FORT MONROE AUTHORITY
Resilience Plan

PREPARED FOR:

FORT MONROE
Where Freedom Lives

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List of Abbreviations

Abbreviation	Definition
AHAC	Affordable Housing Advisory Council
BRAC	Base Realignment and Closure
CBBT	Chesapeake Bay Bridge Tunnel
CERT	Community Emergency Response Team
CFM	Certified Floodplain Manager
CFPF	Community Flood Preparedness Fund
CO-OPS	Center for Operational Oceanographic Products and Services
CRMA	Climate Resilient Mitigation Activities
CRS	Community Rating System
DCR	Department of Conservation and Recreation
EO	Executive Order
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Fort Monroe Authority

FT	Feet
HAZUS	Hazards-United States
HMGP	Hazard Mitigation Grant Program
HRPDC	Hampton Roads Planning District Commission
LiDAR	Light Detection and Ranging
LiMWA	Limits of Moderate Wave Action
MARISA	Mid-Atlantic Regional Integrated Sciences and Assessments
MHHW	Mean High High Water
mm/yr	millimeters/year
MS4	Municipal Separate Storm Sewer System
MSL	Mean Sea Level
NAVD	North American Vertical Datum
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NHL	National Historic Landmark
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRHP	National Register of Historic places
RAND	RAND Corporation
SLR	Sea Level Rise
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VIMS	Virginia Institute of Marine Science
Zone AE	Flood zones are areas that present a 1% annual chance of flooding
Zone VE	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves

Executive Summary

The Old Point Comfort Peninsula, otherwise known as Fort Monroe, is uniquely situated as a coastal community within the municipal boundaries of the City of Hampton in Virginia. As such, the Fort Monroe Authority (FMA) and the City of Hampton have a shared responsibility in managing their properties and providing citizens with a multitude of governmental functions. In doing so, the FMA and City of Hampton seek to coordinate the development and implementation of community wide management plans such as the *Fort Monroe Authority Resiliency Plan* and City of Hampton's *Resilient Hampton Plans* in the continuing stewardship of their respective coastal community.

The land area of Fort Monroe, consist of 561.43 acres in total, which lies within the municipal boundaries of the City of Hampton. Of this land ownership total, the FMA/Commonwealth property ownership consist of 317.98 acres of land. The federal government which includes the National Park Service (NPS), US Army and the Department of Homeland Security currently own 243.45 acres. The property was formerly owned and managed by the United States Army and was transferred to the Commonwealth of Virginia in accordance with the provisions of the Defense Base Realignment and Closure Act (BRAC) which was executed in April of 2009.

Predominately, the lands of Fort Monroe are within a Special Flood Hazard Area (SFHA) subject to inundation by the 1% annual chance of flood and is precariously exposed to flooding from hurricanes and other severe storms which have the potential to produce high-water events. The entirety of Fort Monroe is designated as a National Historic Landmark (NHL) and National Register of Historic places (NRHP) District(s) located on a peninsula, which is surrounded by the Hampton Roads Harbor to the south, the Chesapeake Bay to the east, and Mill Creek to the west. The northern end of the property connects to Buckroe Beach through a narrow isthmus. The northwestern approach to the Fort Monroe peninsula is via the formally incorporated town of Phoebus, which is now part of the City of Hampton; connected by the East Mellen Street and East Mercury Boulevard bridges. Additionally, the historic stone fort, which is within the Fort Monroe National Monument lies within and is surrounded by a tidal influenced wet ditch or moat.

Flooding at Fort Monroe typically originates from tropical storms, hurricanes, and nor'easters which cause high intensity rainfall, high tides, high winds, and storm surges. Historically, during these events, the existing coastal defenses around Fort Monroe are overtopped and the existing stormwater infrastructure experiences back-flooding due to high tidal tailwater elevations. Storm surge is identified as the major contributor to highwater and/or flooding events, and flooding events from rainfall are typically minor and masked by storm surge.

Normal tidal ranges at Fort Monroe using data from the Sewell's Point tide station, found the mean sea level (MSL) to be 5.73 ft which ranges by 2.76 ft in either direction during lunar tides. The existing coastal defenses can withstand these tidal ranges, so flooding is not a concern during normal tidal events. Historic storm surges were analyzed using data from storm events at Sewell's Point between 1928 and 2003. During this period, 29 total events were recorded with a stillwater height of about 4.0 ft or greater. Hurricane Isabel, which occurred in 2003, had the second highest recorded peak stage (6.26 ft) and was found by USACE to be between a 40- and 50-year frequency event. A 100-year event is predicted to produce a stillwater elevation between 7.0 and 7.7 ft above MSL.

The intent of the FMA in the development of a *Fort Monroe Resiliency Plan* is to establish a planning and management document which seeks to address and/or plan for the eventualities which have the potential for high levels of storm surge and sea-level rise. In doing so, it is hoped that this planning and management document will greatly improve the FMA's ability to establish a resilient community within the City of Hampton, which also seeks to meet the requirements of the Community Flood Preparedness Fund (CFPF) grant program administered by the Department of Conservation and Recreation (DCR). The *Fort*

Monroe Authority Resiliency Plan which follows seeks to meet all five (5) objectives as set forth by the CFPF grant program:

1. It is project-based with projects focused on flood control and resilience.
2. It incorporates nature-based infrastructure to the maximum extent possible.
3. It includes considerations of all parts of the local government regardless of socioeconomics or race.
4. It includes coordination with other local municipalities and inter-jurisdictional projects, plans, and activities and has a clearly articulated timeline or phasing for plan implementation.
5. Is based on the best available science and incorporates climate, SLR, storm surge (where appropriate), and current flood maps.

Section 1, Introduction and History of Old Point Comfort and Fort Monroe.

Section 2, Natural Hazards & Vulnerabilities, the hazards that threaten Fort Monroe, and the critical facilities.

Section 3, Existing Flood Protection Measures, details the various infrastructure hardening measures that are already in place.

Section 4, *The Fort Monroe Authority Resiliency Plan*, provides information on the ongoing coordination efforts, the current science guiding the resilience efforts and project opportunities that the FMA plans to explore and develop.

1 Introduction

As a coastal community within the municipality of the City of Hampton, Fort Monroe, also historically known as “Old Point Comfort” is vulnerable to the potential for flooding via storm surge and sea-level rise, which has the potential to threaten the safety of its residents, damage and destroy property, disrupt local commerce and have an Adverse Effect to the Fort Monroe National Historic Landmark District (NHL). While natural hazards are a challenge if not impossible to prevent, designing with the purpose of resiliency can greatly minimize the potential for damage and contribute to accelerated recovery times which result from these hazards. In response to these concerns, the FMA has sought to develop a comprehensive plan that will seek to mitigate the eventualities of flooding events due to storm surge and sea-level rise as well as to coordinate with other local coastal communities. This plan while in a genesis form will be considered a living document that will evolve as conditions and methodologies change. The future of the Fort Monroe coastal community is dependent on the effective stewardship, implementation and ongoing development of this coastal resiliency plan.

1.1 Fort Monroe’s History

Historically known as “Old Point Comfort” and located at the southern tip of the Virginia Peninsula near the entrance to Hampton Roads Harbor, Fort Monroe is bordered by the City of Hampton’s Buckroe Beach to the north, the Hampton Roads Harbor to the south, the Chesapeake Bay to the east, and Mill Creek to the west. Fort Monroe is nearly an island, connected to Buckroe Beach by a narrow isthmus at the north end of the property (Figures 1 and 2). At the center of the property is Fortress Monroe, the original historic stone fort surrounded by a tidally influenced wet ditch or moat, with the remainder of the historic properties located outside the fortress itself. Vehicular access to and from Fort Monroe is provided by two bridge and causeway systems that connect the land mass to the City of Hampton’s Phoebus community.

Fort Monroe was developed and managed by the U.S. Army from 1819 until the U.S. Army’s deactivation of the post as a result of the Base Realignment and Closure (BRAC) on April 27, 2009, at which time ownership of Fort Monroe reverted to the Commonwealth of Virginia. The Fort Monroe Authority (FMA) was established as a political subdivision of the Commonwealth and as the property owner, was directed to manage the property in accordance to the stipulations of the established *Governing Documents.* Within those stipulations the FMA is to directed to provide for public access to the property’s cultural and natural resources and recreational opportunities, exercise exemplary stewardship of the Fort's natural resources, and maintain Commonwealth property in perpetuity as a place that is a desirable one in which to reside, do business, and visit.

The current fortress was built after the War of 1812. The land area around the historic stone fort has expanded over its history to a site that now covers 561 acres. Much of the land mass at Fort Monroe is built on made land and, as a result, is relatively low in elevation and the majority is located within the 100-year floodplain. Fort Monroe has experienced periodic flooding from hurricanes and other major storms over the course of its existence.

Several hurricanes and nor’easters (see Table 2) have impacted Fort Monroe, but the Great Hurricane of 1933 and Hurricane Isabel of 2003 were so severe that they are etched in history. It was believed that during the Great Hurricane of 1933, winds were over 95 miles per hour and tide over 10 feet of height occurred causing major disruption and damage to the infrastructure. Similarly in the recent past in 2003, during Hurricane Isabel, a wide spread infrastructure impact to Fort Monroe happened which amounted to several tens of millions of damage.

In August 2011, Hurricane Irene moved northward over the Outer Banks of North Carolina and just off the Virginia coast, producing heavy rains which caused widespread flooding across most of south central and southeast Virginia Saturday morning, August 27th into early Sunday morning, August 28th. Storm total

rainfall generally ranged from six to as much as 12 inches. Heavy rains associated with Hurricane Irene produced widespread lowland flooding across much of Southside Hampton Roads, including roadways which were washed out or closed. Wind and water caused an estimated $2.2 million in damage to properties leased by the Fort Monroe Authority.

More recently, during Hurricane Matthew in 2016, Buckroe Beach and Fort Monroe both sustained damage. Buckroe Beach suffered extensive shoreline damage and received federal funds for emergency restoration. At Fort Monroe, loss of power inhibited pumping out of basements and other facilities. Fort Monroe is experiencing increasingly frequent tidal flooding, exacerbated by water backflow through the stormwater drainage infrastructure during high tides.

