporary impacts during construction would be less than significant.. Battery #208, the Fire Control Observation Tower, and the Fire Control Observation Station would be protected by exclusion fencing to ensure that structures or foundations are not damaged. Any construction activities adjacent to these structures also would be monitored for unexpected discoveries. In the event of accidental discovery of a cultural resource, construction would stop in the immediate vicinity and the DAF would contact the MHC to evaluate the find and determine an action plan.

Phases 2 and 3, Cliff Stabilization

The Preferred Alternative Phases 2 and 3, cliff stabilization, would have a positive impact, providing protection to Fourth Cliff resources eligible for listing in the NRHP. The Preferred Alternative would slow the erosion, stabilize the shoreline, and protect the historic structures and Fourth Cliff District eligible for listing in the NRHP (Figure 4-5). There would be no adverse effect in accordance with 36 CFR § 800.5(b).

The DAF sent a scoping consultation letter for the previous proposed Preferred Alternative (riprap revetment with vegetated bluff and road repair) to the MHC on January 29, 2019, and scoping consultation letters to three tribes on December 28, 2018, None of the tribes responded but the MHC sent comments on February 22, 2019. The MHC concurred with the DAF's eligibility opinion that three structures at Fourth Cliff Recreation Area are eligible for listing in the NRHP. The MHC also concurred with the DAF's finding that the proposed cliff stabilization plan would have "no adverse effect."

4.8.2 Alternative 2 — Divestiture of the Property

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. It is unlikely the DAF would fully know the new owner's plans and future actions for the site. If Fourth Cliff is transferred out of federal ownership, the DAF would protect resources eligible for listing on the NRHP by including a historic preservation covenant in the deed. The MHC agreed by letter (February 22, 2019) that if this is done, the transfer would have no adverse effect.

4.8.3 No Action Alternative

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance, as needed, resulting in no change to the status quo. Erosion would continue, and the cliff would recede, threatening the three eligible structures. Facilities closest to the edge of the cliff, including Battery #208, would become unsafe and at risk of collapse. The No Action Alternative would result in an adverse effect according to 36 CFR § 800.5(a)(2)(vi). The DAF would work with the MHC on ways to avoid, minimize and mitigate the adverse effect.

Figure 4-5: Cultural Resources Impacts

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Cultural Resources_Figure 4-5.mxd

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FIGURE 4-5

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4.9 Utilities and Utility Infrastructure

The threshold level of significance for impacts to utilities and utilities infrastructure would be an exceedance of the existing utilities' capacity or improvements to utilities and infrastructure at Fourth Cliff.

4.9.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Phase 1, Road Repair and Circulation Improvements

The Preferred Alternative is a phased approach to cliff stabilization. Phase 1 involves cleaning up the site and providing for safe and functional pedestrian and vehicular circulation. Phase 1 would have positive impacts on utilities and infrastructure by removing approximately 6,772 s.f. of existing asphalt and concrete pavement, removing 120 feet of concrete curb at the damaged cliff area, providing improved pedestrian access and use of the facility; recreating some of the camping amenities and safety features lost to erosion; restoring full fire department access; installing ADA-compliant parking and access to site features, and installing a safety railing. Utilities damaged by storms would be permanently addressed, including damaged sanitary pipe, a waterline, and obsolete electrical service from the former RV sites. Concrete RV pads, approximately 600 s.f., would be removed along with the light pole near the edge of the tip and the protective barrier and fence. A 6-foot-wide asphalt pedestrian path would connect the east and west roads. A wood post and cable barrier would be installed for safety while allowing views of the ocean.

On Central Avenue, one new ADA-compliant, van-accessible parking space would be added on Central Avenue near the existing laundry building along with a 6-foot-wide concrete walk to access the new pedestrian route. Five parking spaces would be created at the edge of the existing Central Avenue, replacing the northwest spaces that were lost due to inability for cars to access the area. A fire truck turnaround surfaced with open graded gravel is included. On Cliff Road three existing deteriorated RV spaces would be resurfaced.

There would be no direct impacts to groundwater from the Proposed Action, During construction, temporary less-than-significant impacts to groundwater may occur during excavation and when grading is done for erosion controls. Erosion and sedimentation control BMPs would be employed to minimize impacts.

Phases 2 and 3, Cliff Stabilization

The Preferred Alternative Phases 2 and 3, cliff stabilization, would cause no permanent change to water supply, wastewater and solid waste. Asphalt would be disposed of at a legal, prequalified disposal site in accordance with Massachusetts Solid Waste Regulations, including 310 CMR § 19.017.

4.9.2 Alternative 2 — Divestiture of the Property

Although it is unknown what actions, if any, potential future owners would undertake, it is assumed under the Divestiture Alternative that no construction would take place. There would be no permanent change to water supply or wastewater. The road and paths would not be reconstructed, and the utilities would not be upgraded. The RV pads would not be reconstructed. The amount of solid waste produced by DAF activities at Fourth Cliff would drop to zero after divestiture.

4.9.3 No Action Alternative

Under the No Action Alternative, no construction would take place. There would be no permanent change to water supply or wastewater. The road would not be reconstructed, and the damaged utilities would not be upgraded. The RV pads would not be reconstructed. The amount of solid waste produced at Fourth Cliff would decrease due to the elimination of the three RV sites. There would be no direct impacts to groundwater.

4.10 Geology and Topography

4.10.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Phase 1, Road Repair and Circulation Improvements

The Preferred Alternative is a phased approach to cliff stabilization. Phase 1 involves cleaning up the site and providing for safe and functional pedestrian and vehicular circulation. Implementation would not substantially alter a unique or recognized geologic feature, adversely affect geologic conditions or processes, or expose people or property to geologic hazards that could result in injury or loss of use. Impacts to topography would be negligible.

Phases 2 and 3, Cliff Stabilization

The Preferred Alternative Phases 2 and 3, cliff stabilization using a cobble berm and vegetated bluff at the cliff would change the geology of a small portion of Fourth Cliff. The material forming the toe of the cliff would become stones sized up to 10 inches and the vegetated berm would be created by backfilling and planting. The nearly vertical, exposed cliff face with no vegetation would become a sloped, partially vegetated bank. The impacts to geology and topography would less than significant.

4.10.2 Alternative 2 — Divestiture of the Property

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. There would be no known impacts to the cliff geology and the topography of the cliff would likely continue to change due to ongoing erosion because is it unknown what actions a future owner might pursue to address the ongoing erosion.

4.10.3 No Action Alternative

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance as needed, resulting in no change to the status quo. There would be no impacts to the cliff geology and the topography of the cliff would continue to change due to ongoing erosion.

