



**MARYLAND COAST SMART COUNCIL
COAST SMART CONSTRUCTION PROGRAM
2020**



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Maryland Department of Natural Resources**

TABLE OF CONTENTS

1. INTRODUCTION	4
2. APPLICABILITY	4
i. State and Local Capital Projects That Include the Construction or Reconstruction of a Structure	5
ii. State and Local Capital Projects That Include the Construction of a Highway Facility	5
3. SITING & DESIGN CRITERIA FOR STATE AND LOCAL CAPITAL PROJECTS THAT INCLUDE THE CONSTRUCTION OR RECONSTRUCTION OF A STRUCTURE	7
i. Siting Criteria	7
ii. Design Criteria	8
4. SITING AND DESIGN CRITERIA FOR STATE AND LOCAL CAPITAL PROJECTS THAT INCLUDE THE CONSTRUCTION OF A HIGHWAY FACILITY	9
i. Siting Criteria	9
ii. Design Criteria	10
5. CATEGORICAL EXEMPTIONS	12
i. Project Types and Uses	12
ii. Process	12
iii. Consultation	12
6. COAST SMART CRITERIA WAIVERS	13
i. Waiver Considerations	13
ii. Process	13
iii. Routine Projects	13
7. REPORTING	13
i. Reporting to Council	13
ii. Documentation	13
8. CRITERIA INCORPORATION	14
i. Procedure Manual for Professional Services	14
ii. Facility Program Manual	14
iii. Maryland State Hazard Mitigation Plan and State Disaster Recovery Plan	14
9. COAST SMART PROGRAM ANNUAL REVIEW AND ANALYSIS	14

Appendices

APPENDIX A: Coast Smart Project Screening Form	15
APPENDIX B-1: Coast Smart Waiver Considerations and Process	21
APPENDIX B-2: Coast Smart Criteria Waiver Form	23
APPENDIX C: Legislative Overview	25
APPENDIX D: Glossary and Useful Web-Based Resources	26

Figures

FIGURE 1: Coast Smart Climate Ready Action Boundary (CS-CRAB) & CS-CRAB Elevation	6
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1. INTRODUCTION

In 2014, the Maryland Coast Smart Council (Council) was established in the Maryland Department of Natural Resources (DNR). The DNR Secretary serves as the Coast Smart Council Chair and Council membership consists of representation from academia, State government, and five members appointed by the Governor to represent local government, environmental, and business interests. The purpose of the Coast Smart Council is to develop and adopt, in consultation with DNR and the Maryland Department of Transportation (MDOT), specific Coast Smart Siting and Design Criteria (Criteria) to address impacts associated with sea level rise inundation, and coastal flooding on State and local capital projects that include the construction of a structure or highway facility or the reconstruction of a structure with substantial damage.

The purpose of this document is to provide updated guidance on the siting and design of certain State and local capital projects that include the construction of a structure or highway facility. The goal is to minimize impacts and optimize resilience of infrastructure to future sea level rise inundation and coastal flooding. This 2020 comprehensive update of the Coast Smart Construction Program (Program) document is necessary to comply with changes made since the Program was initially enacted in 2014. The Coast Smart siting and design criteria apply to certain State and local capital projects that involve the construction of a structure or highway facilities, have a cost of \$500,000 or more and are funded with at least 50% State funds. Additionally, the vulnerable areas within which the Coast Smart siting and design criteria apply have been updated to include areas outside of the Special Flood Hazard Area (as was initially required by the original statute). In determining vulnerable areas, DNR and the Maryland Department of Environment (MDE) developed a mapping layer referred to as the Coast Smart Climate Ready Action Boundary (CS-CRAB). All applicable projects located waterward of this boundary are required to comply with the Coast Smart practices described below. This document will continue to be updated as new information regarding vulnerabilities emerge or new assessment tools become available.

Additional information on the Coast Smart Council can be found on the [Council's website](#).

2. APPLICABILITY

All units of State and local government that construct applicable capital projects are subject to the Program. Coast Smart means a construction practice in which preliminary planning, siting, design, construction, operation, maintenance, and repair of a structure or highway facility avoids or minimizes future impacts associated with coastal flooding and sea level rise inundation. Coast Smart includes both siting and design criteria that are applicable throughout the entire lifecycle of a project. Qualifying Agencies are not required to implement siting and design criteria for temporary access points or erosion control measures so long as those practices do not constitute a “structure” or new “highway facility,” as those terms are defined in § 3-1001 of the Natural Resources Article.

i. State and Local Capital Projects That Include the Construction or Reconstruction of a Structure

If a State or local capital project, for which at least 50% of the project costs are funded with State funds and which costs \$500,000 or more, includes the construction of a new structure or reconstruction of a structure with substantial damage, the structure shall be constructed or reconstructed in compliance with the Coast Smart siting and design criteria.

