

RHODE ISLAND COASTLINE COASTAL STORM RISK MANAGEMENT Final Feasibility Study

APPENDIX I: Implementation Plan



**US Army Corps
of Engineers®**
New England District

January 2023

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RHODE ISLAND COASTLINE
COASTAL STORM RISK MANAGEMENT

FINAL FEASIBILITY REPORT
Appendix I: Nonstructural Implementation Plan

TABLE OF CONTENTS

SECTION 1.0 DEFINITIONS.....	1
SECTION 2.0 INTRODUCTION.....	2
2.1 Elevation of Eligible Residential Structures.....	3
2.2 Determining Eligibility: 2 Step Eligibility Process.....	3
2.3 Execution /Recordation of Easement (please see attachment).....	5
2.4 Commencement of Nonstructural Improvements.....	5
2.5 Notice of Construction Completion (NCC).....	5
2.6 Eligible and Ineligible Project Costs.....	5
SECTION 3.0 DRY FLOOD PROOFING OF ELIGIBLE NON-RESIDENTIAL STRUCTURES.....	7
3.1 Determination of Eligibility.....	7
3.2 Commencement of Improvements and NCC.....	8
SECTION 4.0 IMPLEMENTATION METHOD: FEDERAL PROCUREMENT.....	8
SECTION 5.0 VARIOUS METHODS FOR PRIORITIZING THE NONSTRUCTURAL ELEVATION WORK.....	9
5.1 Recommended Plan Implementation Strategy.....	9
5.2 Clustering.....	9
5.3 Risk-Level.....	10
SECTION 6.0 OPERATIONS, MAINTENANCE, REPAIR, REHABILITATION, AND REPLACEMENT (OMRR&R).....	10

SECTION 1.0 DEFINITIONS

Term	Definition
Base Flood	Defined by the National Flood Insurance Program (NFIP) as the “flood having a 1% chance of being exceeded in any given year and is also called the 100-year flood”.
Base Flood Elevation (BFE)	The computed elevation to which floodwater is anticipated to rise during the base flood. The BFE is shown on community’s Flood Insurance Rate Map (FIRM).
Dry Floodproofing	Dry floodproofing makes the structure watertight below the level for which hurricane storm surge risk reduction is provided by preventing flood waters that derive from storm surge from entering the structure. Dry flood proofing may include one or more of the following methods: using waterproof membranes or sealants to reduce seepage of floodwater through walls and wall penetrations; use of watertight shields for doors and windows; and/or installing measures to prevent sewer backup.
Economically Justified	The cost to elevate/floodproofing the structure does not exceed the total monetary cost of the coastal storm flood damages that are anticipated to be avoided over the 50-year period of analysis (years 2030 to 2080).
Eligible structures	Structures that are determined by the United States Army Corps of Engineers (USACE) to be eligible for flood proofing after the completion of the investigations and analyses as described herein.
Floodproofing	Any combination of nonstructural additions, changes, or adjustments to structures which reduce the risk of hurricane storm surge damage to improved real property, water and sanitary facilities, structures and their contents.
Historic Structure	As defined in 44 CFR § 59.1, means any structure that is (1) listed individually in the National Register of Historic Places (maintained by the Department of the Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register; (2) certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district; (3) individually listed on a state inventory of historic places with historic preservation programs which have been approved by the Secretary of the Interior; or (4) individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either by (a) an

	approved state program as determined by the Secretary of the Interior or; (b) directly by the Secretary of the Interior in states without approved programs.
Hazardous, Toxic, or Radioactive Waste (HTRW)	HTRW means hazardous, toxic and radioactive waste as more specifically defined in Engineer Regulation (ER) 1165-2-132, "Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects".
Non-Federal Sponsor (NFS)	The NFS is the cost-sharing partner for the study, design, construction of the project, as well as for the Operation, Maintenance, Repair, Rehabilitation and Replacement (OMRR&R) of the project.
Nonstructural Measures	Nonstructural Measures are permanent or contingent measures applied to a structure and/or its contents that reduces the risk of damages that could result from hurricane storm surge. Nonstructural measures differ from Structural measures (i.e., levees, floodwalls, etc.) in that they focus on reducing the consequences of damages from hurricane storm surge instead of focusing on reducing the probability of damages from hurricane storm surge.