4.11 Land Use and Visual Resources

This section discusses impacts of the alternatives to land use and aesthetics.

4.11.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Phase 1, Road Repair and Circulation Improvements

The Preferred Alternative is a phased approach to cliff stabilization. Phase 1 involves cleaning up the site and providing for safe and functional pedestrian and vehicular circulation. Phase 1 would have positive impact to land use at Fourth Cliff by restoring RV pads and enabling pedestrian access from one side of the cliff to the other. The visual quality of the recreation area itself would be improved for DAF personnel. The replanted areas would restore the bucolic appearance of the recreation area. Views of the ocean would be improved by removing the chain link fence and replacing it with a low wood post and cable barrier. Phase 1 would slightly improve the appearance of the cliff from the beach by removing the unsightly chain link safety fence, sawcutting damaged pavement and removing damaged utilities. Views from the water and the beach would fundamentally be unchanged as Phase 1 would not address cliff erosion and the appearance of most of the damaged cliff would not change (Figure 4-6).

Figure 4-6: Visual Impacts

Exhibit 1: Existing Cliff Debris
(Taken November 2021)

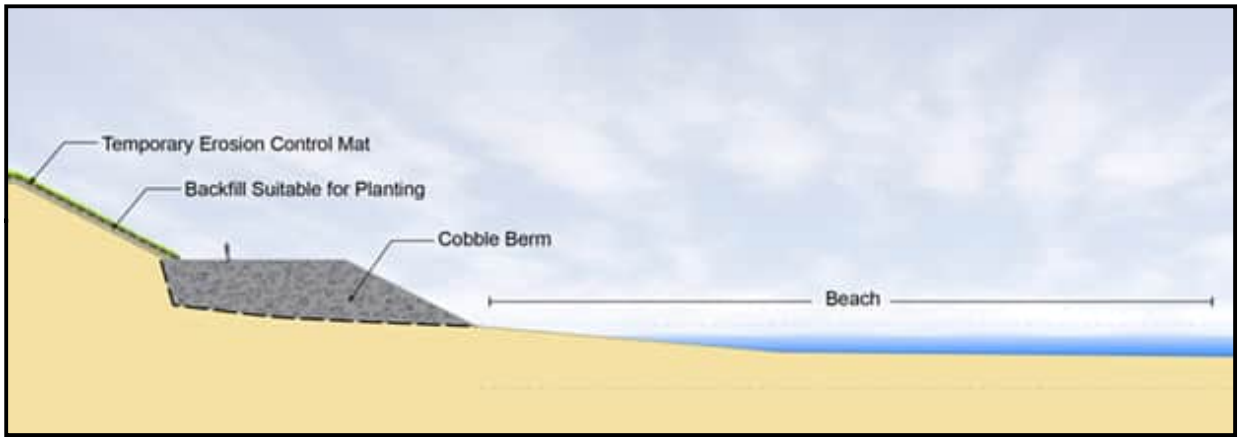

Exhibit 2: Proposed Cobble Berm
& Vegetated Bluff (Phase 2 & 3)

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FIGURE 4-6

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Phases 2 and 3, Cliff Stabilization

The cobble berm and vegetated bluff at the cliff would change the visual character of the coastal bank along Fourth Cliff. The shoreline would change from nearly vertical, exposed cliff face with no vegetation to a sloped, partially vegetated bank. This change would be noticeable from the key viewpoints, the beach below Fourth Cliff or from the water east or north of the site. There would be no change in visual quality from the buildings, RV sites, and recreational areas at the Fourth Cliff facility itself.

4.11.2 Alternative 2 — Divestiture of the Property

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. There would be no impact to land use at Fourth Cliff. The shoreline would continue to erode and deteriorate and the visual quality of the cliff from key viewpoints (beach and water) would not improve. The visual quality would worsen as more of the constructed recreation area environment encroaches on the landscape.

4.11.3 No Action Alternative

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance as needed, resulting in no change to the status quo. There would be no impact to land use at Fourth Cliff. The shoreline would continue to erode and deteriorate and the visual quality of the cliff from key viewpoints (beach and water) would not improve. The visual quality would worsen as more of the constructed recreation area environment encroaches on the landscape.

4.12 Scenic Protected River and National Natural Landmarks

A scoping consultation letter was sent to The North and South Rivers Watershed Association, Inc. on January 16, 2019. Comments received on February 13, 2019, (undated letter) requested coordinating with the National Park Service because of the two rivers' National Landmark status. It stated that hard structures may have negative consequences on shoreline habitat and to longshore sediment transfer.

4.12.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Phase 1, Road Repair and Circulation Improvements

The Preferred Alternative is a phased approach to cliff stabilization. Phase 1 activities are a relatively small roadway and path project and impacts from it will be confined to the uplands on DAF property with no impact on the North River, which is a Scenic Protected River, and would not impact the North and South rivers, National Natural Landmarks. The river corridors are located about 2,000 feet from Fourth Cliff. The Protective Order for the North River covers land up to 300 feet from the bank of the river.

Phases 2 and 3, Cliff Stabilization

The Preferred Alternative no longer includes a hard structure for erosion control, proposing in its place a cobble berm and vegetated bluff. A key design element of the Preferred Alternative is a long-term sediment replacement program that would return sand to potential habitat nesting areas to compensate for potential loss caused by the cobble berm, if warranted based on monitoring of the nesting area. The Preferred Alternative (Phases 2 and 3) is expected to have a less-than-significant impact.

4.12.2 Alternative 2 — Divestiture of the Property

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither

the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. There would be no impact to the North and South rivers corridor, located about 2,000 feet from Fourth Cliff.

4.12.3 No Action Alternative

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance as needed, resulting in no change to the status quo. There would be no impact to the North and South rivers corridor, located about 2,000 feet from Fourth Cliff.

4.13 Massachusetts Coastal Zone Program Policies

The federal Coastal Zone Management Act of 1972 gave states with marine or Great Lakes shorelines the opportunity to develop management plans for coastal resources within the coastal zone and the authority to implement these plans. The project area is within the Massachusetts Coastal Zone which is the area bounded by the seaward limit of the state's territorial sea (generally 3 miles from shore) to 100 feet landward of major roads, railroads or other visible right–of-way.

The CZM implements the March 2011 *Massachusetts Coastal Zone Management Policy Guide* (Policy Guide) which is a component of the federally approved Massachusetts coastal program. The Policy Guide included the coastal program policies that address natural, cultural, social, and economic resources. MCZM ensures consistency with its policies through several laws and regulations such as the Massachusetts Environmental Policy Act (MEPA), the Massachusetts WPA, and the Massachusetts Public Waterfront Act (Chapter 91).