- A “structure” is defined as a walled or roofed building; a manufactured home; or a gas or liquid storage tank that is principally above ground.
- “Substantial damage” means damage caused by any source that is sustained by a structure such that the cost of reconstruction to its before-damaged condition is at least half of the structure's replacement cost before the damage occurred.

ii. State and Local Capital Projects That Include the Construction of a Highway Facility

Beginning on July 1, 2020, if a State or local capital project includes the construction of a highway facility, where at least 50% of the project costs are funded with State funds and which costs \$500,000 or more, the highway facility shall be constructed in compliance with the Coast Smart siting and design criteria.

- “Highway facility” is defined in § 3-101(f)(2) of the Transportation Article as any one or more or combination of projects involving the rehabilitation and reconstruction of highways in the State highway system to meet present and future needs and the development and construction in new locations of new highways necessitated by traffic demands to become parts of the State highway system, including federally-aided highway projects partially funded by this State and all incidental property rights, materials, facilities, and structures.
- “Construction of a Highway Facility” is limited to new State and local highway facilities and does not include projects involving the rehabilitation and reconstruction of existing highways.

iii. Coast Smart Climate Ready Action Boundary (CS-CRAB) and CS-CRAB Elevation

Under Natural Resources Article § 3-1009(c), the Council, in consultation with DNR and MDOT, is required to establish Coast Smart siting and design criteria to address sea level rise inundation and coastal flood impacts on State and local capital projects. A component of this requirement is that structures and highway facilities “be designed and constructed or reconstructed in a manner to withstand the storm surge from a storm that registers as a Category 2 on the Saffir-Simpson hurricane wind scale, including a requirement for structures to be constructed or reconstructed at a minimum elevation above the projected storm surge.”

As background, Storm Surge Inundation Maps (SSIMs) are created as one component of a Hurricane Evacuation Study and as such are traditionally used for identifying hurricane evacuation zones. According to the Federal Emergency Management Agency (FEMA), SSIMs

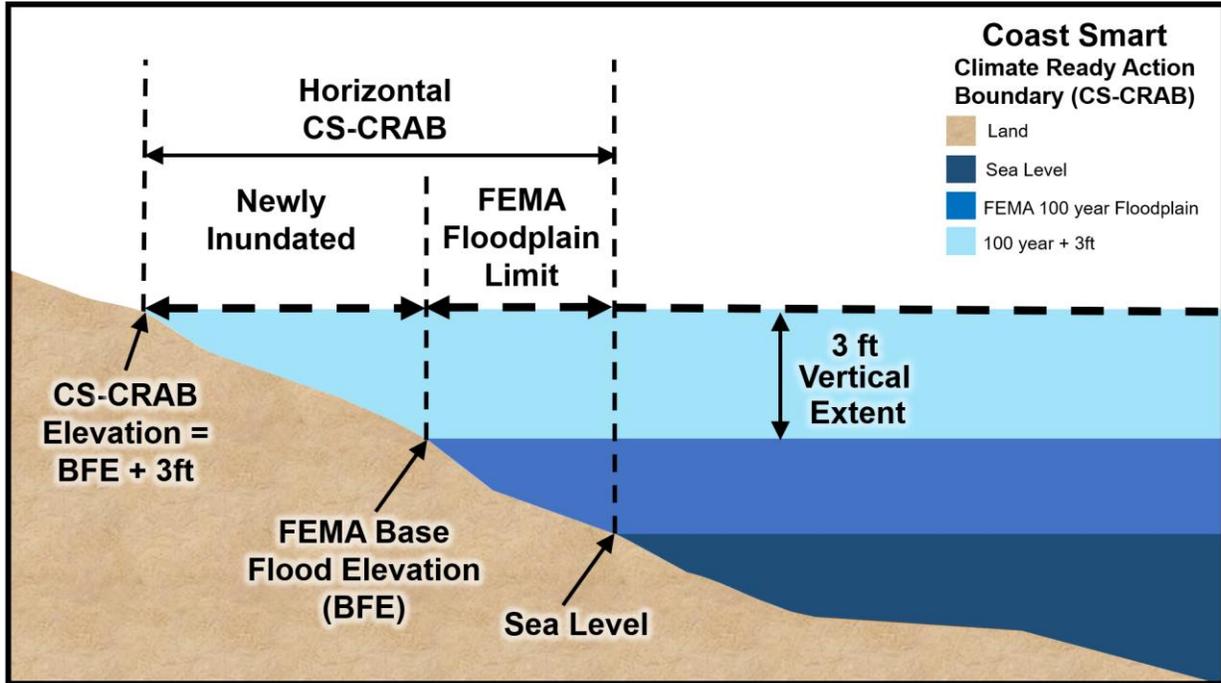
are not meant to be used for [regulatory or insurance purposes](#). Storm surge heights are influenced by many factors, including hurricane intensity, size, forward speed, the angle of approach to the shoreline, astronomical high tide level, and local geographic features. SSIMs do not include consideration of wave action or probability. In reviewing the SSIMs and a variety of different storm scenarios, the Council's expert workgroup determined that the use of the SSIMs would not adequately characterize flood risk or accurately predict where the water may go.