SECTION 2.0 INTRODUCTION

This Nonstructural Implementation Plan describes the general process for the implementation of nonstructural measures, as described in this Final Report, designed to reduce the risk of damages caused by coastal storms in the study area. The primary goal of the Recommended Plan is to reduce the risk of damage from storm surge for structures that have a FFE at or below the Base Flood elevation and that have been shown to be economically justified or are included in the Recommended Plan using Other Social Effects or Environmental Quality benefits categories and were identified in the NED exemption, based on hydrologic conditions predicted to occur in 2030 (the beginning of the 50-year period of analysis).

The Recommended Plan consists of the following measures:

1. Elevation of the Finished First Floor (FFE) of eligible structures to a design height which was determined separately for each structure based on 1% AEP NACCS water level + wave contribution + sea level change (intermediate through 2080).
2. Floodproofing (e.g. flood shields, sealants) of eligible structures that can't be elevated.
3. Property owners located in the project area will be informed of the details of implementation of the protection feature of the project, including eligibility criteria, the eligibility process, and the related duties and obligations of USACE, the NFS, and the property owner. Based upon present information, the anticipated duties and obligations are generally outlined below; however, some of this information may be

modified as the Nonstructural Implementation Plan is finalized as part of planning, engineering, and design (PED). While each individual eligible structure has been evaluated for the most cost-effective nonstructural measure, the government reserves the right to determine which measure shall be implemented at each structure location. It is anticipated that implementation of the Nonstructural plan will occur over an approximate 5-year period (assuming funding of ~\$10 million/year). However, the scale of the Project is highly dependent upon the participation rate and the amount of funding allocated in any given year.

If the property owner does not want to participate in the Project, USACE and the NFS would defer any further action on that structure until such time as the property owner elects to participate or until the period of construction ends. However, the Government reserves, at its sole discretion, the right to determine whether or not a structure may participate in the Nonstructural plan after a property owner has declined participation, and if allowed to participate, the timing and scheduling of such participation in the Project.

2.1 Elevation of Eligible Residential Structures

Owners of eligible residential structures may participate by having their structure elevated to the FFE elevation described in **Section 2.0**, above. If the required elevation is greater than 12 feet above ground level, the structure would not be eligible for elevation and would be ineligible to participate due to engineering and risk related factors.

2.2 Determining Eligibility: 2 Step Eligibility Process

Step 1- Preliminary eligibility: Structures that meet the following eligibility criteria will have met this first step in the eligibility process and will be eligible for further consideration in the process.

- The structure must have a FFE at or below the 100-year BFE, based on hydrologic conditions predicted to occur in 2030 (the beginning of the 50-year period of analysis); and
- Elevation of the structure is deemed to be economically justified or the structure was included in the Recommended Plan using Other Social Effects or Environmental Quality benefits categories and were identified in the NED exemption.

At the time of this Final Report, a structure inventory has been compiled which identifies 497 structures in the Study Area that, based on present information, have been deemed to be preliminarily eligible to participate in the Project (See the Final Integrated Feasibility Report and Environmental Assessment). These structures will require additional structure-specific analysis during PED to determine final eligibility.

Step 2 - Eligibility Determination – Investigations: The following is a general overview of Step 2 in the eligibility process for those structures meeting the Step 1 eligibility requirements. Additional details concerning the process, what makes up the eligibility

criteria, and related requirements will be developed during PED and provided prior to Project implementation.