Figure 1: Fort Monroe Vicinity Map Illustration

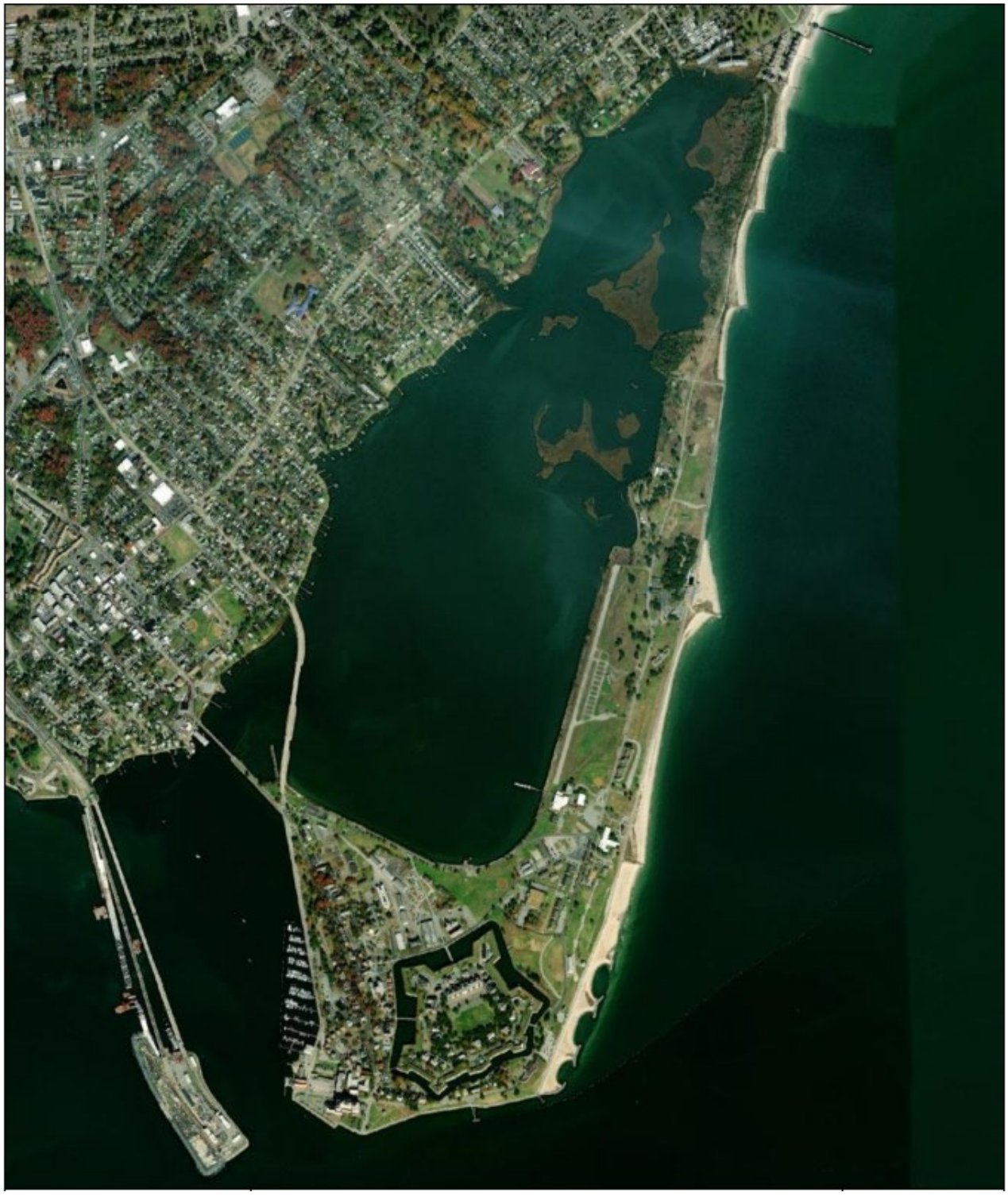

Figure 2: Fort Monroe Aerial Photograph Illustration

2 Natural Hazards and Vulnerabilities

The risk from natural hazards has increased across Virginia. The number of federally declared disasters has steadily increased nationally. The number of federally declared disasters has experienced a 250 percent increase over the past 20 years, including declarations for flooding, hurricanes, severe storms, and wildfire. It is forecast that this increase in extreme weather events and natural disasters will continue to have a profound impact on localities across Virginia, especially to those localities that lie within coastal regions.

2.1 Flooding and Related Hazards

2.1.1 Nature of Flooding at Fort Monroe

The most serious flooding that occurs at Fort Monroe is during two types of meteorological events: tropical systems including tropical storms and hurricanes and “northeaster” storms, which are stationary low-pressure systems that form off the Atlantic coast and produce high tides, large waves, and heavy rainfall. The anticyclonic nature of these storms produces high winds from the north and northeast. Hurricanes tend to be relatively fast-moving events that typically pass through the area in a matter of hours, but often have higher winds and larger storm surges. Northeast storms, however, often last through several tidal cycles and create high storm surges and longer-term impacts on flood protection measures and coastal structures.

A U.S. Army Corps of Engineers study (“Fort Monroe Flood Evaluation and Protection Study”) was performed to identify flood protection measures needed at Fort Monroe. The Corps Study reviewed storms from 1928 to 2003 and determined that approximately 40% of the flooding events at Fort Monroe that produced stillwater heights in excess of 4 feet were generated by tropical systems while the remaining 60% were associated with northeastern storms.

These weather events bring about flooding to Fort Monroe in several ways. The first is through storm surges and wave action that overtop coastal defense structures such as seawalls that front the Chesapeake Bay. This was the principal source of floodwaters in Fort Monroe during Hurricane Isabel. Additional flooding occurs from storm surges that force water back into the storm drains, which then flood up into the interior streets of the fort and into the entrances to moat and the fortress itself. Rainfall during these storms generally causes only minor flooding at Fort Monroe, which is often masked by the storm surge.

The flooding pattern during Hurricane Isabel in 2003, which was a severe tropical storm when it struck the Hampton Roads area, is characteristic of the types of flooding Fort Monroe has experienced during major storms. As documented in the Corps Study, much of the flooding occurred from overwash of the seawalls, which was trapped in low points in the landscape and built up before flowing to other parts of Fort Monroe. This flooding was further augmented by the back flooding of storm drains. Backflooding occurred in the Historic Village, Inner Fort, and North Gate zones and to a certain extent, the Wherry Quarter, during the storm.

A major storm drain trunk line from the fortress moat to Mill Creek served as a conduit for the tidal surge, flooding the moat, the fortress, and much of the area around it. The Historic Village and portions of the Wherry Quarter and Parks and Recreation areas also experienced flooding from storm surges that overtopped the seawall. During the storm, the area along Fenwick Road was completely inundated by the storm surge flooding both the street and the Officer’s quarters along the Fenwick Road.

A depressional region in an area north of the Wherry Quarter retained flood waters from overtopping of the seawall that built up and flowed south into the Wherry Quarters, the Historic Village, and North Gate areas. These floodwaters exited the fort along the marina seawall and through a breach in the Mill Creek berm during the storm.

The undeveloped areas along Dog Beach at the north end of Fort Monroe experienced flooding primarily from the overtopping of the coastal sand dunes during major storms.

Figure 3 shows the stillwater flood elevations from Hurricane Isabel. The higher flood elevations in the northern part of Fort Monroe reflect the water trapped in the RV park area. Those along the Fenwick Avenue seawall represent the higher wave systems affecting this quarter of Fort Monroe.

Figure 3: Fort Monroe Hurricane Isabel Maximum Water Levels (in feet)

Knowledge of the normal tide ranges is instructive to understanding the normal water level fluctuations at Fort Monroe. The nearest tide station to Fort Monroe is at Sewell's Point, across Hampton Roads Bay at the Norfolk Naval Station. The mean sea level elevation and tide range at Fort Monroe as reported by NOAA and calculated from Sewell's Point in the 2005 Corps Study for the period 1983- 2001 are as follows:

- 5.73 feet MSL (based on NAVD 88)*
- Mean low low water elevation to mean high high water (MHHW) elevation: 2.76 feet (lunar tides)

*All elevations referenced to mean sea level in this report are on the NAVD 88 datum unless otherwise indicated.

The average tide range is well below the elevation of the principal coastal defense structures, which range from 7.0 feet MSL for the berm along Mill Creek to 10.8 feet MSL for the Wherry Quarter seawall.

2.1.2 Historic Storm Surges

Historic storm records are available from the late 1920s to the present. Table 1, taken from the 2005 Corps Study, shows the peak stage of hurricanes and northeasterns at Sewell's Point from 1928-2003, with tidal stillwater elevations of 4.0 feet NAVD 88 or greater. USACE has determined that this is the flood stage at which Fort Monroe begins to experience flooding. Table 2 ranks the storms by the height of the peak stage.

Table 1: Tidal Stage Frequency for Hampton Roads Bay (Adopted Stillwater Frequency vs. FEMA Stillwater Frequency)

Return Frequency	Fort Monroe Study	FEMA Flood Insurance Study (a)	
	NAVD 88	NGVD 72	NAVD 88
1 year	3.5	3.9 (b)	3.1
2 year	3.9	4.4 (b)	3.6
5 year	4.5	5.1 (b)	4.3
10 year	5	5.8	5
25 year	5.8	7.0 (b)	6.2
50 year	6.4	7.8	7
100 year	7	8.5	7.7
200 year	7.6	9.1 (b)	8.3
500 year	8.4	9.8	9

Notes:
(a) Based on Newport News and Hampton flood insurance studies
(b) Obtained from stillwater frequency curve adopted by FEMA
NGVD = National Geodetic Vertical Datum
Source: Norfolk District, USACE, 2005

Table 2: Ranking of Storms based on Peak Stage

Hurricanes			
Rank	Date	Name	Peak Stage (ft)
1	8/23/1933	Aug'33	7.41
2	9/18/2003	Isabel	6.26
3	9/18/1936	Sep'36	6.07
4	9/16/1933	Sep'33	5.51
5	9/27/1956	Flossy	4.98
6	9/12/1960	Donna	4.92
7	9/19/1928	Sep'28	4.78
8	9/13/1964	Dora	4.46
9	9/16/1999	Floyd	4.4
10	9/25/1992	Danielle	4.09
11	8/17/1986	Charley	3.94

Nor'easters		
Rank	Date	Peak Stage (ft)
1	3/7/1962	6.19
2	4/11/1956	5.38
3	4/27/1978	5.15
4	2/5/1998	5.03
5	10/6/1957	4.66
6	10/5/1948	4.59
7	10/25/1982	4.58
8	1/28/1998	4.49
9	11/4/1930	4.35
10	10/21/1958	4.35
11	7/3/1933	4.31
12	1/24/1940	4.21
13	4/13/1988	4.19
14	10/14/1977	4.17
15	1/1/1987	4.1
16	10/21/1961	4.04
17	8/30/1999	4.03
18	10/19/1997	4

**For storms with a flood stage 4.0 ft NAVD88 or greater*
***Source: Norfolk District, USACE*

A total of 29 events with a stillwater height of about 4.0 feet NAVD 88 or greater have impacted Fort Monroe since 1928. In addition to flood height, the probability of various flood stages was examined by the Norfolk District in the Corps Study to facilitate the design of flood protection measures after Hurricane Isabel. Table 2 taken from the study, shows the relationship between the adopted stillwater frequencies for Hampton Roads versus the computed Federal Emergency Management Agency (FEMA) stillwater frequencies for the same area.