The Preferred Alternative's consistency with CZM policies and principles is discussed in Appendix H and Appendix I. Although Phases 2 and 3, erosion control at the tip and the eastern bank, will be designed and built in the future when funds are available, Phase 1, primarily cleaning up the site and improving circulation, is designed and funded and requires no state permits. DAF will file Notice of Project Change detailing the design and potential impacts of the proposed erosion-control measure, when available.

4.14 Water Resources

This section evaluates impacts to water resources relevant to the project area, which are surface water, floodplains, wetlands, and access to the water's edge.

Comments on the scoping coordination letter DAF sent to CZM dated March 29, 2022, and a prefiling meeting for the ENF on March 30, 2022, provided valuable input. The comments expanded on the direction provided by CZM and other agencies and entities in 2019 as regards DAF's original proposed cliff stabilization project using a rip-rap revetment.

The Preferred Alternative is a phased approach to cliff stabilization. Phase 1 involves cleaning up the site and providing for safe and functional pedestrian and vehicular circulation, and Phases 2 and 3 include an erosion-control system. Impacts from the Preferred Alternative to coastal resources would require review, licenses, and permits from local, state and federal agencies. The proposed project would require a Notice of Intent with Scituate, ENF for MEPA (Certificate requiring no Environmental Impact Report received August 8, 2022), Section 401 Water Quality Certificate, USACE § 404 permit, and CZM consistency determination. Order of Conditions from the Scituate Conservation Commission would include conditions that would seek to minimize and mitigate the impacts of the Preferred Alternative to coastal resources under its jurisdiction. In addition, USACE and the contractor would seek comments from federal and state agencies for the Section 404 permit.

4.14.1 Surface Water

4.14.1.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Preferred Alternative, Phase 1, 2 and 3

The Preferred Alternative would not create permanent impacts to surface water. Temporary construction-related impacts could include sedimentation and erosion. Mitigation measures to reduce impacts would include the following:

Temporary stormwater BMPs would include

- Silt protection at catch basin inlets;
- Silt fence and erosion-control tubes;
- Street sweeping and other dust-control measures would be performed regularly;
- Pavement will be loaded into trucks and hauled offsite at time of removal, eliminating the possibility of runoff from a stockpile; and
- BMPs in the Stormwater Pollution Prevention Plan including checking, cleaning, repairing, and replacing BMPs throughout construction and after every rain event would be followed.

Permanent BMPs would be included at the base of the proposed turnaround on Cliff Road, grading the surface to drain as it does in the existing condition—into the woods. Ultimately, this stormwater drains west and into the catch basins on the west side of the cliff. Along the cliff side of the pedestrian path, a new grass-lined swale with check dams empties into a 500 cubic feet (c.f.) sediment basin with 2:1 side slope. A water quality riser with a 1/4 inch orifice and open-grate overflow will be connected to the existing catch basin with a 12-inch HDPE pipe sloped at 1.0%. The existing catch basin contains a 14-inch reinforced concrete pipe that drains at an assumed 1.0% slope to the west.

The key component of the site work is that the proposed grading would allow stormwater to flow inland and down the slope to the existing catch basins as in existing conditions. Due to elevations and stormwater management described herein, stormwater from the top of the cliff does not now flow over the edge of the cliff onto the cliff face and would continue not to flow over the edge of the cliff with the Preferred Alternative. Construction stormwater and permanent stormwater would flow inland, away from the edge of the cliff, traveling a path of primarily pervious lawn or woods, before flowing into the storm catch basin or water quality swale.

The grass-lined swale and sediment basin are provided. A 0.25-inch water quality orifice and 12-inch concrete pipe to the existing system provide water quality to the extent practicable. The site is too small to require detention; it only requires 660 c.f. of water quality. The contractor will not be allowed to perform maintenance on the site or have hazardous material storage on the site. This minimizes the likelihood of a spill or environmental concern.

4.14.1.2 Alternative 2 — Divestiture of the Property

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. No construction would likely take place. There would be no impacts to surface water.

4.14.1.3 No Action Alternative

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance as needed, resulting in no change to the status quo. There would be no impacts to surface water.

4.14.2 Floodplains

4.14.2.1 Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property

Phase 1, Road Repair and Circulation Improvements

Phase 1 of the Preferred Alternative, road repair and pedestrian improvements, would not impact very-high-risk (VE) flood zone but would impact 7,400 s.f. of high-risk (AE) flood zone located along the western shore of the facility (Figure 4-5).

Phases 2 and 3, Cliff Stabilization

Phase 2 and 3 of the Preferred Alternative, a cobble berm with vegetated bluff, would permanently impact 79,559 s.f. of very-high-risk (VE) flood zone adjacent to the eastern bank of the cliff and 1,965 s.f. of high-risk (AE) flood zone located along the western shore of the facility. Work would be conducted within a VE flood zone. Construction of the cobble berm with vegetated bluff is not likely to raise the flood elevation (Figure 4-7). The project would protect landward features from flood tides during storms and the associated wave erosion. Because the eroded cliff is adjacent to coastal flood zones, stabilizing the bank will impact flood zones in that area. There is no practicable alternative other than to install the composite shore protection structure at the cliff.

4.14.2.2 Alternative 2 — Divestiture of the Property

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. No construction would likely take place. There would be no impacts to floodplains.

4.14.2.3 No Action Alternative

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance as needed, resulting in no change to the status quo. There would be no impacts to floodplains.

4.14.3 Coastal Wetlands

310 CMR 10.00 regulates coastal resource area in order to contribute to the public interests of flood control, storm damage prevention, and protection of marine fisheries and wildlife habitat. Five protection methods ranging from a vertical bulkhead wall to beach nourishment alone were assessed by DAF (refer to Table 2-1). DAF used the following standards to evaluate the methods: engineering feasibility, environmental impact, degree of permanence and required maintenance, and ability to control sheeting rainfall. Although the Preferred Alternative would not be very effective in areas on high wave energy and would have approximately a 25-year predicted lifespan, it is the most appropriate given the regulatory framework for storm damage prevention and protecting environmental resources.

The Preferred Alternative would impact six coastal resource areas as defined by the WPA—velocity zone, coastal beach, coastal dune, barrier beach, coastal bank and land subject to coastal storm flowage. Most of the coastal wetland areas are within a flood zone. With the exception of velocity zone, Phase 1 of the Preferred Alternative would result in no impacts to coastal resource areas. Phases 2 and 3, installation of the erosion control system, would impact six resource areas.