- Once preliminary eligibility is determined, property owners will be asked to execute an application/participation agreement and will also be required to grant a temporary right-of-entry to USACE and the NFS to enter upon the property to conduct such property and structural investigations deemed necessary to determine final eligibility for participation in the Project. These investigations may include: structural inspections, surveys, limited environmental testing and site assessments, verifying current elevation and determining elevation requirements, and conducting such other activities deemed necessary by USACE and the NFS to make a final determination of eligibility. A property owner may elect not to participate at any time prior to execution of an easement for the performance of the nonstructural measure upon the property. Refusal to grant temporary right-of-entry will constitute the election not to participate.
- The property owner shall submit satisfactory documentation as outlined in the application/participation agreement.
- The NFS shall conduct title research to confirm the property has clear title; and appraisals that may be necessary.
- An ASTM Phase I Environmental Site Assessment (ESA) and asbestos investigation will be conducted to confirm the absence of HTRW and damaged or friable asbestos or asbestos-containing materials, and, if warranted, additional HTRW investigations and a Phase II ESA will be conducted at the property. If the presence of HTRW, asbestos, or asbestos-containing materials in a damaged or friable form is confirmed on the property, the property owner shall be obligated, at his sole cost and expense, to conduct all necessary response and remedial activities in full compliance with applicable local, state, and federal laws and regulations and provide proof of same before the property can be deemed to have met the eligibility requirements;
- The structure will be evaluated by USACE to ensure that all of the following eligibility requirements are satisfied:
 - The structure can be elevated to meet the required BFE. However, in no event will a structure be raised greater than 12 feet above the ground level;
 - Based on a visual assessment, the structure is in a condition that is suitable for elevation without the need for repair or rehabilitation. Any repair or rehabilitation necessary to achieve that condition will be at the sole cost and expense of the property owner (see paragraph 5 “Eligible and Ineligible Improvement Costs” below);
 - Implementation of nonstructural measures does not impact threatened or endangered species;
 - Implementing nonstructural measures on the property does not require discharging fill into the waters of the United States and would not result in any impact to wetlands; and
 - The property has not previously received any disaster assistance for the elevation of the structure.

2.3 Execution /Recordation of Easement (please see attachment)

Upon project approval, the property owners and the NFS will be required to execute a temporary work area easement for project construction, as well as a permanent easement, which will be binding upon the owners, their heirs, assigns, transferees, and any other successors in interest. The provisions of this easement have been developed and are included in **Appendix G**, *Real Estate Planning Report*.

2.4 Commencement of Nonstructural Improvements

Following the eligibility determination and receipt of proof of recordation of the required documentation, elevation of the structure will commence. The entire structure will be lifted and placed on a new foundation (i.e., columns, piers, posted or raised foundation walls) so that the FFE is at the target elevation described in **Section 2.0**, above. All utilities and mechanical equipment, including air conditioners and hot water heaters, will also be raised to the required elevation. Property owners may choose to raise the structure, utilities, and/or mechanical equipment in excess of the predicted targeted elevation; however costs attributable to elevations in excess of the minimum requirements set forth herein are not deemed eligible costs (described below) and would be performed at the sole cost, risk, and expense of the property owner.

2.5 Notice of Construction Completion (NCC)

Upon completion of the improvements, an inspection will be performed by USACE and upon final approval by the District Engineer, or his designee, a notice of construction completion will be issued to the NFS and the individual elevation project will be closed out as complete.

2.6 Eligible and Ineligible Project Costs

Eligible Project Costs: All elevations will require local permits prior to any onsite construction. Only the costs of elevation and foundation retrofitting are eligible costs. No Federal funds will be used to restore, replace, or repair the structure. No additions to the habitable spaces of the structure will be permitted in the performance of the elevation work. Eligible project costs of structure elevation include: design costs; costs of obtaining all required permits (i.e., zoning or land use approvals, environmental permits or required certifications, historic preservation approvals, and building permits), unless identified as an ineligible project cost; costs of title searches (in review of title information submitted by the property owner), surveys, appraisal fees and costs for the following tasks:

- elevating the structure;
- raising the roof and extending the walls of a side structure attached to the main structure (i.e., garage);