Based on this analysis, Hurricane Isabel was judged by USACE to be between a 40- and 50-year frequency event. As can be seen from the table, planning for an event occurring with a probability of 1 in 100 years would require coastal defense structures capable of handling a stillwater elevation of between 7.0 and 7.7 feet above MSL, not including wave action on top of the storm surge. This is higher than Hurricane Isabel, which caused extensive damage and flooding of Fort Monroe.

2.1.3 Historic Changes in Local Mean Sea Level

The U.S. Geological Survey (USGS) and NOAA have established and monitored tide gauges along the Atlantic Coast and specifically in the Chesapeake Bay for a number of years. The Sewell's Point tide gauge has the most extensive and continuous data record in the Chesapeake Bay region, from 1927 to present (Figure 4). This tide gauge recorded an increase in sea level of 1.15 feet (an average of approximately 0.17 inch/ year) from 1927 to 2006. This rate is equivalent to a sea level rise of 1.46 feet per 100 years.

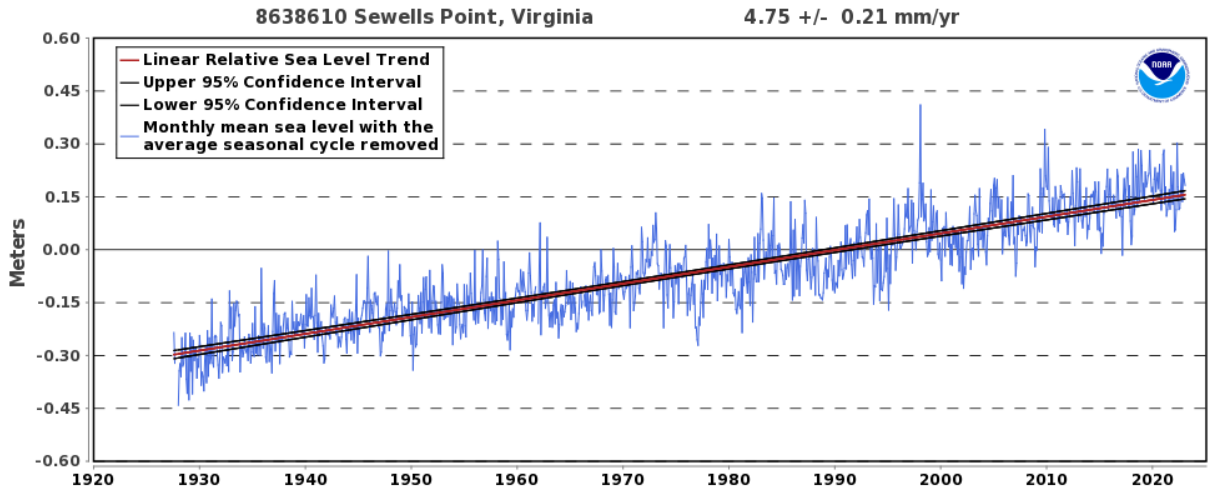

Figure 4: Mean Sea Level Trend, Sewells Point, VA

The relative sea level trend is 4.75 millimeters/year with a 95% confidence interval of +/- 0.21 mm/yr based on monthly mean sea level data from 1927 to 2022 which is equivalent to a change of 1.56 feet in 100 years (NOAA).

The Chesapeake Bay Bridge Tunnel (CBBT) tide gauge recorded an increase of 0.61 feet (an average of approximately 0.24 inch/ year) from 1975 to 2006 (Figure 5). This rate is equivalent to a sea level rise of 1.98 feet per 100 years.

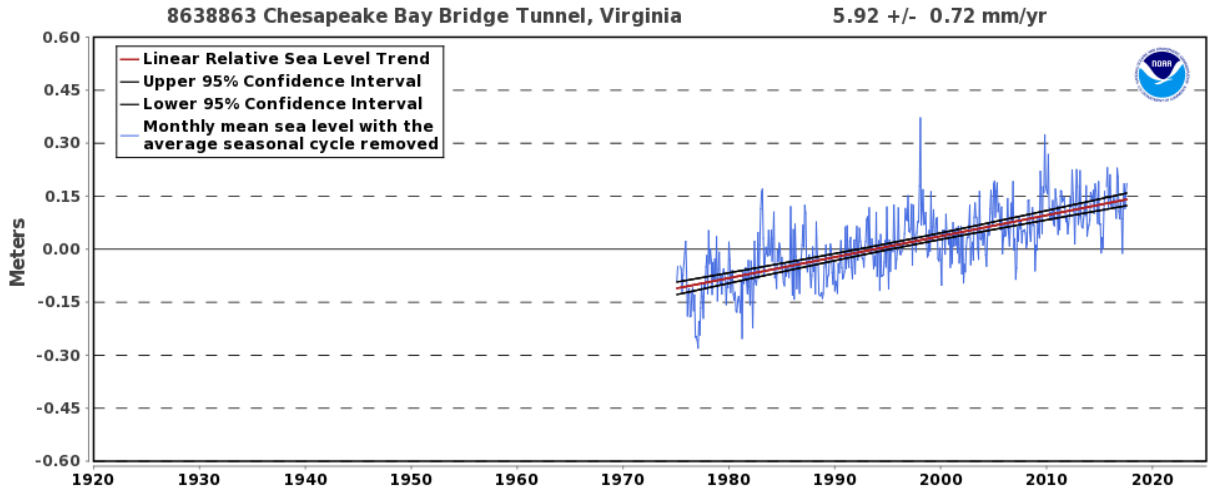

Figure 5: Mean Sea Level Trend, Chesapeake Bay Bridge Tunnel, VA

The relative sea level trend is 5.92 mm/year with a 95% confidence interval of +/- 0.72 mm/yr based on monthly mean sea level data from 1975 to 2017 which is equivalent to a change of 1.94 feet in 100 years.

2.1.4 Future Flooding

Being already susceptible to flooding, as sea level rise and climate change continue to happen, Fort Monroe's flooding hazards will only continue to get worse. The Department of Conservation and Recreation manages the Virginia Coastal Resilience Web Explorer which compiles maps and data from analyses done for the Virginia Coastal Resilience Master Plan. Figures 6 and 7 show the types of flood events that DCR estimates could occur in the years 2020 and 2040, respectively.

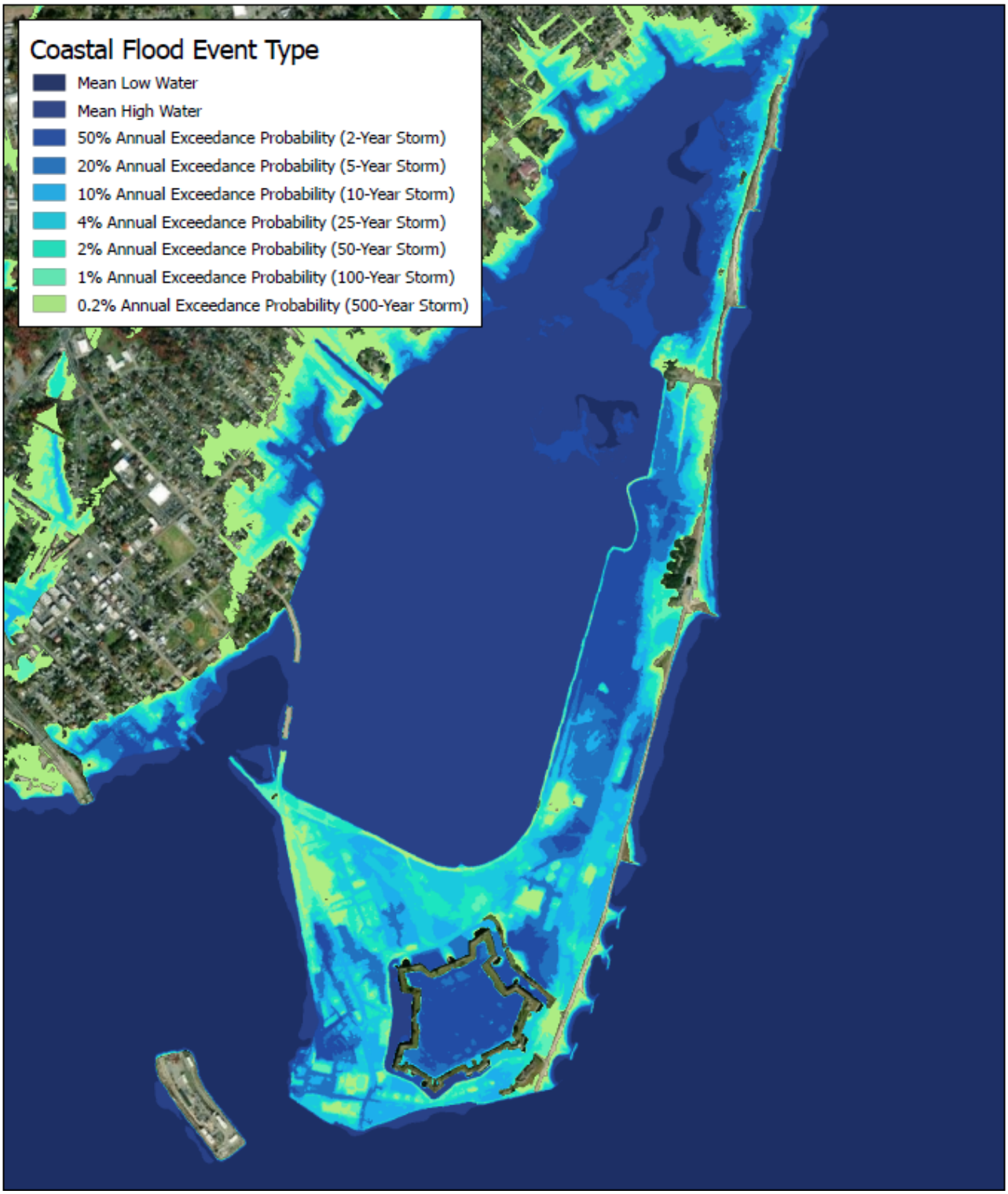

Figure 6: Fort Monroe 2020 Inundation (Source: Virginia Coastal Resilience Web Explorer)