Velocity Zone

Velocity flood zones, also called V-zones or coastal high-hazard areas, are identified by FEMA as areas "where wave action and/or high velocity water can cause structural damage in the 100-year flood," a flood with a 1% chance of occurring or being exceeded in a given year.

The Preferred Alternative is mapped within and adjacent to a high-risk VE flood zone on the eastern side and high risk AE flood zone on the west side of the cliff

The FEMA Flood Insurance Rate map for Scituate, Fourth Cliff Recreation Area (FEMA FIRM Panel No. 25023C0137K, effective date 11/4/2016) shows the beach area is located within a Special Flood Hazard Area, with a base flood elevation determined. The map indicates two separate base flood elevations within the project area; one elevation (elevation 23 feet) along the eastern side, coincident with the Bay, and a different elevation (elevation 17 feet) at the north and west sides and the inlet. The project area located on top of the cliff is located within Zone X, Areas of Minimal Flood Hazard.

Overall, no adverse impacts to mapped area identified by FEMA are anticipated by implementing the Preferred Alternative. Phases 2 and 3, erosion-control system, would be designed to reduce wave reflection, dissipate wave energy, and address the sources of upland runoff.

Coastal Beach

Coastal beach may play an important role in preventing damage from storms, providing flood control, and protecting marine fisheries. Coastal beach exists from the toe of the coastal bank and cliff face and extends laterally toward and below the mean low water line. Currently the beach is devoid of vegetation and does not indicate regular use by wildlife. Cliff erosion onto the beach gets washed into the South River during storm events.

The Preferred Alternative Phases 2 and 3, cliff stabilization, would impact approximately 41,606 s.f. of Coastal Beach. Fourth Cliff is a minor source of sediment for beaches in the project area, and the cobble berm with vegetated bluff is not expected to increase erosion or impede sediment transport. The proposed cobble berm (Phases 2 and 3) would be designed to provide sediment supply with grain size consistent with existing conditions (Figure 4-8).

Coastal Dune

Coastal dunes aid in storm damage prevention and flood control by supplying sand to coastal beaches. Coastal dunes protect inland coastal areas from storm damage and flooding by storm waves and are also often significant in protecting wildlife habitat. The Preferred Alternative Phases 2 and 3, cliff stabilization, would impact approximately 43,184 s.f. of Coastal Dune. The dune on the east side is unvegetated and has formed relatively recently. The dune was not present during a comprehensive ecological analysis conducted at Fourth Cliff in 2008 and was not identified as a wetland resource in the MassGIS system. The dune does not play a role in storm damage prevention (Figure 4-9).

Barrier Beach

Barrier beaches are narrow strips of low-lying land consisting of coastal beaches and dunes running roughly parallel to the trend of the coast. The Preferred Alternative Phases 2 and 3, cliff stabilization, would temporarily impact approximately 11,200 s.f. of Barrier Beach during construction by locating a barge (approximately140 feet by 40 feet) and tug on the west side Barrier Beach for up to 10 months. The Barrier Beach at the tip and west side of the peninsula is not important for storm damage prevention and would not be changed by the Phase 2 cobble berm installation. The proposed cobble berm (Phases 2 and 3) would be built to minimize the time the barge is in the Barrier Beach to the extent possible (Figure 4-10).

Coastal Bank

The Preferred Alternative Phases 2 and 3, cliff stabilization, would impact approximately 1,436 l.f. of Coastal Bank. The proposed cobble berm (Phases 2 and 3) will be designed to slow erosion of Fourth Cliff while minimizing impacts to adjacent beaches. The cobble berm will be designed to maximize energy dissipation and avoid refocusing wave energy. It will be designed to provide a minor source of sediment (Figure 4-11).

Land Subject to Coastal Storm Flowage

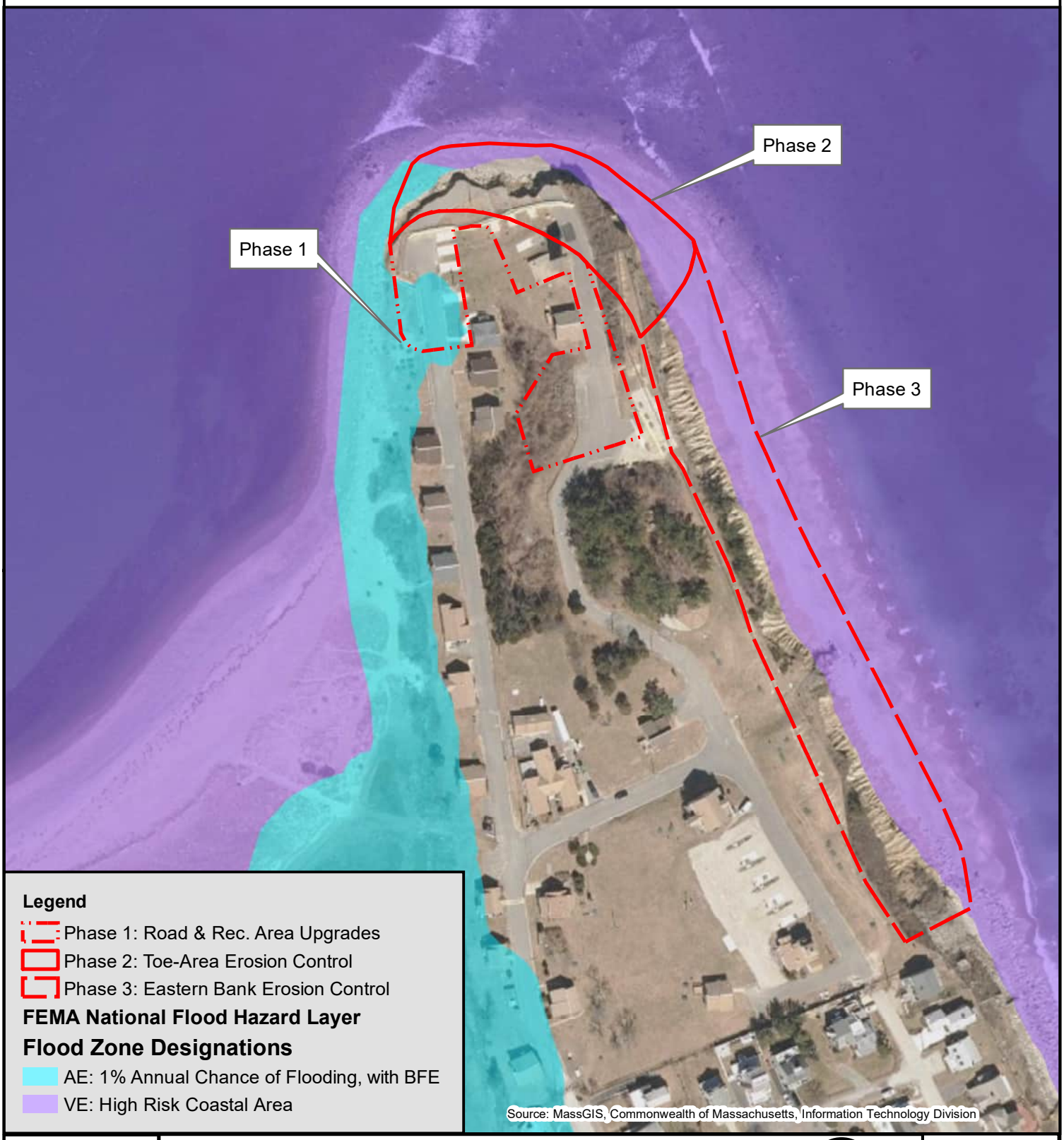
The Preferred Alternative Phases 2 and 3, cliff stabilization, would impact approximately 84,790 s.f. of Land Subject to Coastal Storm Flowage (Coastal Dune and Coastal Beach). The proposed cobble berm structure is not expected to significantly affect floodwater flow paths or velocities to the extent that could impact adjacent properties because the design has been revised from the original hard revetment structure design and the revised design complies with CZM guidance.