- raising mechanical equipment (i.e., air conditioner, furnace, water heater, electrical panel, fuel storage, valves, or meters);
- connecting, disconnecting, and extending utility connections for electrical power, fuel, incoming potable water, wastewater discharge;
- meeting access requirements of applicable building codes (i.e., stairs with landings, guardrails);
- creating large vent openings in the foundation and walls to meet requirements for flood water entry and exit;
- in instances where special access improvements (i.e., elevators, lifts, ramps, etc.) may be required (i.e., in the case of physically handicapped or elderly homeowners or occupants) special handicapped access can be considered an eligible improvement cost when documented by the medical certificate of a licensed physician. Multiple special access points may also be eligible for funding where necessary to meet state or local building code compliance;
- removal of any trees which restrict the elevation of a structure;
- site grading and site restoration including restoring landscaping to its preconstruction condition;
- for historic structures that are listed or eligible for listing in the National Register of Historic Places, costs associated with maintaining the historic designation as determined by the Rhode Island State Historic Preservation Office (including such costs to preserve the historic façade and character of the building whether through exterior structural modifications, landscaping, lighting, paint, disguising and/or blending of the nonstructural measure with the building, etc.);
- temporary site protection measures during site work; and
- allowable relocation assistance funds for displaced tenants in accordance with Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs of 1970, Public Law 91-646, 84 Stat. 1894 ([42 U.S.C. 4601](#)), as amended by the Surface Transportation and Uniform Relocation Assistance Act of 1987, Title IV of Public Law 100-17, 101 Stat. 246-256. Relocation assistance for tenants may include, among other things, advisory services, and reimbursement of costs of moving personal property, rental assistance to supplement the costs of leasing a comparable replacement dwelling, (See Appendix F (Main Report), Real Estate Plan for more detailed information.) Note that a structure is ineligible for nonstructural measures if it would require elevation over 12 feet above ground level due to engineering and risk related factors. Landowners whose properties are voluntarily elevated will not be eligible for benefits in accordance with URA; however, tenants of these structures may be eligible for these benefits.

Ineligible Project Costs: The costs that exceed that which is necessary to safely elevate and or flood-proof an eligible structure are deemed ineligible costs and any such costs remain the sole responsibility of the property owner. These costs may include, among others, costs associated with:

- any structural and system repair due to existing deficiencies;

- modifications or improvements to a septic system except for extension of lines from the raised structure to the existing system;
- cost for elevation above the targeted FFE;
- modifications to structures that are not attached to the eligible structure;
- modifications to tubs, pools, spas, hot tubs, and related structures or accessories;
- modifications to decks and patios not connected to or immediately adjacent to the structure except for modifications that are expressly required by building codes (i.e., stairways and landing modifications);
- the proper remediation, removal and disposal of environmental contaminants including but not limited to HTRW, asbestos, and asbestos-containing materials in damaged or friable form;
- costs associated with bringing a non-conforming structure into compliance with current building code, housing code, and/or other applicable codes;
- costs associated with special access improvements (i.e., elevators, lifts, ramps, etc.) that are deemed ineligible; and
- improvements to structures not considered the primary residence (i.e., detached garage, shed and/or barns).

SECTION 3.0 DRY FLOOD PROOFING OF ELIGIBLE NON-RESIDENTIAL STRUCTURES

Dry flood proofing consists of sealing all areas from the ground level up to approximately 3 feet of a structure to reduce the risk of damage from storm surge resulting from coastal storms, as described in this report, by making walls, doors, windows and other openings resistant to penetration by storm surge waters. Walls are coated with sealants or, waterproofing compounds, or are covered by plastic sheeting and mechanisms to prevent back-flow from water and sewer lines such as drain plugs, standpipes, grinder pumps, and back-up valves are installed. Openings, such as doors, windows, sewer lines and vents, may also be closed temporarily or permanently, with sandbags or removable closures.