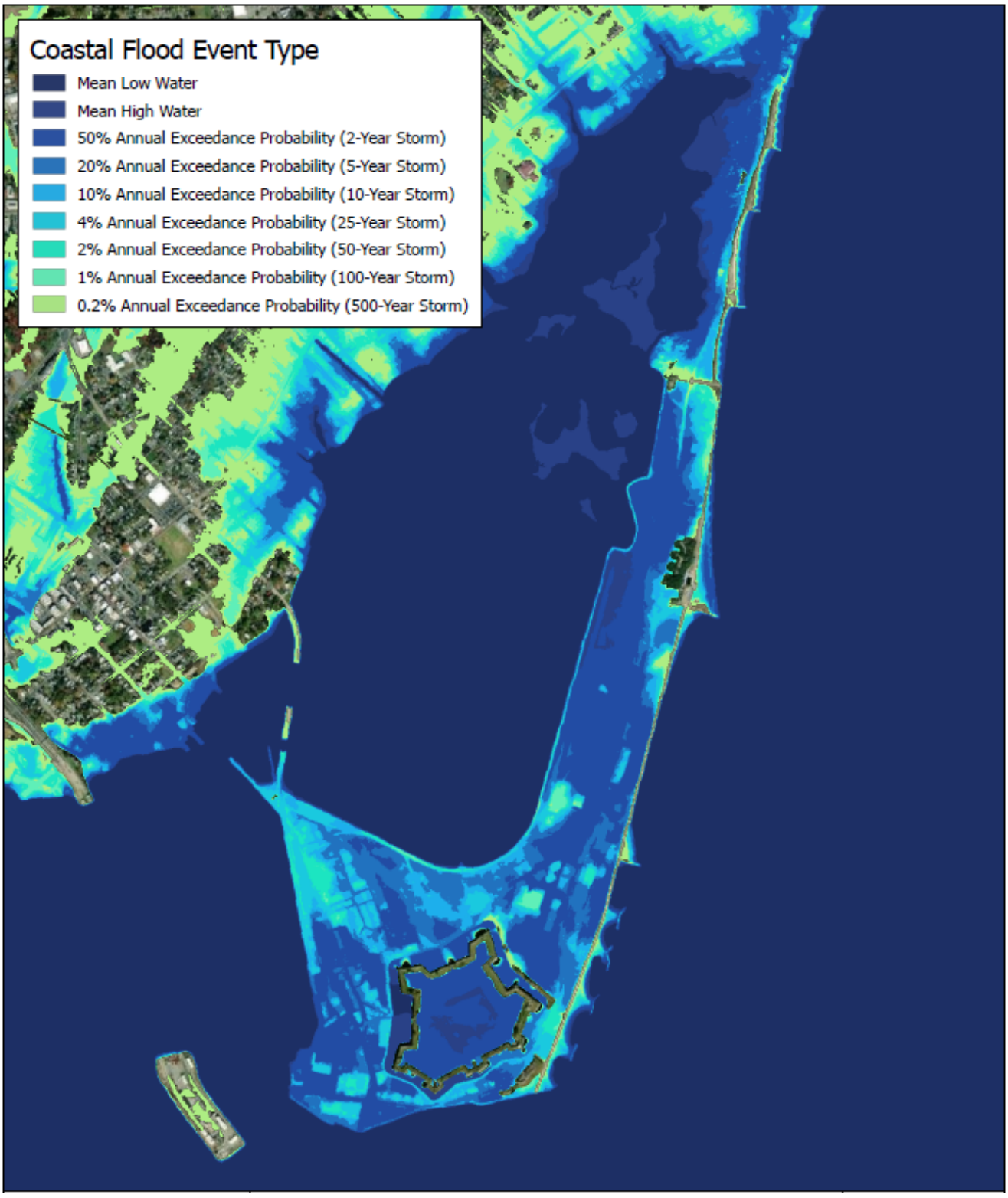

Figure 7: Fort Monroe 2040 Inundation (Source: Virginia Coastal Resilience Web Explorer)

2.2 Other Hazards

There are several other hazards, natural or manmade, that could result from flooding events. Further details and strategies to address these hazards can be found in the Hampton Roads Hazard Mitigation Plan.

2.2.1 Earthquakes and Landslides

An earthquake is the motion or trembling of the ground produced by the sudden displacement of rock in the Earth's crust. Earthquakes can affect hundreds of thousands of square miles; cause damage to property measured in the tens of billions of dollars; result in loss of life and injury to hundreds of thousands of persons; and disrupt the social and economic functioning of the affected area.

Since 1774, there have been only three earthquake epicenters within 65 miles of Hampton Roads, one on the Delmarva Peninsula and two in the Hampton Roads area. Only minor structural damage as a result of these earthquakes has been reported in the region. Impacts of a severe earthquake centered in Hampton Roads, damage to local structures, would likely be severe because buildings in the region are not typically designed to withstand high magnitude quakes. Underground infrastructure damage is also expected to be severe and could cause long-term power, water, and sewer service interruptions in the region. Likewise, damage to bridges, tunnels, and roads could disrupt transportation routes for much of the population.

On Tuesday afternoon, August 23, 2011, an earthquake with a moment magnitude of 5.8 occurred about 7 miles southwest of Mineral, Virginia, which is near Lake Anna in Louisa County (121 miles from Hampton Roads). The earthquake was widely felt, with felt reports received from people as far away as Detroit, Atlanta, Boston, Toronto, and Montreal. Dozens of aftershocks up to magnitude 4.5 have been recorded, including a magnitude 4.2 aftershock approximately six hours after the main shock and a magnitude 4.5 aftershock about a day and a half later. Officials at Fort Monroe, in Hampton, Virginia, also reported some minor structural damage as a result of the quake.

2.2.2 Hazardous Material Incidents

Hazardous material incidents can include the spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous material, but exclude:

- any release which results in exposure to poisons solely within the workplace
- emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine
- release of source, byproduct, or special nuclear material from a nuclear incident
- the normal application of fertilizer.

In Hampton Roads, the negative impacts of hazardous materials incidents are dependent on the nature of the materials involved. While each chemical transported locally has unique qualities, there are generally three types of impacts:

- economic
- environmental
- life/safety impacts to residents and first responders

Environmental impacts of highest concern in Hampton Roads include the results of spills of petroleum products into the region’s waterways. A spill could still impact water quality, aquatic life, and valuable wetlands along the shoreline. There is also a potential for hazardous materials incidents along roadways or railroads to impact groundwater.

2.3 Critical Facilities

The impacts caused due to flooding and other hazards can block access to emergency response activities. The effects on roads can prevent emergency personnel from traveling to where they are needed and limit access to critical facilities. Since Fort Monroe's only connection to the rest of the City of Hampton are two bridges, it is imperative that access to these critical facilities remain viable. Critical facilities are those that are vital to the health, safety, and welfare of the public, and include:

- Hospitals and other medical facilities
- Police stations
- Fire stations
- Necessary transportation systems
- Potable water, wastewater, oil, natural gas, electric power, communication systems, and similar facilities

3 Existing Flood Protection Measures

3.1 Current Flood Protection Measures

Fort Monroe was heavily damaged by Hurricane Isabel in 2003. As a result of this storm, a major flood protection initiative was undertaken by the Army to replace and improve damaged structures. The improvements were based on recommendations contained in a study completed in 2005 by the Norfolk District, USACE ("Fort Monroe Flood Evaluation and Protection Study" hereinafter referred to as the "Corps Study") to identify flood protection measures needed at Fort Monroe. The study recommended a number of repairs and flood protection improvements, many of which have since been implemented.

The flood protection measures at Fort Monroe consist of seawalls, breakwaters, berms, and storm drain outfall backflow preventers. A description of these features is contained below:

3.1.1 Seawalls

There are three seawalls protecting Fort Monroe from the waters of the Chesapeake Bay and Hampton Roads Bay. A seawall exists along McNair Drive adjacent to the waters of Hampton Roads Bay on the south side of Fort Monroe. This seawall, which is actually a sloped earth and stone revetment, is located along the marina and extends from the security gate at the entrance to Fort Monroe to the southern end of the marina. The top of the revetment slopes along McNair Drive from a height of 9.5 feet MSL near the security gate to a low point of about 6.5 feet MSL near Pier C at the marina. Atop the revetment is a 2.8-foot-high concrete guard rail with openings along the guard rail. To address flooding at the southern end of the base, the openings in the guard rail have been filled to form a solid concrete wall from Pier F to Building 207. Along the guard rail there are openings to the marina piers.

A second seawall extends from the Naval Sea Systems Command building complex (Navy Pier) at Buildings 204 and 205 to Battery Parrot on Fenwick Road. This seawall was overtopped and extensively damaged during Hurricane Isabel and has recently been reconstructed as a vertical, 4,400-foot-long concrete seawall with a new top elevation of 9.5 feet MSL and a sloped armor stone toe revetment (Figure 8).

A third seawall extends from Battery Parrott to north of the community center (former Officer's Club). This is a vertical face concrete wall with a general elevation of 10.8 feet (NAVD 88). Atop the wall is a metal pedestrian guard rail, behind which is located a paved access road (Gulick Road). This seawall sits approximately 6 to 8 feet higher than the surrounding Wherry Quarter housing complex and provides flood protection to the area. Figure 9 shows the location of the seawalls at Fort Monroe.