A summary of impacts to resource areas by phase for the Preferred Alternative is shown in Table 4-4.

Table 4-4. Summary of Resource Area Impacts

	Phase 1 (Road Repair and Pedestrian Paths)	Phases 2 and 3 (Erosion-control System)
	(s.f.)	(s.f.)
Water Resources		
Velocity Zone	7,400	79,559
Coastal Beach	0	41,606
Coastal Dune	0	43,184
Barrier Beach	0	11,200 (temporary)
Coastal Bank	0	1,436 l.f.
Land Subject to Coastal Storm Flowage	0	84,790
Biological Resources		
NHESP	0	82.333

Figure 4-7: Floodplain Impacts



U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

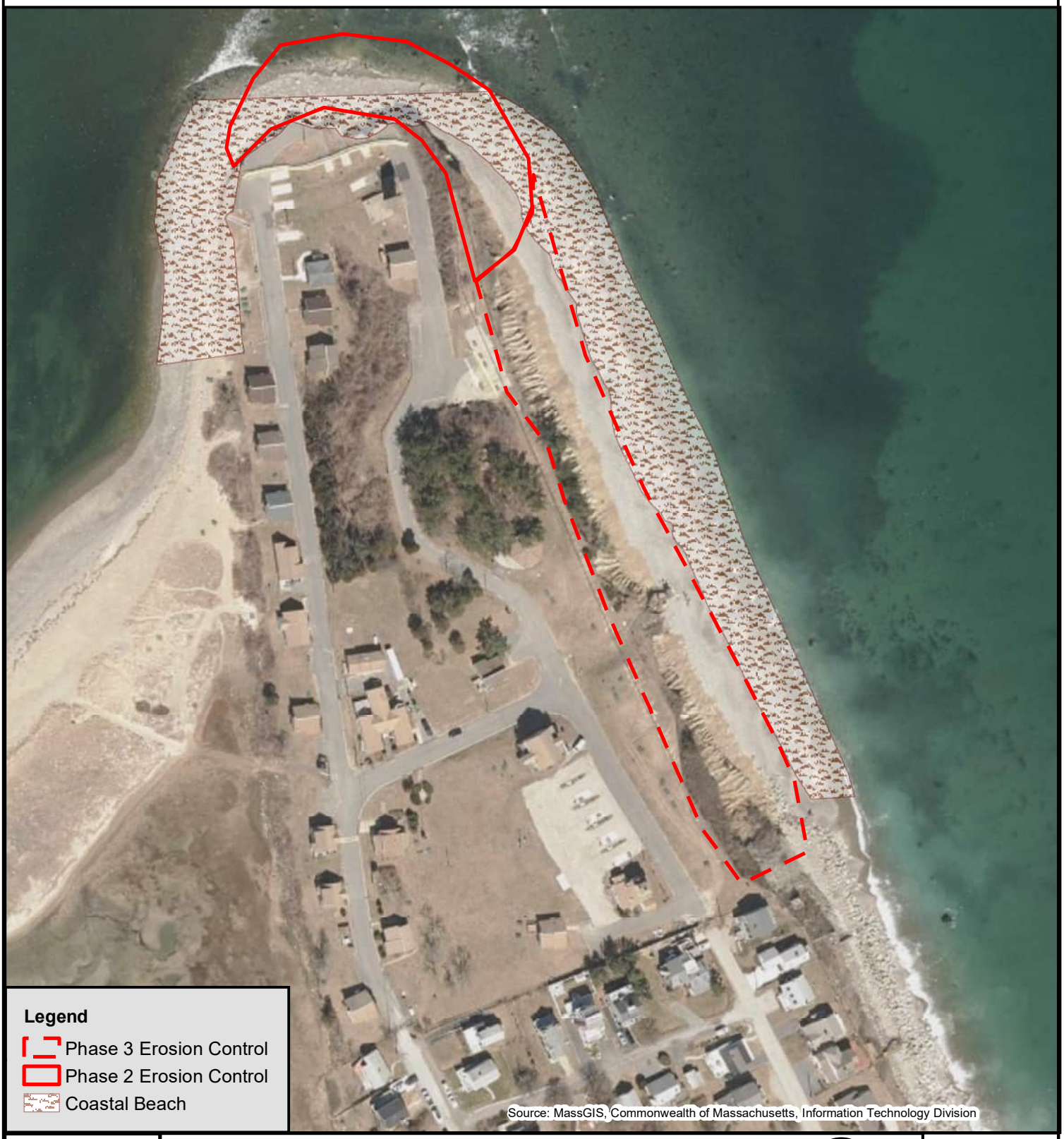
0 40 80 160
Feet

FIGURE 4-7

FEB 2023

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Floodplain Impacts_Figure 4-7.mxd

Figure 4-8: Coastal Beach Impacts



U.S. AIR FORCE

FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 40 80 160
Feet

FIGURE 4-8

FEB 2023

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Coastal Beach_Figure 4-8.mxd

Figure 4-9: Coastal Dune Impacts

FOURTH CLIFF RECREATION AREA
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PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