Due to the limitations of the SSIMs and the infeasibility of mapping a consistent, minimum elevation above a projected storm surge, the Council reviewed a variety of alternative mapping scenarios. To address inundation from long-term sea level rise risks and short-term storm effects, the Council adopted the use of a mapping layer that uses the 100-year FEMA floodplain elevations, also referred to as the Base Flood Elevation. The FEMA floodplain maps are produced in support of the National Flood Insurance Program (NFIP). In contrast to the SSIMs, the FEMA floodplain maps are regulatory documents that identify areas of possible inundation due to both riverine and coastal flooding. Flood inundation areas shown on FEMA mapping for coastal areas are based on storm surge and wave action (where applicable), and are tied to localized shoreline and elevation data. The FEMA mapping products have a documented methodology for determining a regulatory Base Flood Elevation that is used for State and local floodplain management and construction purposes.

After evaluating a variety of mapping scenarios, the Council found that adding a 3-foot vertical extent above the 100-year FEMA floodplain elevations, also referred to as the Base Flood Elevation, would address the footprint of a Category 2 storm surge and would include areas inundated by an at least 2-foot rise in sea level. This also allows the Council's approach to be tied to existing floodplain regulations and to MDE's and DNR's existing reviews of State Clearinghouse projects and provides more precision for determining minimum elevation criteria. This method, which conveys resiliency by adding a vertical extent above the Base Flood Elevation, is currently the most technologically feasible and accurate approach for addressing and implementing the statutory requirement. As data improves, the Council will periodically review this mapping methodology to ensure that it remains as accurate as possible.

The Council's mapping approach resulted in the development of the CS-CRAB and the CS-CRAB Elevation. The "CS-CRAB Elevation" means a selected flood elevation fixed at the Base Flood Elevation plus a 3-foot vertical extent. The CS-CRAB is the corresponding horizontal floodplain created by the CS-CRAB Elevation (see Figure 1 below).

FIGURE 1: Coast Smart Climate Ready Action Boundary (CS-CRAB) & CS-CRAB Elevation



3. SITING & DESIGN CRITERIA FOR STATE AND LOCAL CAPITAL PROJECTS THAT INCLUDE THE CONSTRUCTION OR RECONSTRUCTION OF A STRUCTURE

Requirements: State and local capital projects for which: (1) at least 50% of the project costs are funded with State funds, (2) cost \$500,000 or more, and (3) include the construction of a new structure or the reconstruction of a structure with substantial damage shall satisfy the following siting and design criteria.

i. Siting Criteria

The following specifications related to the location of a structure on a lot or parcel or within a larger geographic area are required:

1. Construction of new State and local structures and the reconstruction of substantially damaged State and local structures shall be avoided, to the maximum extent practicable, waterward of the CS-CRAB. If location waterward of the CS-CRAB is unavoidable, the project shall be designed in accordance with the Design Criteria below.
2. To the maximum extent practicable, new State and local "critical or essential facilities" shall not be located waterward of the CS-CRAB. If location waterward of the CS-CRAB is unavoidable, the Qualifying Agency shall apply for and obtain a

waiver of the Siting Criteria and the project shall be designed in accordance with the Design Criteria below to the maximum extent practicable.