Some common flood proofing measures include:

- Backflow valves;
- Closures on doors, windows, stairwells, and vents--they may be temporary or permanent;
- Rearranging or protecting damageable property--e.g., relocate or raise utilities;
- Sump pumps and sub-drains; and
- Water resistant material; metal windows, doors and jambs; waterproof adhesives; sealants and floor drains.

While each individual eligible structure will be evaluated for the most cost-effective nonstructural measure, the government reserves the right to determine which measure shall be implemented at each structure location.

3.1 Determination of Eligibility

The process of determining eligibility would be substantially similar to the process followed above in connection with the elevation of residential structures. Identification of eligibility criteria and details concerning the process will be developed during PED and provided prior to Project implementation. At the time of this Final Report, a structure inventory has been compiled which identifies 207 preliminarily eligible structures in the Study Area. Eligible property owners who request application of the dry flood-proofing measures to their structures must execute an application/participation agreement, must provide temporary right-of-entry, and undergo similar site and structural assessments, present the requisite documentation, and undergo a structure-specific analysis performed during the design phase that is substantially similar to that which is described above in connection with the elevation structures.

3.2 Commencement of Improvements and NCC

Upon determination that a structure is qualified for dry flood proofing, a scope of work will be developed. Each structure must have an approved sanitary disposal system and be in compliance with local and state health and building codes. The property owners and the NFS will be required to execute a temporary work area easement for project construction, as well as a permanent easement, which will be binding upon the owners, their heirs, assigns, transferees, and any other successors in interest. The provisions of this easement have been developed and are included as an attachment to the Real Estate Planning Report. After the easement is recorded in the public records of the county in which the property is located, the dry flood proofing work will be commenced, completed, inspected by USACE, and after final approval by the District Engineer, or his designee, a notice of construction completion will be issued to the NFS and the individual dry flood-proofing project will be closed out as complete

SECTION 4.0 IMPLEMENTATION METHOD: FEDERAL PROCUREMENT

The traditional method of implementation is generally described in publications of the USACE National Flood Proofing Committee and Flood Risk Management Planning Center of Expertise. This method of implementation utilizes a federal procurement process to obtain design and construction contractors for the various floodproofing measures. The Government will procure contracts that will allow a contractor to perform floodproofing work on multiple structures through a series of one or more task orders. The contractor will also be responsible for all work associated with the elevation from approval of the elevation plans for each structure to final inspection.

Real Estate regulations (Engineering Regulation (ER) 405-1-12, paragraph 12-9d(3)) allow for small quantities of borrow material to be supplied by the construction contractor through the use of readily available commercial sites, if supported by an analysis conducted by the Government and the NFS, and if no other constraints exist.. For purposes of this Final Report, it has been assumed that the analysis performed pursuant to the above cited ER 405-1-12 will determine that the required borrow quantities constitute a small quantity that can be obtained through a commercial site that meets the Project requirements. Prior to issuing a construction task order, the Government will conduct the necessary analysis in accordance with ER 405-1-12.

Contractors would be required to demonstrate that any proposed commercial borrow site is environmentally cleared and contains geo-technically suitable borrow material. In evaluating the suitability of the proposed commercial borrow site, impacts to wetlands would be prohibited. Costs of utilizing a commercial borrow site would be considered an item of construction cost, and not an item of LERRD cost.

SECTION 5.0 VARIOUS METHODS FOR PRIORITIZING THE NONSTRUCTURAL ELEVATION WORK

5.1 Recommended Plan Implementation Strategy

This final integrated feasibility report and environmental assessment recommends a strategy to implement the nonstructural project for eligible structures. Structures that have been identified as preliminarily eligible as part of the Recommended Plan are located in the study area that include all or part of 19 towns. In order to effectively implement the Recommended Plan, clusters of eligible structures that represent the highest risk for coastal storm flood damages (i.e. those with the highest Benefit to Cost Ratios, BCRs) would be identified and prioritized for construction. Individual structures would be addressed based on a ranking of risk from highest to lowest within the cluster. The ranking of individual structures would be revisited as elevation work is completed, as additional funding is distributed, and as new clusters are identified. Addressing groups of structures within a small geographic area would be more cost-effective, efficient, and would also allow for a more strategic methodology for applying nonstructural measures to at-risk structures. Additional work on this process would occur during the design phase of the Project.