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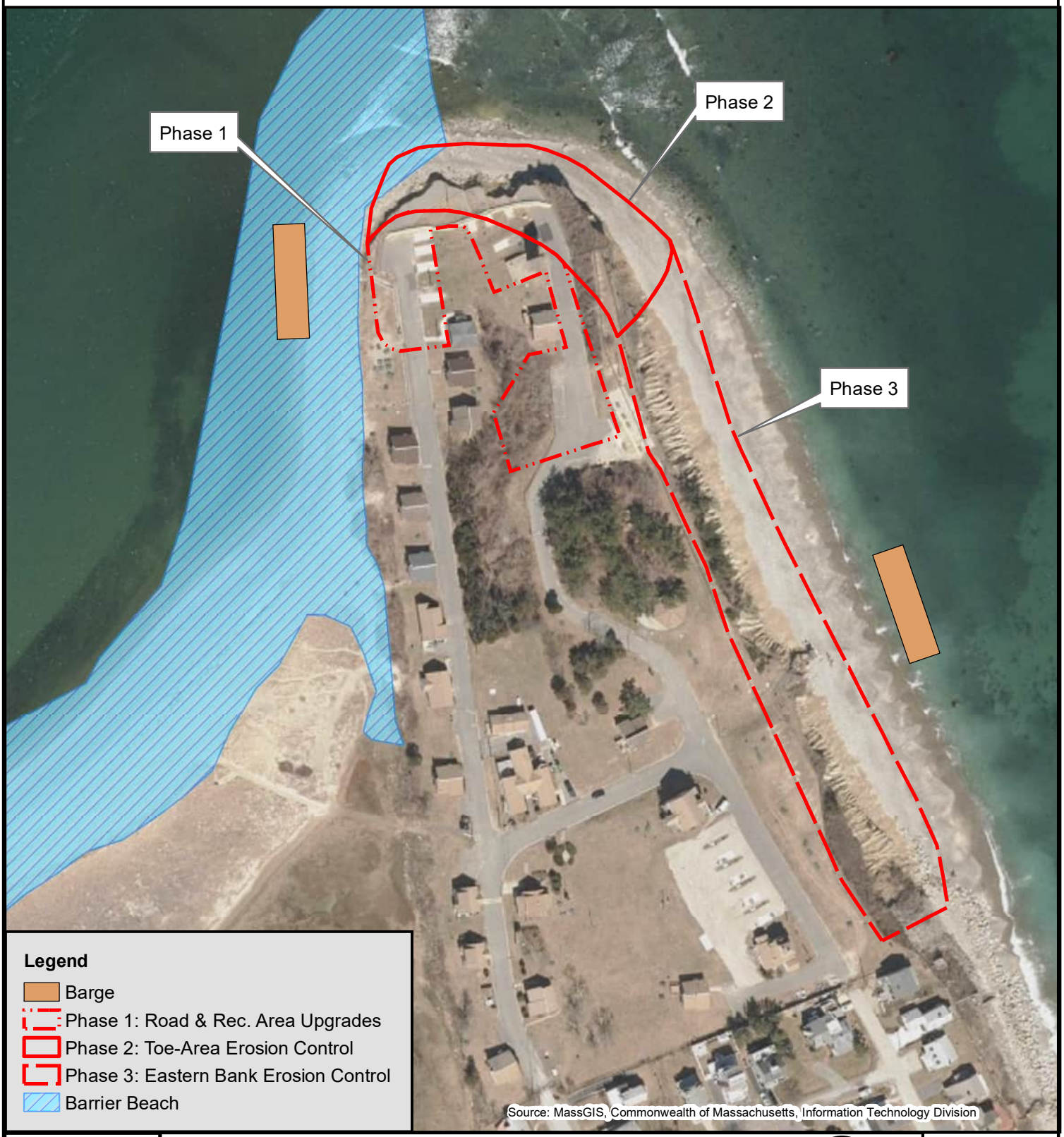
FIGURE 4-9

FEB 2023

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Coastal Dune_Figure 4-9.mxd

Figure 4-10: Barrier Beach Impacts



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FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 40 80 160
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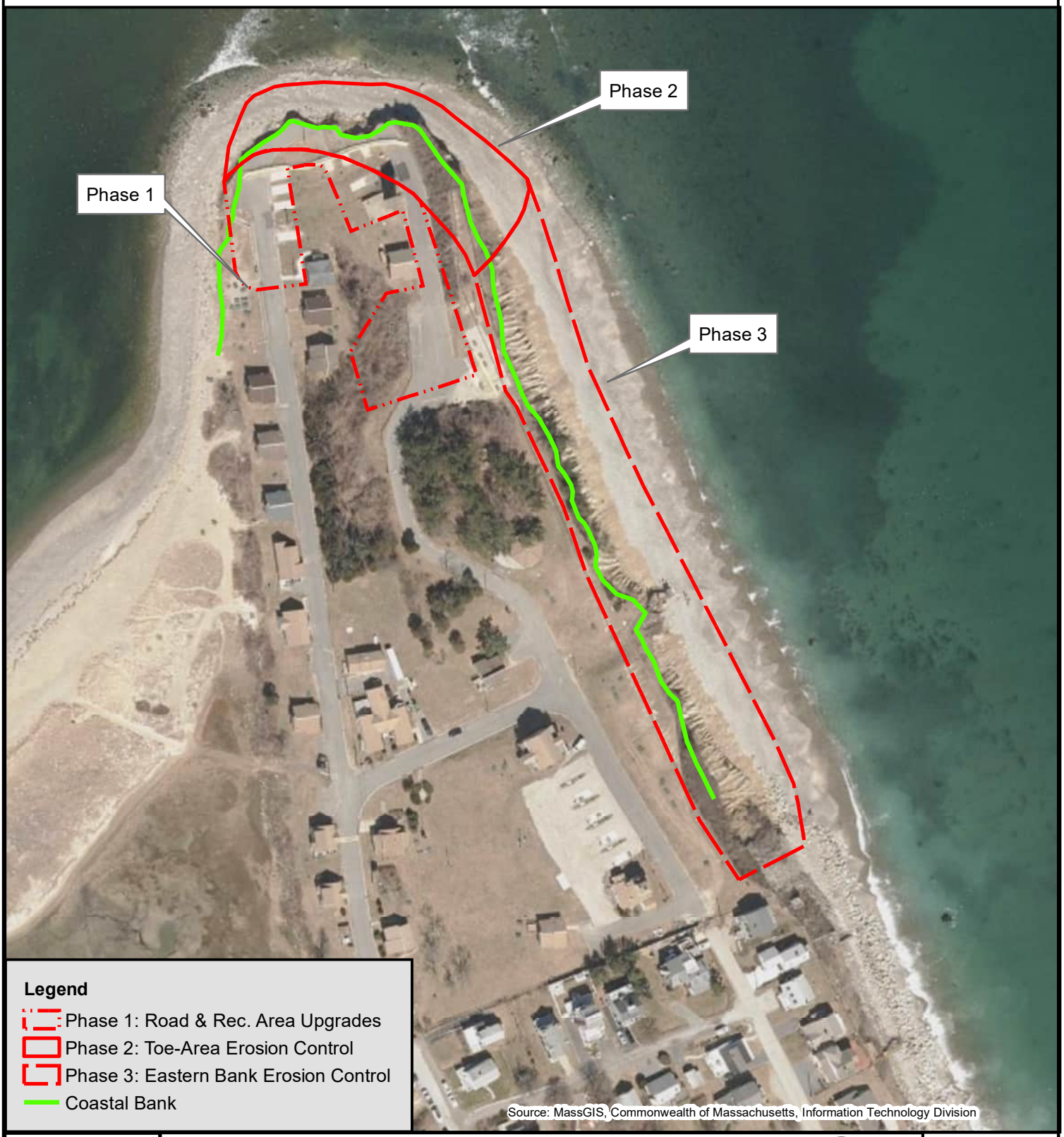
FIGURE 4-10