3. Temporary structures, such as construction and engineering offices, shall not be allowed in floodways or "V" Zones with the exception of those temporary structures that are directly related to water dependent uses as defined in the [Categorical Exemptions](#).
4. Existing natural and nature-based features that may serve to buffer the project from the impacts of future sea level rise inundation, coastal flooding or storm surge (e.g., vegetated or forested buffers, dunes, wetland adaptation areas) or that support general climate adaptation practices (e.g., habitat adaptation areas), shall be identified, protected, and maintained to the maximum extent practicable.
5. Onsite mitigation measures (e.g., living shorelines, forested buffers) should incorporate identified features under the above referenced criteria (number four) to enhance, restore or create natural and nature-based features to provide additional protection against future sea level rise inundation and coastal storm impacts.

ii. Design Criteria

The following structural specifications related to the shape, size, or form of construction practice guidelines are required:

1. All State and local structures shall be designed to avoid or minimize future impacts associated with future sea level rise inundation, coastal flooding, saltwater intrusion and salinization, and storm surge over the anticipated design life of a project.
2. If located waterward of the CS-CRAB, all new non-critical State and local structures and the reconstruction or rehabilitation of substantially damaged non-critical State and local structures shall be constructed with a first floor elevation at or above the CS-CRAB Elevation to ensure minimal flooding and storm surge impacts.
 - a. The mechanical and electrical systems (e.g., junction box) associated with these structures shall be at least three (3) feet above the first floor elevation unless otherwise specified by building code.
3. If located waterward of the CS-CRAB, the reconstruction or rehabilitation of all State and local "critical and essential" substantially damaged structures shall be constructed with a first floor elevation at least one (1) foot above the CS-CRAB Elevation to ensure continuity of operations.
 - a. The mechanical and electrical systems (e.g., junction box) associated with these structures shall be at least three (3) feet above the first floor elevation unless otherwise specified by building code.

4. If granted a waiver to the siting criteria or a categorical exemption applies, a new State and local “critical and essential” structure located waterward of the CS-CRAB shall be constructed with a first floor elevation at least one (1) foot above the CS-CRAB Elevation to ensure continuity of operations.
5. Flooding potential should be considered when choosing building materials for all structural projects, including for wells, minor improvements or maintenance and repair, as corrosion and other environmental and health consequences can become a concern for materials subjected to flood waters.¹
6. Utilize FEMA standards (44 CFR 60.3(c)(3)(ii)) for dry floodproofing and wet floodproofing parts of a structure located below the CS-CRAB Elevation to prevent or minimize the effect of coastal flooding.
7. Structures proposed within a Limit of Moderate Wave Action (LiMWA) boundary, also known as the "Coastal A Zone," when mapped under NFIP shall comply with construction standards applicable for “V” Zones. For structures proposed within Zone A of the LiMWA (less than 1.5 feet wave height), also consider designing projects that comply with construction standards applicable for “V” Zones.
8. Consider the long-term resiliency and safety of a site based on the intended use and the operational needs of the proposed State or local structure, including site access, design and location of underground tanks, storage and use of hazardous materials, and utilities.

4. SITING AND DESIGN CRITERIA FOR STATE AND LOCAL CAPITAL PROJECTS THAT INCLUDE THE CONSTRUCTION OF A HIGHWAY FACILITY

Requirements: New State and local capital projects for which (1) at least 50% of the project costs are funded with State funds, (2) cost \$500,000 or more, and (3) include the construction of a highway facility shall satisfy the following siting and design criteria.

i. Siting Criteria

The following specifications related to the location of a highway facility on a lot or parcel or within a larger geographic area are required:

1. Construction of new State and local highway facilities waterward of the CS-CRAB shall be avoided to the maximum extent practicable. If the location of the new State or local highway facility, including a “critical or essential” highway facility, waterward of the CS-CRAB is unavoidable, the new State or local highway facility shall be designed in accordance with the design criteria below.

¹ Maryland Department of Environment. 2014. *Maryland Model Floodplain Management Ordinance*. Maryland Department of Environment, Baltimore, Maryland.