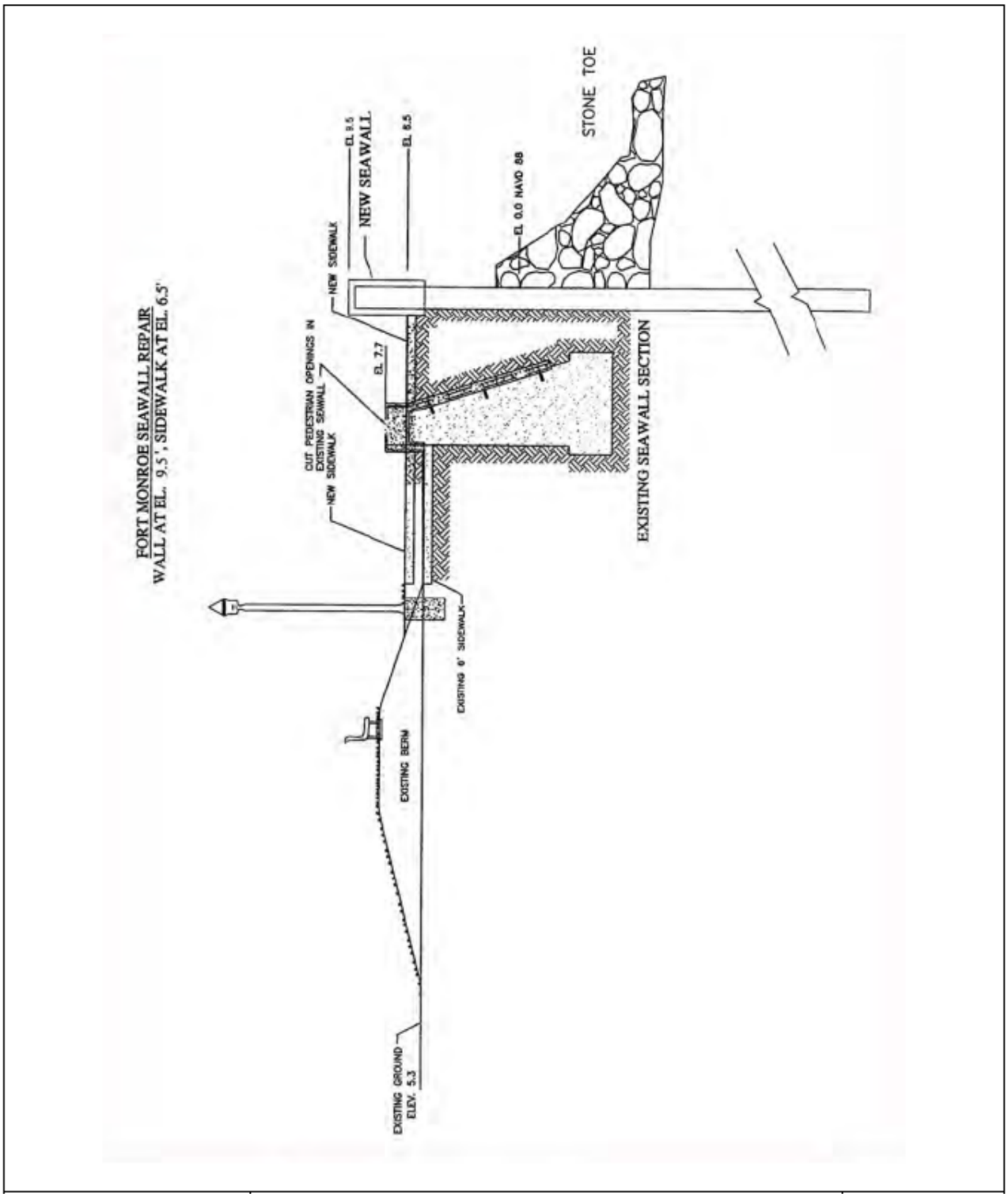

Figure 8: Fort Monroe Seawall Repair

Figure 9: Fort Monroe Seawalls and Berm

3.1.2 Breakwaters

The Corps Study recommended the construction of 15 new breakwaters extending at least 1,000 feet north from Battery Parrot. The proposed breakwaters, which have an elevation of 7.0 feet will help protect Fort Monroe from wave energy during storms. Due to budget limitations, a terminal groin and only four of the recommended 15 breakwaters were completed by December 2008. Sand has been placed between the breakwaters and the seawall to form a beach as part of this project. The U.S. Army did not plan to construct any additional breakwaters following the 2005 Base Realignment and Closure Act (BRAC). Figure 10 shows a typical breakwater detail.

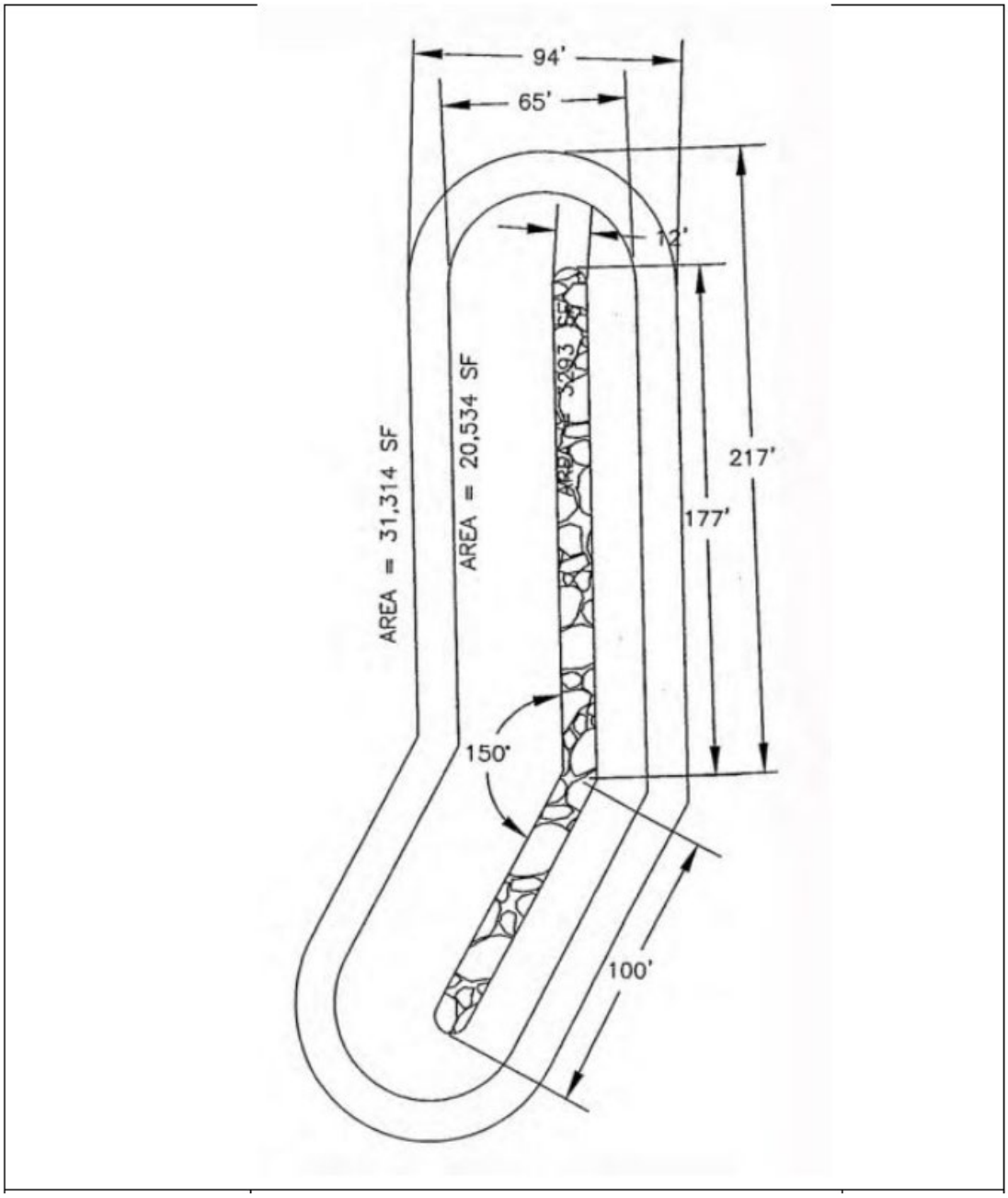

Figure 10: Typical Breakwater Plan

3.1.3 Mill Creek Berm

A berm currently exists along Mill Creek to the west of Fort Monroe. The berm elevation varies but is generally around 7.0 feet MSL. During Hurricane Isabel this berm was breached adjacent to the north end of the airstrip due to the pressure of storm surge water trapped in a low point between the berm and the seawall along Gulick Drive from wave overwash. Some of this water also flowed south into the Wherry Housing area and contributed to flooding in and around the northern part of the fortress moat. As noted above, to preclude future breaches, the Norfolk District, USACE recommended lowering the Mill Creek Berm north of the bowling alley to an elevation 5.5 feet. According to the Corps Study, the lowered Mill Creek Berm will allow interior waters to escape out toward Mill Creek rather than build up inside the fort. After evaluation by the fort's Public Works Department and because of budgetary limitations, this recommendation was not implemented. The U.S. Army did not plan to implement this recommendation before the base closed in 2011.

3.1.4 Dog Beach Dunes

Dog Beach begins at the Paradise Ocean Club and runs north to Buckroe Beach at the northern end of the fort. Dog Beach is lined by natural dunes approximately 5 to 8 feet in elevation above the surrounding land. These dunes were overtopped during Hurricane Isabel.

3.1.5 Stormwater Backflow Preventer

The Corps Study identified storm drains as a significant source of flooding at Fort Monroe during Hurricane Isabel. Many of the storm drains are well below the storm surge level and provide conduits to flooding deep into Fort Monroe property. Accordingly, the study recommended installing backflow preventers consisting of both "check valves" installed within or adjacent to storm drains and "flap gates" installed on the end of storm drain outfalls. The flap gates are "Tideflex" neoprene rubber pinch valves that prevent Fort Monroe from back flooding through the storm drains during high tides, but allow stormwater to be released from the fort during major storm events.

Backflow preventers have been installed for 19 of 69 outfalls to Mill Creek, the Chesapeake Bay, and the inner fort moat. Figure 11 shows the location of stormwater outfalls on Fort Monroe and denotes those which have been installed with backflow preventers; two have been recently added.

Figure 11: Storm Sewer Lines and Outfalls

3.2 Participation in State and Federal Programs

3.2.1 FEMA

FEMA's Hazard Mitigation Grant Program provides funding to state, local, tribal, and territorial governments so they can develop hazard mitigation plans and rebuild in a way that reduces, or mitigates, future disaster losses in their communities. (FEMA)

3.2.2 MS4

Fort Monroe was designated as a Phase II regulated small Municipal Separate Storm Sewer System (MS4) and was issued a permit in August 2014 by the Virginia Department of Environmental Quality. The permit was renewed for an additional five years in November 2018 and will remain valid until October 2023. The City of Hampton manages portions of Fort Monroe's MS4 including the beaches and boardwalk area of Fort Monroe, as well as the Fort Monroe Community Center. The MS4 program has goals to be met in the following areas:

- Public Education and Outreach on Stormwater Impacts
- Public Involvement and Participation
- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Post-Construction Stormwater Management
- Pollution Prevention and Good Housekeeping for Municipal Operations

3.3 Planning, Policies, and Guidance

The implementation of hazard mitigation activities involves departments and individuals in a broad range of professions. Stakeholders may include local planners, public works officials, economic development specialists, and others. Concurrent local planning efforts can complement hazard mitigation goals even though they are not designed as such.