FEB 2023

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Barrier Beach_Figure 4-10.mxd

Figure 4-11: Coastal Bank Impacts



FOURTH CLIFF RECREATION AREA
SHORELINE REPAIR & STABILIZATION PROJECT,
PLYMOUTH COUNTY, SCITUATE, MASSACHUSETTS

0 40 80 160
Feet

FIGURE 4-11

FEB 2023

U.S. AIR FORCE

Location: \\BOSFIL11\Data2\NAI_proj\KZF\2018\E2X82200 - KZF 4th Cliff\600 Discipline Files\650 GIS\GIS\MXD\Fourth Cliff_Coastal Bank_Figure 4-11.mxd

4.14.4 Alternative 2 — Divestiture of the Property

Under the Divestiture Alternative, the DAF would declare Fourth Cliff as excess property and would proceed to divest its ownership interest. A new owner would be sought. The DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. No construction would likely take place. There would be no impacts to velocity zone, coastal beach, coastal dune, barrier beach, coastal bank, or land subject to coastal storm flowage.

4.14.5 No Action Alternative

Under the No Action Alternative, the DAF would address neither the damage caused by storm damage nor the continuing shoreline erosion at Fourth Cliff. The DAF would do periodic maintenance, as needed, resulting in no change to the status quo. There would be no impacts to velocity zone, coastal beach, coastal dune, barrier beach, coastal bank, or land subject to coastal storm flowage.

4.15 Cumulative Effects

A cumulative effect (impact) is that which produces an “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions” (40 CFR § 1508.1(g)). This section discusses the recent, present, and foreseeable future projects considered during the assessment of cumulative effects of each alternative. A cumulative impact analysis captures the effects that would result from the Preferred Alternative in combination with the effects of other actions in the same ROI.

The impacts from Fourth Cliff alternatives are generally less than significant and BMPs would be used to lessen impacts. Projects identified in Table 4-5 (projects that took place in the past, current projects and those likely to happen in the future) are mostly not close in geography or time. The incremental impacts from all projects are none or negligible. No cumulative effects are expected. The following resource areas were examined in detail for the EA:

- Air Quality
- Soils
- Biological Resources
- Noise
- Safety and Occupational Health
- Cultural Resources (NHPA Section 106)
- Utilities and Utility Infrastructure
- Land Use and Visual Quality
- Water Resources
- Scenic Protected Rivers and National Natural Landmarks Program

Table 4-5 lists projects that were recently completed, ongoing projects and planned projects identified for Scituate and Marshfield. Table 4-5 indicates that these projects, primarily located geographically distant from Fourth Cliff, do not overlap with or combine with the Preferred Alternative to exceed a threshold.

Table 4-5 Past, Present, and Future Projects

Project	Completion	Town(s)	Does Action Overlap in Space with Preferred Alternative?	Does Action Overlap in Time with Preferred Alternative?	Do Incremental Effects Exceed a Significance Threshold?
Route 3A Corridor Improvements	Estimated 2024	Scituate	No	No	No
8 Newell Avenue Single Family House	Estimated December 2022	Scituate	No	No	No
South River Dredging – Phase 1	Completed (2019)	Marshfield and Scituate	No	No	No
Fourth Cliff Recreation Area Improvements	Completed (2017)	Scituate	No	No	No
Station 4 Humarock Fire Station Expansion	Completed (2021)	Scituate	No	No	No
Coastal Erosion, Sediment Transport, and Prioritization Management Strategy Assessment for Shoreline Protection	Adopted (2016)	Scituate	No	No	No
DAF/Mass. Audubon/North and South Rivers Watershed Association/ Massachusetts Bays National Estuary Partnership Blue Mussel Restoration Program	Estimated summer 2025	Scituate	Yes (Phase 2)	No	No

4.15.1 Past Projects

Completed projects in Scituate and Marshfield do not have negative impacts on Fourth Cliff or the region. Improvements at the Fourth Cliff facility include demolishing Buildings 35 and 37 and removing supporting utilities, constructing a one-way stone access drive, building eight new RV sites, building a new access drive to existing cottages, constructing a new gravity sanitary sewer, and installing water, sewer, and electrical connections to each of the new RV sites. Expansion of the Scituate Station 4 fire station included temporarily relocating the fire station functions to Fourth Cliff Recreation Area. The expansion was completed and the station functions returned to the River Street facility. The new fire station will ensure safety for Humarock residents. Dredging the South River removed over 18,000 c.y. of material from the entrance channel to the South River, some of which was likely debris from the eroded Fourth Cliff, addressing navigation safety issues.

4.15.2 Reasonably Foreseeable Future Projects

The DAF will build a pavilion/gazebo in the future on the western side of its property, away from where the work to stabilize the cliff would be done. The proposed location is off Central Avenue and is currently used as a picnic area with picnic tables and fire grills. A portable tent structure is often installed during the peak season. The proposed pavilion would be about 20 feet by 40 feet and would consist of a roof with open sides. Construction of the pavilion would likely be included in Phase 2. Up to three additional trucks per day may be on the site during construction, generating less-than-significant temporary traffic, noise, or air quality impacts. No long-term impacts are anticipated from construction of the pavilion. The private house on Newell Avenue and the roadway work on Route 3A will have no impact.

Scituate's *Coastal Erosion, Sediment Transport, and Prioritization Management Strategy Assessment for Shoreline Protection* (August 2016) recommends actions to protect the shoreline at Fourth Cliff and Humarock Beach, south of the Fourth Cliff project area. In late 2018 the Board of Selectmen dropped a plan to elevate Central Avenue and build a 1-mile-long dune along the beach. Because there is no timetable for acceptance or implementation, it is not included as a reasonably foreseeable action. However, the Preferred Alternative does further Scituate's strategy of protecting Fourth Cliff.