2. Temporary structures, such as construction and engineering offices, shall not be allowed in floodways or "V" Zones with the exception of those temporary structures that are directly related to water dependent uses as defined in the [Categorical Exemptions](#).
3. Existing natural and nature-based features that may serve to buffer the project from the impacts of future sea level rise inundation, coastal flooding or storm surge (e.g., vegetated or forested buffers, dunes, wetland adaptation areas) or that support general climate adaptation practices (e.g., habitat adaptation areas), shall be identified, protected, and maintained to the maximum extent practicable.
4. Onsite mitigation measures (e.g., living shorelines, forested buffers) should incorporate identified features, under number 3 above, to enhance, restore or create natural and nature-based features and to provide additional protection against future sea level rise inundation and coastal storm impacts.

ii. Design criteria

The following structural specifications related to the shape, size, or form of construction practice guidelines are required:

1. All State and local highway facilities shall be designed to avoid or minimize future impacts associated with future sea level rise inundation, coastal flooding and storm surge, over the anticipated design life of a project. When designing new highway facilities, the Qualifying Agency shall consider the anticipated project design life and complete the *Project Vulnerability Assessment* section in the Coast Smart Project Screening Form located in Appendix A.
2. All new non-critical State and local highway facilities located waterward of the CS-CRAB shall demonstrate use of construction practices that minimize flooding impacts on the highway facility and neighboring properties for the design life of the project. For example, in some circumstances, this may mean elevating a highway facility, while in other circumstances, it may be more appropriate to design a facility lower and with construction practices to withstand stronger impacts.
 - a. The mechanical and electrical systems (e.g., junction box) associated with highway facility structures shall be three (3) feet above the first floor elevation unless otherwise specified by building code.
3. All new State and local "critical and essential" highway facilities located waterward of the CS-CRAB, as well as all "critical and essential" structures located waterward of the CS-CRAB that have been granted a waiver to the siting criteria, shall be constructed with a first floor elevation at least one (1) foot above the CS-CRAB Elevation to ensure continuity of operations.

- a. The mechanical and electrical systems (e.g., junction box) associated with “critical and essential” highway facility structures shall be three (3) feet above the first floor elevation unless otherwise specified by building code.
4. To the maximum extent practicable, State and local highway facility structures serving transportation purposes that are not water dependent or dependent on integral infrastructure (e.g., bus shelters) shall be constructed with a first floor elevation at or above the CS-CRAB Elevation to ensure minimal flooding and storm surge impacts as well as to ensure an appropriate tie-in to the complete highway project.
5. Flooding potential should be considered when choosing building materials for all structural projects, including minor improvements or maintenance and repair, as corrosion and other environmental and health consequences can become a concern for materials subjected to flood waters.²
6. Utilize FEMA standards (44CFR60.3(c)(3)(ii)) for dry floodproofing or wet floodproofing parts of a structure located below the CS-CRAB Elevation to prevent or minimize the effect of coastal flooding.
7. Highway facilities proposed within a LiMWA boundary, also known as the “Coastal A Zone,” when mapped under the NFIP shall be designed in compliance with construction standards applicable for “V” Zones. Highway facilities proposed adjacent to the LiMWA, also consider designing projects with a design life greater than 50 years in compliance with construction standards applicable for “V” Zones.
8. Consider the long term resiliency and safety of a site relating to the operational needs of the proposed highway facility, including site access, design and location of underground tanks, storage and use of hazardous materials, and other utilities.

² Maryland Department of Environment. 2014. Maryland Model Floodplain Management Ordinance. Maryland Department of Environment, Baltimore, Maryland.

5. CATEGORICAL EXEMPTIONS

i. Project Types and Uses

The following project types may be determined by the Qualifying Agency to be exempt from strict application of siting and design criteria, provided that it can be demonstrated that the project has been designed to include adaptation and resiliency features to prevent or mitigate damage to the maximum extent practicable.

1. *Water-dependent uses.* Projects that require continued direct access to the water as an integral part of the use, or facilities that directly support water dependent uses.
2. *Passive public access.* Projects that provide either recreational or scenic access to water bodies or shoreline areas which need to be within a flood zone for their purpose, including those that provide a flood mitigation benefit.
3. *Historic structures.* The necessity of continued investment of State resources in properties individually listed or determined eligible for listing in the National Register of Historic Places or a contributing resource within a historic district listed on or determined eligible for listing in the National Register. Projects should follow the Maryland Historical Trust's Flood Mitigation Guide: Maryland's Historic Buildings (2018) guidance document.³
4. *Temporary structures or uses.* Structures intended to be in place for less than 180 consecutive days in any given calendar year.
5. *Emergency use.* Structures essential to save lives and protect property, public health and safety.

ii. Process

The agency requesting the exemption shall complete the Coast Smart Project Screening Form in Appendix A and indicate which exemptions apply.

iii. Consultation

Qualifying Agencies may request a formal consultation with the Council for the purpose of reviewing a proposed project or to seek a determination of compliance with the Categorical Exemption provisions, as specified above.