With the designation of National Historic Monument comes added responsibility as well as heartfelt enthusiasm for the preservation of Fort Monroe. A historic preservation plan is intended to preserve historic structures or districts within a community. An often overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards to include the identification of the most effective way to reduce future damages. This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards or are within a historic district that cannot be easily relocated out of harm's way.

The FMA utilizes as its management and planning document for Undertakings as the relate to historic properties the *Fort Monroe Preservation Manual and Design Standards, 2016*. Also, in consideration of floodplain planning and design where historic properties are affected, the FMA also applies to the greatest extent possible the National Park Service (NPS) *Guidelines on Flood Adaptation for Rehabilitating Historic Properties, 2019*.

Given the unique characteristics of Fort Monroe which is located entirely within NHL and NRHP District(s), the FMA has established an *Agreement* on May 3, 2022 with the Virginia Department of Conservation and Recreation (DCR) which states the following:

"All development within the Fort Monroe National Historic Landmark District occurring within any special flood hazard area shall be evaluated for a Variance Permit based on each final project design. In the assessments of Variance Permit requests, Development projects will be evaluated using the most current FEMA Flood Insurance Rate Map (FIRM), the City of Hampton Zoning Ordinance and Executive Order 45. Where the City of Hampton and Virginia State Level Floodplain Management Minimum Standards as established under EO 45 conflict, the least restrictive will apply."

The FMA further received a letter of *Understanding* on June 28, 2022 from the City of Hampton, Virginia Deputy Zoning Administrator that states the following:

"The City has reviewed the approved variance from the Virginia Department of General Services, which permits the proposed project to comply with the City of Hampton's Flood Zone requirements or the EO45 requirements, whichever is least restrictive. Upon review of the two sets of requirements, it seems apparent that the City's Flood Zone requirements are the least restrictive.

New construction or substantial improvements located within the AE special flood hazard zone would be required to meet the standards of Zoning Ordinance Sections 9-34(2 & 3). Those standards include such things as a lowest finished floor elevation of three feet above the base flood elevation, flood venting, and elevated electrical, mechanical, and plumbing components.

New construction or substantial improvements located within the VE or Coastal A special flood hazard zones would be required to meet the standards of Zoning Ordinance Sections 9-34(2 & 3) and 9-33(1)(g). The Coastal A flood zone can be identified in the FIRM as the AE flood zone area waterward of the Limits of Moderate Wave Action (LiMWA) line. Requirements for these structures include but are not limited to elevating the bottom of the lowest horizontal structural member to three feet above the base flood elevation, and utilizing pilings or columns for construction to allow waves to pass beneath the structure.
Historic structures being renovated in any of the special flood hazard zones are exempt from the requirements mentioned above insofar as each requirement impairs the historic nature of the structure (Sec. 9-35(1)(c)). This determination is made by the City's Floodplain Administrator.

It is our understanding that review and permitting for improvements on Fort Monroe will be conducted by the appropriate agencies of the Commonwealth of Virginia. As such, the above information is meant to assist that review of projects for potential compliance with the City of Hampton's Flood Zone requirements. In the event there is any question as to how the requirements pertain to a specific development, the City's Floodplain Administrator will make a determination upon request."

3.4 Regional Efforts

3.4.1 Hampton Roads Hazard Mitigation Plan

The Hampton Roads Hazard Mitigation Plan represents the community's blueprint for how it intends to reduce the impact of natural and human-caused hazards on people and the built environment. The essential elements of the hazard mitigation plan include a risk assessment, capability assessment and mitigation strategy.

As part of the City of Hampton, Fort Monroe will devote available resources to implementing the Hazard Mitigation Actions identified in the Hampton Road Hazard Mitigation Plan where applicable. Regional Mitigation Actions that are being taking throughout Hampton Roads include:

1. Use side-scan LIDAR to collect lowest floor elevation data for flood-prone structures in the region, focusing initially on repetitive loss areas in each community.
2. Use AHAC structure and HRPDC resources to develop additional regional mitigation strategies and initiate annual workshop on mitigation project funding. Possible new topics include Climate Resilient Mitigation Activities (CRMA), HMGP 5% Initiative projects, and including Sea Level Rise estimates in elevation requirements under recent HMGP guidance.
3. Analyze and update the platform, availability, and accuracy of HAZUS input data and output results for the purposes of conducting future, more detailed vulnerability analyses

The following mitigation actions in the Hampton Roads Hazard Mitigation Plan that are specific to the City of Hampton and apply to Fort Monroe are:

1. Maintain participation in National Flood Insurance Program and Community Rating System. Continue enforcement of standards in existing ordinance that meet and exceed NFIP minimum requirements.
2. Acquire, elevate, relocate, retrofit or floodproof structures in flood prone areas. Flood protection may include small structural flood control projects, such as tide gates. This action includes Mitigation Reconstruction projects.
3. Provide flood and wind protection and flood access/egress for critical facilities and infrastructure. Retrofits may include but are not limited to: elevate and harden communication sites, relocate EOC/911/311 facility outside of floodplain, provide generator backup or prewire evacuation shelters for quick hook-ups, and upgrade sewer pump stations.
4. Purchase property from trustee sales/tax sales that are identified as repetitive loss or severe repetitive loss. Consider raising the floor elevation of the flood-prone structures. This action includes Mitigation Reconstruction projects.
5. Implement ordinance to create and enforce no-wake zones in flooded areas.
6. Adopt and implement holistic watershed plan. May include Climate Resilient Mitigation Activities (CRMA).
7. Improve use of social media before, during and after hazard events
8. Expand capacity/training for Community Emergency Response TeAM (CERT) groups and neighborhood-serving organizations to include communication about mitigation, building code requirements response.
9. Improve drainage system maintenance, including increased sediment and debris clearance.
10. Coordinate with owners of post-FIRM structures that are NFIP “minus-rated” to help property owners determine reason for rating and implementing solutions.
11. Conduct repetitive loss area analyses of repetitive flood loss areas and identify potential mitigation options.
12. Build resiliency into how FMA addresses its social, economic, and physical challenges
13. Prepare public outreach materials. Educate elected officials and residents on the importance of the NFIP and the City’s floodplain management efforts, maintaining flood insurance coverage, the benefits of City’s CRS participation, and methods for mitigating flood damage
14. Maintain storm-resistant beach from Grandview to Fort Monroe
15. Implement warning system for coastal storms.

3.4.2 Other Hampton Roads Public District Commission Efforts

Listed below are other programs and activities that the HRPDC is implementing to address resilience.

- Subsidence Monitoring
- Resiliency Meeting and Working Groups
- Regional Flood Insurance Campaign
- Regional Sea Level Rise Policy
- Resolution to Encourage Local Adoption of C-PACE Financing Programs

4 Resilience Plan

After the Base Realignment and Closure of Fort Monroe was announced in 2005, the Army discontinued capital improvements, significant maintenance and additional flood protection measures through 2011 when the majority of the property reverted to the Commonwealth.

Not all of the recommendations made in the Corps Study were funded following Hurricane Isabel or were carried out before the Majority of the property reverted to the Commonwealth of Virginia in 2011. This, combined with the range of sea level rise noted below (see Figure 12) indicates that future modifications to existing flood protection measures as well as new flood protection measures will be required to deal with increasing flood threats. Current research predicts, on average, a higher rate of sea-level rise than that which was considered in the Corps Study.

Although the long-term effectiveness of recent flood protection measures (backflow preventers) have yet to be determined, initial experience with at least two northeastern storms in October and November of 2008 indicate that the new backflow preventers, along with a recent upgrade of the storm drain structures in the historic area that have provided additional storage capacity, are reducing localized flooding through the storm drain system. While the flood protection measures recently undertaken should reduce the frequency of flooding at Fort Monroe, it is acknowledged by both the USACE Norfolk District and the FMA that the improvements could still easily be overwhelmed by a category 2 or stronger hurricane or a once in a hundred years northeast storm.

The recommendations below are of general necessity in nature as they represent a substantial financial commitment to flood protection by the Fort Monroe Authority. These will likely need to be undertaken in a phased manner, keyed to additional research on sea level rise, the future frequency of major storms, and the availability of funding. Funds will likely not be available to “flood proof” Fort Monroe, so it is essential that a cost-effective approach be taken to future flood protection measures that provide the maximum protection for the events of greatest frequency.

While the recommendations contained in this section address primarily coastal defense structures and the routing of interior flood water, certain flood mitigation measures keyed to building modifications and discussed in Section 4.4 below also are flood protection measures. These measures are important aspects of long-term flood protection at Fort Monroe and should be considered in conjunction with the recommendations for coastal defense structures discussed below.

4.1 Continued Coordination

Fort Monroe will continue to partner with the City of Hampton to build a thriving and resilient community and participate in several regional workgroups and committees hosted by the HRPDC.