Additional phases of South River dredging project will be done as funding allows, potentially implemented over a 10-year timeframe. If South River dredging project(s) and the cliff stabilization project were to occur at the same time, less-than-negligible temporary impacts caused by work in the South River could include air quality, traffic, and noise.

4.15.3 Cumulative Effects of Past and Future Actions and the Proposed Action

The past projects identified above do not have ongoing negative impacts. Impacts from future projects and the Proposed Action are primarily temporary construction-related impacts. Therefore, there are no expected permanent cumulative effects.

For construction-related impacts, the temporary impacts are likely to be localized at the project site at Fourth Cliff and may exist for a short period of time (less than 5 months). This class of impacts caused by cliff stabilization work could include the addition of about 20 construction-worker automobiles and about 10 trucks per day using the local streets. Operation of these vehicles at could create additional noise at Fourth Cliff. Operation of the crane, backhoe, grader, and other equipment would also create additional noise, including backup indicators and general construction noise. Potential impacts in similar time and space would be created by the other future projects.

However, the cumulative impacts of all projects are expected to be negligible. The small number of private cars and construction vehicles per day and the relatively short duration of all projects would result in less-than-significant cumulative noise and traffic effects within the ROI and beyond.

Cumulative impacts to coastal beach and barrier beach from the future projects and the Proposed Action could occur if the projects were undertaken at the same time or in close succession. Coordination with Scituate's dredging and shoreline protection activities would be completed to avoid adverse impacts to these two resources.

4.16 Summary of Environmental Consequences and Conservation Measures

Table 4-6 summarizes the impacts of the alternatives.

Table 4-6. Summary of Environmental Impacts for the Alternatives Analyzed

Impact Category	Alternative 1 — Retreat, Repair, and Stabilize Fourth Cliff Coastal Property			Alternative 2 — Divestiture			No Action Alternative		
	Significant	Less than Significant	None or Beneficial	Significant	Less than Significant	None or Beneficial	Significant	Less than Significant	None or Beneficial
Air Quality		■				■			■
Soils		■			■			■	
Biological Resources		■				■		■	
Noise		■				■			■
Safety and Occupational Health			■		■			■	
Cultural Resources (NHPA § 106)			■		■		■		
Utilities and Utility Infrastructure			■		■			■	
Land Use and Visual Resources			■		■			■	
Scenic Protected River			■			■			■
Water Resources		■				■		■	

The following mitigation measures would be implemented under the Preferred Alternative.

- The contractor would use construction BMPs to reduce soil erosion, stormwater pollution, emissions, and noise.
- If any previously undiscovered cultural or archaeological remains are uncovered during construction, all activity would be halted and the DAF Cultural Resource Manager contacted to coordinate with the MHC.
- To protect threatened and endangered species, environmental oversight personnel onsite and on-call would educate the contractor about potential nesting areas and take appropriate action if they encounter a nesting area.

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5 Consultation

Scoping letters for preparation of the EA in 2019 were sent to the following parties.

- MHC (SHPO)
- Scituate Board of Selectmen
- Scituate Town Administrator
- Scituate Planning Department
- Scituate Conservation Commission
- Scituate Coastal Advisory Commission
- Scituate Historical Commission
- Scituate Historical Society
- Scituate Department of Public Works
- Mashpee Wampanoag Tribe
- Wampanoag Tribe of Gay Head (Aquinnah)
- Narragansett Indian Tribe
- Massachusetts Commission of Indian Affairs
- Marshfield Board of Selectmen
- North and South Rivers Commission
- North and South Rivers Watershed Association
- Massachusetts Coastal Zone Management
- CZM South Shore Regional Coordinator
- Natural Heritage and Endangered Species Program Regulatory Review
- USFWS
- Massachusetts Audubon Society
- NOAA/National Marine Fisheries Service
- Massachusetts Board of Underwater Archaeological Resources

Follow-up scoping letters for preparation of the EA were sent in March 2022 to update stakeholder on the changes to the Proposed Action and Preferred Alternative (copies of agency coordination documentation are provided in Appendix A). The follow-up scoping letters were sent to the following parties:

- Scituate Town Administrator
- Scituate Planning Department
- Scituate Conservation Commission
- Scituate Coastal Advisory Commission
- Marshfield Town Administrator
- North and South Rivers Watershed Association
- Massachusetts Coastal Zone Management
- MCZM South Shore Regional Coordinator
- Natural Heritage and Endangered Species Program Regulatory Review
- USFWS
- Massachusetts Audubon Society
- NOAA/National Marine Fisheries Service

The ENF filed with MEPA was sent by file transfer protocol and email to the following (see Appendix H):

- Department of Environmental Protection, Boston and Southeastern Regional Office
- Mass. Division of Fisheries & Wildlife
- MassDOT Public/Private Development Unit
- MassDOT District 5
- Massachusetts Historical Commission (hard copy sent via USPS)
- Metropolitan Area Planning Council
- Scituate Board of Selectmen
- Scituate Town Administrator

- Scituate Planning and Development
- Scituate Coastal Management Office
- Scituate Board of Health
- Scituate Conservation Agent
- Scituate Town Library (hard copy sent via USPS)
- Marshfield Board of Selectmen
- Marshfield Town Administrator
- Marshfield Town Planner
- Ventress Memorial Library (Marshfield, Massachusetts; hard copy sent via USPS)
- Marshfield Board of Health
- Marshfield Conservation Agent
- State Representative Patrick Kearney
- State Senator Patrick O'Connor
- Division of Marine Fisheries – South Shore
- Massachusetts Coastal Zone Management
- CZM South Shore Regional Coordinator
- Mass. Audubon
- Mashpee Wampanoag Tribe
- Wampanoag Tribe of Gay Head (Aquinnah)
- Narragansett Indian Tribe
- The North and South Rivers Watershed Assn. Inc.
- Scituate Historical Society
- Richard Wright, Scituate resident
- Mark Jeanmarie, Scituate resident

Comments on the ENF included questions about Phase 1 design and construction, suggestions for a sediment replenishment program to be implemented when Phases 2 and 3 are implemented, guidance on complying with solid waste management regulations, a request to fully describe the barge transport and staging in Phases 2 and 3 to assess potential impacts, and support for addressing the erosion problems at Fourth Cliff to help preserve the recreation area for military personnel and families.

The DAF provided Supplemental Information to MEPA and the ENF distribution list on July 15, 2022, addressing comments and questions and has incorporated many of the responses in the EA.

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