³ Flood Mitigation Guide: Maryland's Historic Buildings (2018). Historic Preservation & Emergency Management. mht.maryland.gov/documents/PDF/plan/floodpaper/2_Preservation%20Emer%20Mgt%20-%202018-06-30a.pdf

6. COAST SMART CRITERIA WAIVERS

Any unit of State or local Government may request a waiver from one or more of the specific Siting or Design Criteria. Waiver requests will be reviewed for approval by the Governor's Smart Growth Subcabinet, established under State Government Article, § 9-1406.

i. Waiver Considerations

Exceptions to the Criteria may be granted based on consideration of the factors listed in Appendix B.

ii. Process

The Qualifying Agency requesting the waiver shall provide a brief (no more than two pages) letter of request for a waiver to the Governor's Smart Growth Subcabinet, explaining and demonstrating 1) why a proposed project is unable to meet Program requirements and; 2) how the project is eligible for a waiver based on one or more of the considerations listed in Appendix B. The waiver request should be provided in Microsoft Word or .PDF format for distribution, review and consideration by the Smart Growth Coordinating Committee and Smart Growth Subcabinet. Qualifying Agencies should allow up to eight (8) weeks for a response to waiver requests. See Appendix B for more information on the waiver submittal package and process.

iii. Routine Projects

The Council may establish, in writing, an agency-specific procedure by which certain routine projects may be handled in an expedited way without individual waiver approval.

7. REPORTING

i. Reporting to Council

All units of State and local government shall provide a list to the Council of individual State and local agency capital projects at least annually, which were undertaken within the previous fiscal year and related to implementation of Program, including Categorical Exemption and Waiver determinations. DNR will work with relevant partners to develop an electronic reporting system so local jurisdictions can easily log projects in real time.

ii. Documentation

Reporting materials shall include all documentation used to determine compliance with Construction Siting and Design Criteria, including the Coast Smart Project Screening Form (See Appendix A). Reporting documents will be used by the Council for the purposes of further development or refinement of Siting and Design Criteria, Categorical Exemptions, and general standards and procedures for applying and obtaining a waiver.

8. CRITERIA INCORPORATION

i. Procedure Manual for Professional Services

The Maryland Department of General Services (DGS) shall incorporate the Program Requirements into Chapter II, Section 6 of the Procedure Manual for Professional Services,⁴ as appropriate.

- The Procedure Manual serves as a guide for providing professional services during all phases of design and preparation of contract documents for capital projects involving the construction, alteration or renovation of State buildings with an estimated construction cost greater than \$2 million. It is intended that the procedures also be followed to the fullest extent practicable for other State public improvements such as facilities renewal projects, special structures, roads, utilities, and site improvements. Chapter II, Section 6 of the Manual outlines DNR's coastal/floodplain design requirements in two subsections: 6.2 Requirements and 6.5 Coast Smart Construction Program. Appendix C of the Manual covers Floodplain Management Criteria for Flood-Prone Areas.

ii. Facility Program Manual

The Department of Budget and Management and DGS shall amend the Facility Program Manual to incorporate Program requirements.

- Section 3-602(d) of the State Finance and Procurement Article of the Annotated Code of Maryland requires that before an appropriation may be authorized for a capital project, the unit of State government requesting the appropriation shall submit a facility program justifying the project and describing, in detail, the scope and purpose of the project. The Facility Program Manual defines and describes the content of a facility program; provides instruction on the preparation of a facility program; and provides information regarding facility program submission requirements.

iii. Maryland State Hazard Mitigation Plan and State Disaster Recovery Plan

The Maryland Emergency Management Agency shall incorporate the Construction Criteria, as they are amended from time to time, into all State Hazard Mitigation Plan updates and into the State Disaster Recovery Plan.