4.2 Sea Level Rise – The Science

On October 18, 2018, the Hampton Roads Planning District Commission approved and adopted a resolution encouraging local governments to consider adopting policies incorporating sea level rise into

planning and engineering decisions. As shown in Figure 12, the approved Sea Level Rise Planning Policy and Approach recommends the following relative sea level rise scenarios:

- 1.5 ft above current mean higher high water (MHHW) for near-term (2018-2050)
- 3 ft above current mean higher high water (MHHW) for mid-term (2050-2080)
- 4.5 ft above current mean higher high water (MHHW) for long-term (2080-2100)

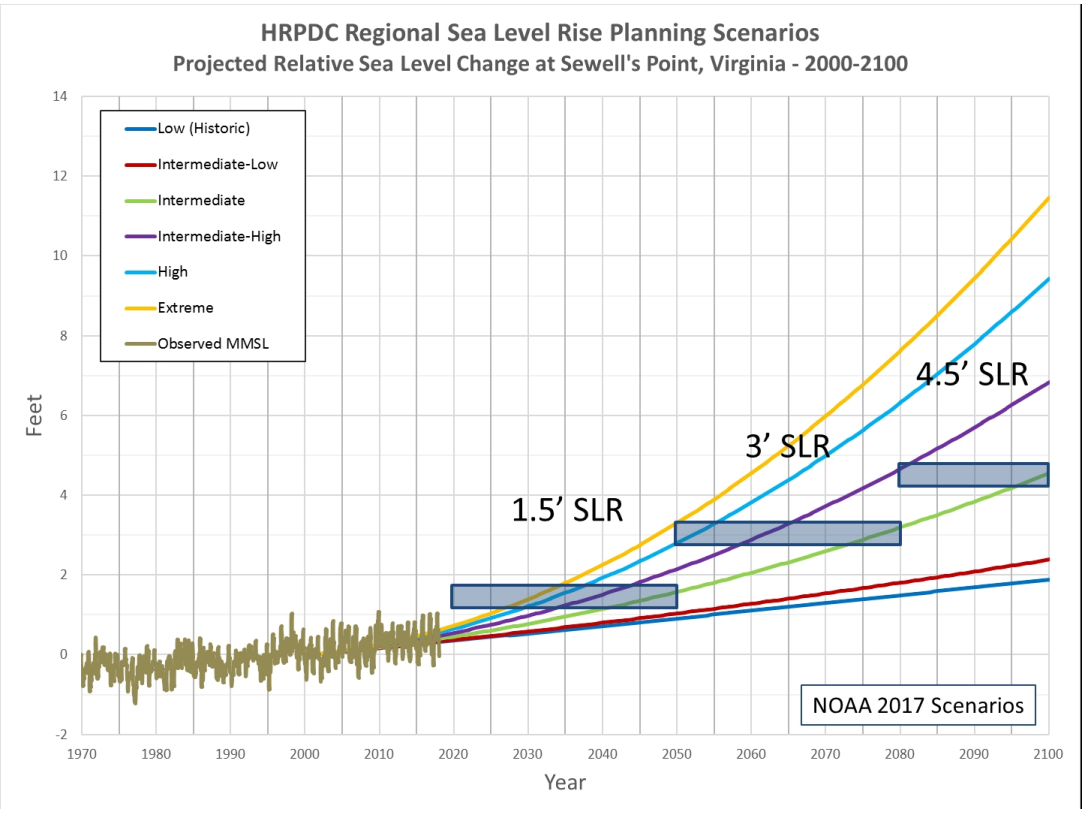

Figure 12: HRPDC Sea Level Rise Scenarios

The rationales behind this resolution are as follows:

- Sea level rise is projected to be significant for Hampton Roads. Factoring it into planning and design decisions will reduce risk and damage from flooding and storm surge.
- Significant advances in climate modeling and analysis of observed trends support development of new sea level rise projections at the local level that are improvements above previously recommended projections.
- A regional consensus on values and approaches for sea level rise planning would provide support for local efforts, assist with regional coordination, and encourage state and federal agencies to adopt similar standards.

The information that this resolution relies on are regression-based projections form the Virginia Institute of Marine Science (VIMS) and regional sea level rise scenarios from NOAA's Center for Operational Oceanographic Products and Services (CO-OPS).

In 2018, VIMS released Sea Level Rise Report Cards for a number of coastal communities in the United States, including Norfolk. These report cards are based on the statistical analysis of observed sea level trends based on established tide gauges. In the case of Norfolk, this analysis has found that there is

significant evidence of sea level rise accelerating over the last fifty years. Based on this analysis, VIMS is predicting that sea level will rise at Norfolk by 0.49 meters (1.61 feet) between 1992 and 2050, with a 95% chance that mean sea level in 2050 will be between 0.29 and 0.67 meters (0.95 to 2.20 feet) above 1992 mean sea level. This confidence interval accounts for interannual and decadal variations in mean sea level.

In January 2017, NOAA, in partnership with the U.S. Geological Survey, the U.S. Environmental Protection Agency, and Rutgers University, published a report updating global and regional sea level rise scenarios for the United States.2 This report takes advantage of additional observations of sea level change and ongoing research into global and regional drivers of sea level rise, including rapid ice melt, ice sheet instability, shifts in ocean circulation patterns, changes in the Earth's gravitational field, and vertical land movement. The overall result is that the upper bound of plausible global sea level rise is higher than considered in the previous 2012 NOAA report. In addition, regional drivers such as vertical land movement, ocean circulation, and shifts in the gravitational field account for a significant amount of projected sea level rise in Hampton Roads. Overall, the report projects between 1.9 feet of sea level rise in Hampton Roads between 2000 and 2100 at the low end and 11.5 feet of sea level rise under the most extreme case. According to the report's probabilistic assessment, the most likely scenario is approximately 4.5 feet of sea level rise by 2100.

Sea level trends are continuously being monitored and updated by both federal (NOAA, USACE) and state (VIMS) entities. In addition, research, and analysis into the dynamics of sea level and how it responds to changing climatic conditions are also ongoing. The HRPDC recommends that the HRPDC staff and localities reevaluate and consider updating these scenarios as appropriate based upon new information developed by NOAA, USACE, or VIMS46.

In an effort to bolster resilience in Hampton Roads, the Hampton Roads Planning District Commission is developing design tidal elevations and rainfall depths for Hampton Roads communities that incorporate future sea level rise. Each locality's standards were calculated based on varying storm surge elevations for a set of combined SLR and return period scenarios.

Several notes on those tidal elevations from the draft Resilient Stormwater Design Standards are as follows:

Notes:

1. Sea level rise scenarios are based on HRPDC Sea Level Rise Planning Policy and Approach (2018).
2. Except where noted, all elevations sourced from statistical analysis of the distribution of water elevations in each watershed from the FEMA Region III Storm Surge Study conducted by the U.S. Army Corps of Engineers Engineer Research and Development Center (2013).
3. Conditions related to the 3-ft and 4.5-ft sea level rise design levels include non-linear increases derived from numerical modeling completed by the U.S. Army Corps of Engineers as part of the North Atlantic Coast Comprehensive Study.

Proposed design rainfall depths were developed based on two (2) resources – the current City of Virginia Beach public facilities manual and the RAND/MARISA project. The latter program developed a tool for the Chesapeake Bay Watershed to generate rainfall for individual counties by applying change factors to NOAA Atlas 14 data. A table of rainfall depths has been developed for each Hampton Roads locality, providing increased rainfall depth values accounting for a 20% increase in depth as well as corresponding to the various MARISA scenarios.

Currently, the Resilient Stormwater Design Standards are in draft form. Localities will have the option of adopting these standards in whole or in part.

4.3 Capacity Building and Planning

The CFPF program defines capacity-building programs as “improving the local government's ability through training of existing staff, hiring personnel, contracting with expert consultants or advisors, and other related actions that allow a local government to identify and mitigate risk and flood impacts.” A program could be considered essential to an economically, socially, and environmentally sustainable community.

In addition to capacity building, programs can also be considered preparation for the future. Fort Monroe will review opportunities to be involved in planning programs. For example, FMA will look into and identify types of staff support that may help plan future needs, such as staff capacity, on-call contracts, and training. For example, the Authority recently supported Certified Floodplain Manager (CFM) training and certification for several staff. The Authority will continue to explore additional opportunities to fund additional floodplain management training to increase the knowledge and abilities of staff.

4.4 Population Demographics

Fort Monroe Authority (FMA) is a political subdivision of the Commonwealth of Virginia and is within the municipal boundaries of the City of Hampton. The City of Hampton appoints two members to the FMA Board of Directors, while the State appoints the remaining members. Specific population demographics are not available for FMA as the population is transient and as stated previously are all located within the City of Hampton’s demographic area.

Also, due to this unique and shared responsibility, the FMA’s follows the evacuation plan as established by the City of Hampton, as Appendix B shows.

4.5 Flood Prevention and Protection Projects

For the CFPF program, projects can be defined as activities that include developing flood protection facilities, acquiring land, restoring natural features, or other activities involving the design, construction, or installation of facilities. As opportunities are identified and vetted, Fort Monroe plans to seek grant funding through the CFPF program.

Ten (10) projects identified based on the prior reuse and master planning that will support the resiliency of Fort Monroe are listed below, categorized into short-, mid-, and long-term projects. Appendix A provides a summary of these projects.

Short-term:

- Digitization of Historical Documents and Records
- Window and Door Retrofit
- Bulkhead at the Kayak Launch
- Wet and dry floodproofing buildings located in the floodplain
- Sump pumps and Backup Generator Installation

Mid-term:

- Mill Creek Living Shoreline
- McNair Seawall
- Fortress Outer Moat Wall

Long-term

- Installation of Breakwaters

- Installation of Groins

Fort Monroe will endeavor to keep this Plan up to date with projects as they are developed. To that end, the following criteria have been established that lay out the requirements for future projects such that they can be then considered incorporated by reference into this Plan.

Projects shall:

1. consider climate change and forward-looking conditions
2. include a provision for equity-based decision making
3. consider a level of protection beyond the regulatory design standard
4. incorporate nature-based infrastructure to the maximum extent practical
5. analyze at least three (3) alternatives to address the issue – recommended, an alternate, and no action – if the project proposed does not employ a nature-based or hybrid solution and the total project cost is anticipated to be greater than $3 million
6. be broken into phases that can be accomplished in a 3-year timeframe
7. include a maintenance plan for structural improvements