Any structure scheduling or prioritization will be subject to the availability of Federal funds. The locations for scheduling or prioritizing the implementation of nonstructural work will be determined during PED but will be fully assessed for implementing the nonstructural plan in an efficient and cost-effective manner. Some of the methods for scheduling or prioritizing nonstructural work that will be considered as part of the prioritization process are as follows; however, additional methods of scheduling or prioritizing such work will also be considered for the priority locations to implement the nonstructural plan

5.2 Clustering

The eligible property owners in a contiguous neighborhood or subdivision (i.e. small scale area) would be targeted for priority in nonstructural plan implementation. A focus on clustered properties would create a ranking hierarchy of which properties to address first. The size of a cluster would need to be defined but would consist of an area where multiple eligible structures would be constructed simultaneously. This approach would rank efficiency as the main factor in determining which eligible properties should be prioritized.

5.3 Risk-Level

Within the clustered area, structures of various risk levels would be identified. In such cases, the focus would be on willing property owners that exhibit the highest risk for coastal storm flood damages (i.e. highest BCRs). For example, if 100 property owners execute easements within the clustered area, the owners who reside in the lowest portions of the floodplain would be prioritized for construction. Once these properties are elevated, the next highest-risk properties would be targeted. This approach couples risk exposure and clustering to determine which eligible properties should be prioritized.

SECTION 6.0 OPERATIONS, MAINTENANCE, REPAIR, REHABILITATION, AND REPLACEMENT (OMRR&R)

For all structure types, OMRR&R costs are expected to be 'de minimus' and will be confined to regular, periodic surveys and curb-side visits of structures where nonstructural measures have been applied in order to determine that the requirements of the OMRR&R Manual are being met. A minimal cost for these efforts has been calculated as part of NFS' OMRR&R responsibilities. Once the nonstructural measures have been implemented and NCC'd, the owner of the property will be responsible for all cost and risk of maintaining, repairing, rehabilitating and replacement the flood proofing measures that were utilized for the subject property. A draft OMRR&R Manual shall be provided to the NFS as early as possible in the period of implementation because USACE will issue a NCC for each flood proofed structure once the flood proofing is complete. At the time of the issuance of an NCC, the NFS's obligations for operation and maintenance for the subject structure or lands commences. Flood proofed structures shall be considered a separable element and functional portion of the Project. The NFS is responsible for the enforcement of the provisions of the easement executed by the owners of property benefiting from the nonstructural measures and for enforcement of the requirements of the OMRR&R Manual, including by not limited to, compliance with the requirements of Section 402 of the Water Resources Development Act of 1986, as amended. Upon NCC for NED implementation for a given structure or contract, the USACE will furnish to the NFS a final OMRR&R manual addressing, among other things, the NFS' responsibility for enforcement of terms of the easement, as well as other OMRR&R requirements. The NFS shall conduct periodic inspections at the intervals specified in the OMRR&R Manual to ensure that the owners, their heirs, and assigns, are in compliance with the terms and conditions of the executed easements and shall provide written certifications to USACE that the structures and lands have been inspected and that no violations have been found. Regarding the elevated residential structures, the inspections will determine among other things, that no part of the structure located below the level of the lowest habitable finished floor has been converted to living area for human habitation, or otherwise altered in any manner which would impede the movement of waters beneath the structure; that the area below the predicted target FFE is being used solely for the parking of vehicles, limited storage, or access to the structure and not for human habitation; that mechanical, electrical or plumbing devices have not been installed below the target FFE; that the property is in compliance with all applicable floodplain ordinances and regulations. USACE shall have the right, but not the obligation, to perform its own inspections of the flood proofed structures pursuant to the Project.