9. COAST SMART PROGRAM ANNUAL REVIEW AND ANALYSIS

The Council will meet quarterly, or as deemed necessary, for the purposes of further development or refinement of Siting and Design Criteria, Categorical Exemptions, and general standards and procedures for applying and obtaining a waiver.

⁴ Procedure Manual for Professional Services. Design, Construction and Energy Project Management and Design Division. (Department of General Services). dgs.maryland.gov/Documents/ofp/Manual.pdf

APPENDIX A: Coast Smart Project Screening Form

This document is intended to help Maryland State agency personnel and others understand and apply the Coast Smart Construction Program guidelines for various phases of their capital project to prevent or minimize the future impacts of coastal and riverine flooding, storm surge and sea level rise inundation.

1. *Applicability.*

Does the State or local capital project funded with more than 50% State funds and costing at least \$500,000 involve:

- a. Construction of a structure: Yes _____ No _____
- b. Reconstruction of a structure: Yes _____ No _____
- c. Construction of a new highway facility: Yes _____ No _____

2. *Coast Smart Climate Ready Action Boundary (CS-CRAB) and CS-CRAB Elevation.*

- a. Is the project located waterward of the CS-CRAB? Yes* _____ No _____

*If yes, include a map showing the proposed footprint of the project relative to the CS-CRAB. Also, provide the CS-CRAB Elevation and lowest ground elevation of the structure or highway facility.

3. *General Project Information.*

- a. Project name:

- b. Location (Address, [Community Name](#), Zip Code):

- c. Contact Name:

Email: _____ Phone: _____

- d. Brief project description:

- e. [Tax Map/Grid/Parcel or State Department of Assessments and Taxation \(SDAT\) Account Number](#):

- f. [Flood Insurance Rate Map \(FIRM\) Panel No.](#): _____

- g. FIRM effective date: _____

- h. Identify (circle) Flood Zone(s) present:

Zone A, Zone AE, Zone AH, Zone AO, Zone AR, Zone A99, Zone V, Zone VE, Zone X (shaded or unshaded) or Zone D

4. **Categorical Exemptions.** Does your project qualify for any of the approved Categorical Exemptions? If yes, please identify which exemptions apply below:

- a. Water-Dependent Uses
- b. Passive Public Access
- c. Historic Structures
- d. Temporary Structures or Uses
- e. Emergency Use

Note: If your project qualifies for a Categorical Exemption and is located waterward of the CS-CRAB, you are still required to include adaptation and resiliency features to prevent or mitigate damage to the maximum extent practicable.

5. **Project Design Life.** What is the timescale for project planning, design, construction, maintenance and operation? Select one.

- a. Short-term project (design life < 25 years)
- b. Medium-term project (design life between 25-50 years)
- c. Long-term project (design life between 50 – 100 years)
- d. Very long-term project (design life > 100 years)

6. **Project Vulnerability Assessment.** In project planning, it is useful to consider the proposed project's vulnerabilities to sea level rise impacts (i.e., future inundation, flooding and storm surge corrosion due to saltwater intrusion or salinization) over the course of the project's design life. Answering the following questions will provide project planners with awareness regarding vulnerabilities that may warrant additional siting or design considerations.

Note: When planning new State and local structures and highway facility projects with a design life that is not expected to extend beyond 50 years or where there is a relatively high risk tolerance limit (e.g., rare flooding is tolerable), assess vulnerability using current "medium range" or "best estimate" relative sea level rise projections. When new State and local structures and highway facility projects with a design life that is expected to extend beyond 50 years or where there is a very low acceptance of any flooding risk, apply current "high" end relative sea level rise scenarios or projections.

- a. Is the project located in an area that experiences nuisance flooding?
 - i. Yes _____
 - ii. No _____
- b. Is the project a critical or essential facility?
 - i. Yes _____
 - ii. No _____

c. Will there be any external electrical or mechanical systems servicing the structure or highway facility?

i. Yes* _____ ii. No _____

* If yes, will they be elevated?

i. Yes _____ ii. No _____

d. Will there be external fuel tanks (e.g., propane)?

i. Yes* _____ ii. No _____

Describe type and indicate whether they are above-ground or underground storage tanks: _____

* If yes, the external tanks should be anchored and/or elevated.

e. Will there be any enclosures below the first floor?

i. Yes* _____ ii. No _____

* If yes, will the enclosure have flood openings?

i. Yes _____ ii. No _____

f. *Ecosystem Resiliency*. Circle all ecological features on site that may serve to buffer the project from the impacts of future sea level rise inundation, coastal flooding or storm surge:

- i. Vegetated or forested buffers
- ii. Dunes
- iii. Beaches
- iv. Wetland or marsh system
- v. Oyster beds or reefs
- vi. Barrier island(s)
- vii. Potential wetland migration on site
- viii. Habitat adaptation areas on site
- ix. Natural and nature-based features that could be enhanced, restored or created to provide additional protection against future sea level rise inundation and coastal storm impacts

Explanation/Others:

Other siting considerations:

What building materials will be used to increase resiliency?