Appendix A

DRAFT - Fort Monroe Authority Resilience Projects Summary

Project Title	Project Type	Project Timing	Purpose and Need	Description	Estimated Cost
Digitization of Historical Documents and Records	Rehabilitation / Replacement	Short	Protect historical documents from damage by water inundation.	Digitize significant historical records which could become damaged during flooding events by scanning and creating digital copies of all paper records.	$
Window and Door Retrofit	Rehabilitation / Replacement	Short	Protect the building envelopes from flooding and coastal storm damage.	Replace various exterior windows and doors in buildings along the Chesapeake Bay which are subject to leaking during coastal storms, flooding, and sea level rise with water tight fixtures.	$$
Bulkhead at the Kayak Launch	Installation / New Construction	Short	Improve stormwater discharge from inner fortress and restore pulic use of the Kayak Launch on Mill Creek	Repair the existing, failing steel bulkhead along Mill Creek and replace the underlying drainage piping from the Moat to Mill Creek.	$$
Wet and dry Floodproofing Buildings Located in the Floodplain	Rehabilitation / Replacement	Short	Protect historical and critical buildings from flooding during coastal storms and sea level rise.	Provide flood protection measures for various low lying buildings such as raising electrical components and HVAC, installing foundation vents, sump pumps, applying coatings and sealants and flood protection barriers.	$$$
Sump pumps and Backup Generator Installation	Installation / New Construction	Short	Protect building basements from flooding caused by coastal storm events and power outages.	Provide sump pumps where required, and backup generators, where a secondary power source is needed. Many of the basements regularly flood during heavy storm events.	$$$
Mill Creek Living Shoreline	Rehabilitation / Replacement	Short to Mid, multiple phases	Restore the sustained population of native oysters, at a density sufficient to naturally propagate, to serve as a living breakwater for managing the effects of flooding caused by coastal storms and sea level rise .	Replace the asphalt and riprap “armored” shoreline along Mill Creek with a living shoreline to restore the habitat for shore birds, improve the water quality in Mill Creek.	$$$
McNair Seawall	Installation / New Construction	Short to Mid, multiple phases	Protect the landside roadway and commerial and residential properties from the effects of coastal storms and sea level rise.	Replace existing bulkhead along the Marina area with new impermeable seawall and complete the existing seawall along Fenwick Road.	$$$$
Fortress Outer Moat Wall	Installation / New Construction	Mid, multiple phases	Improve ability of tidal moat to contain storm water.	Dewater moat and perform repairs to counterscarp wall and stormwater inlets. Return depth of moat to the original 8 feet	$$$$
Installation of breakwaters	Installation / New Construction	Long	To stabilize and protect the shoreline and wetlands and provide shelter for new intertidal marsh habitat.	Provide additional breakwaters in the Chesapeake Bay along the eastern boundary of Fort Monroe ,per the Army Corps of Engineers recommendations, to allow for the accretion of sediment between the structure and the shoreline.	$$$$
Installation of groins	Installation / New Construction	Long	Reduce beach erosion and sand transport.	Install groins to restrict longshore sediment transport and capture sand transported by longshore current. These may be installed with jetties to act as a barrier against erosion from currents, tides ,waves and storm events.	$$$$

Project Timing	Project Commencement
Short	≤ 5 years
Mid	5 - 10 years
Long	≥ 10 years

Price Classification	Estimated Project Cost
$	0 - $1,000,000
$$	$1,000,000 - $2,500,000
$$$	$2,500,000-$7,500,000
$$$$	$7,500,000 +

CITY OF HAMPTON – EVACUATION INFORMATION[1]

EVACUATION

Many times, individuals are forced to evacuate more often than we think. Hundreds of times each year, transportation or industrial accidents release harmful substances, forcing thousands of individuals to leave their homes and go to a safer area. Fires and floods cause evacuations even more frequently. Almost every year, people living in cities and communities along the Atlantic and Gulf coasts are forced to evacuate due to an approaching hurricane.

To enable an effective evacuation, local evacuation planning has occurred over many years in several parts of the country. Specific evacuation plans vary by the area and type of disaster. The local emergency management office can provide you with information about evacuation plans in your local area.

HOW MUCH TIME WILL YOU HAVE TO EVACUATE?

The amount of time you will have to evacuate your home or community depends upon the disaster. Sometimes, you may have days to prepare, such as in the case of hurricanes which can be detected early. However, in many more common disasters, such as a hazardous materials spill, you may only have moments to leave. This means that you must prepare yourself now , because once you need to evacuate, it may be too late to collect even the most basic necessities.

WHO SHOULD EVACUATE?

Individuals who live in known storm surge areas should evacuate from their homes. The potential for loss of life and major property damage due to storm surge is much greater along the coastal and inland water areas. Individuals who reside in mobile homes, or other structures that are subject to severe damage or destruction from tropical or hurricane force winds must also consider evacuation. If you live in an area that is not subject to storm surge or flooding, and your structure is sturdy enough to withstand the winds, then you should consider sheltering in-place.

EVACUATION PERIODS

Evacuation periods can last for hours or several days. You may be responsible for your own food, clothing and other supplies for part or all of this time. Remember, it may take a few days for supplies to arrive or utilities to be restored to a disaster area. For this reason, it is imperative that you make preparations to take care of yourself for up to 72 hours without outside help.

WHERE SHOULD YOU GO?

If you must leave your house and evacuate, consider making arrangements with friends or relatives who reside outside of the threat area. Hotels and motels may be available along the evacuation route, but they normally fill up very rapidly. If you plan to go to a shelter, you should ensure that the shelter will be open. Not all shelters in an area may open for a disaster, so listen to local radio and television stations for shelter information. Remember to take your individual disaster kit with you when you evacuate or go to a shelter. You cannot take pets, alcohol, drugs or weapons to a shelter.

ADVANCE EVACUATION PLANNING

Use the Preparation checklists available to assist you in planning for an emergency. Assemble the materials early, as you may only have minutes to react after being told to evacuate.

- Evacuation Zone: http://tiny.cc/hamptonevacuationzones

[1] *Information was obtained from the City of Hampton's website at Hampton.gov/1684/Evacuation-information*

- Review possible evacuation procedures with your family. Each individual should understand what they are responsible for doing during an evacuation, and also where to meet if you become separated.
- Ask a friend or relative outside your area to be your "emergency contact" so that everyone in the family can call that person and report that they are safe.
- Find out where children will be sent if they are in school when and evacuation is announced.
- Plan now where you will go if you must evacuate.
- Consider the homes of friends or relatives who live outside the potential disaster area.
- Contact the local emergency management office to learn about community evacuation plans. Review public information to identify potential reception centers and shelters.
- Keep your car's gas tank at least 3/4 full at all times. During emergencies, filling stations may be closed or run out of gas. Never store extra fuel in your garage.
- If you do not have a car or other vehicle, make transportation arrangements with friends or neighbors.
- Know where and how to shut off electricity, gas and water at the main switches and valves. Make sure that you have the tools that you would need to do this (normally a pipe or adjustable wrench.) If you do not know how to turn your utilities off, check with your local utility company.
-

WHAT SHOULD YOU DO WHEN YOU ARE TOLD TO EVACUATE?

- If there is time, secure your house.
- Unplug appliances.
- Turn off natural gas, propane or other fuel valves where they enter the house if advised to do so. If a flood hazards area, store propane tanks or secure them safely to the structure.
- Turn off the main water valve if told to do so.
- Take any actions needed to prevent the water pipes from freezing, if this is a threat.
- Securely close and lock all doors, windows and the garage.
- Place a sign in the front door or window to notify authorities that the house or apartment has been evacuated. If possible, leave a number where you may be reached.
- Follow the recommended evacuation routes. Do not take shortcuts! They may be blocked.
- Listen to the radio for emergency shelter or evacuation information.
- Carry your individual preparedness kit, first aid kit, and vehicle kit with you when you leave.

HAMPTON SHELTER GUIDELINES

SHELTER INFORMATION

Hampton has several buildings designated as potential shelters during disasters. Most are schools or other public buildings. Decisions about which to open and when are made and publicized, along with other emergency information when a disaster threatens. When a hurricane is approaching, we may open multiple shelters equipped with generators that have capacity for pets and medical monitoring; during a smaller, isolated incident (snowstorm with power outages), we may open a temporary day shelter. If shelters are opened and a resident needs transportation or assistance, call 311; 911 if it's an emergency. In the event of a large evacuation, the city will utilize school buses and post instructions.

Evacuation and shelter updates will be posted in the News Flash on the city's main page, as well as this page, and social media. You can subscribe to get emergency information sent to you via email or

text here. TV and radio stations will also update information. Hampton also has an agreement with WHOV, 881. FM, to broadcast the city's emergency information.

TIPS FOR USING HAMPTON SHELTERS

- If at all possible, make arrangements to stay with a friend or relative.
- Do not attempt to seek refuge in a shelter unless notified by authorities that it has been opened.
- Listen to advice on evacuation and leave promptly when advised to do so.
- Recognize that a public shelter's primary function is to provide a roof over your head. Food and blankets may not always be available.
- Pet owners should contact 311 or check news sources above for information about available shelters that can accommodate animals. Pet-friendly shelters will be designated as necessary during severe weather. Some shelters are not equipped or staffed for pet sheltering. Weapons and alcoholic beverages are not allowed in a shelter. Circumstances may also require a ban on cigarettes or cigar smoking.
- Wherever you go, take provisions with you. Try to help others in a shelter any way you can.
- Shelters will be established only as an emergency and temporary means of caring for people who cannot find refuge elsewhere.

Appendix C

FORT MONROE AUTHORITY
BOARD OF TRUSTEES
RESOLUTIONS

Adopted September 21, 2023

WHEREAS, the Virginia Coastal Resilience Master Plan ("**VA CRMP**") is a guiding document for the Commonwealth to increase its resilience to flooding and sea level rise, which contains a list of projects identified by the Commonwealth and local leaders that will strengthen resilience in Virginia's coastal areas;

WHEREAS, the Department of Conservation and Recreation ("**DCR**") is the state agency overseeing the VA CRMP and the projects that will be funded, in whole or in part, by the Community Flood Preparedness Fund (the "**Fund**");

WHEREAS, in order for coastal resiliency projects at Fort Monroe to qualify for funding administered by DCR, from the Fund or other sources, Fort Monroe is required to develop a "Coastal Resiliency Plan for Fort Monroe" (the "**FMA Resiliency Plan**") that must be reviewed and approved by DCR;

WHEREAS, the Fort Monroe Authority, a public body corporate and political subdivision of the Commonwealth of Virginia (the **"FMA"**), acting by and through its Board of Trustees (the "**Board**"), desires to develop the FMA Resiliency Plan;

NOW THEREFORE BE IT

RESOLVED, that the Executive Director, or in his absence the Deputy Executive Director, is authorized, in the name and on behalf of the Board and the FMA develop the FMA Resiliency Plan, in compliance with the requirements of the VA CRMP, and to seek and obtain DCR's approval thereof; and

RESOLVED, FURTHER, in furtherance of the foregoing, that the Executive Director, or in his absence the Deputy Executive Director, is authorized, in the name and on behalf of the Board and the FMA to develop and submit to DCR initial drafts of the FMA Resiliency Plan, with the understanding that the final FMA Resiliency Plan will require the further review and approval of the Board prior to becoming effective.

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I certify that the above resolution is a true and correct copy of the resolution adopted by the Fort Monroe Authority Board of Trustees at their meeting on September 21, 2023 and no later action was taken to reduce or remove the authority granted by the resolution.

C. Borja

Carmen L. Borja
Assistant Secretary
Fort Monroe Authority Board of Trustees