What type of construction will be used (e.g., relocatable, portable, expendable in the event of storm damage)?

Will there be any functional use restrictions placed on the project (e.g., temporary)?

Other design considerations:

Is there adequate shoreline protection at the proposed project's site?

Explain any additional risk of heightened storm surge due to future sea level rise inundation:

7. **Qualitative Cost/Benefit Analysis.** Provide qualitative assessment of anticipated benefits and costs of the proposed project with the following factors:

- a. *Risk v. Time.* What are the potential future financial and other losses associated with sea level rise inundation, coastal flooding and storm surge over the project's anticipated design life? How does this cost compare to inaction?

- b. *Risk Tolerance*. What is the risk tolerance for the proposed project?
i. Low _____ ii. Medium _____ iii. High _____

Explain:

- c. *Socioeconomic Considerations*. What are the short- and long-term costs associated with the project?

- i. What costs are associated with the need for additional shoreline protection?

- ii. What types of emergency responses will there be during extreme events?

- iii. What is the possible need for the repair or rebuilding of damaged structures?

- d. *Environmental Impacts*. Are there increased impacts of the project to the environment due to the incorporation of resiliency measures (e.g., increasing the height of a bridge may necessitate a need for larger bridge abutments with greater impact to the waterway and nearby wetland areas)?

- e. *Cultural Impacts.* Are there increased impacts of the project to cultural resources due to the incorporation of resiliency measures (e.g., increasing the height of a bridge may necessitate a need for larger bridge abutments with greater impact to historic structures or cultural value of the surrounding areas)?

APPENDIX B-1: Coast Smart Waiver Considerations and Process

Any unit of State or local government may request a waiver from one or more of the specific Siting or Design Criteria. Waiver requests will be reviewed for approval by the Governor's Smart Growth Subcabinet, established under § 9-1406 of the State Government Article of the Annotated Code of Maryland.

I. Waiver Considerations. Exceptions to the Criteria may be granted based on consideration of the following factors

- *Cost-Benefit Analysis.* The full extent of short-term and long-term costs, including those associated with additional shore protection, emergency response during extreme weather events, and the potential necessity of rebuilding or repairing damaged structures. Included in this analysis should be the costs of providing government services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, and water systems, and streets and bridges.
- *Importance of the Services.* Determination of the level of importance of services to the State of Maryland provided by the proposed project.
- *Socioeconomic and Cultural Considerations.* The necessity of continued investment of State resources in coastal communities in order to protect and stimulate economic growth and revitalization or maintain a unique cultural value.
- *Structural and Natural and Nature-Based Resiliency Measures.* Proposed construction practices and site development standards for the protection of structural and ecological features on site, in anticipation of the need to prepare for, respond to, and recover from extreme weather events, sea level rise inundation, coastal flooding, storm surges and shoreline erosion.
- *Statutory/Regulatory Conflicts.* Statutory or regulatory requirements (e.g., Americans with Disabilities Act) that may conflict with the strict application of the Siting and Design Criteria.
- *Federal Grant Funding Criteria.* Specific grant requirements which may specify alternative construction standards or practices and/or may preclude application of strict interpretation of the Siting and Design Criteria.
- *Mapping Error.* Land elevations shown on mapping products or tools are proven to be inaccurate by a licensed surveyor or engineer.
- *Public Health, Safety and Welfare.* An analysis of the danger that materials may be swept onto other lands to the injury of others or the danger to life and property due to flooding or erosion damage.

- *Suitability of Alternative Locations.* Availability of suitable alternative project locations that are subject to a lower risk of flooding or erosion damage.
- *Emergency Response and Access.* Safety of access to and from a site, facility or the structure or infrastructure by passenger and emergency vehicles during a flood.

2. Waiver Process. The Qualifying Agency requesting the waiver shall provide a brief (no more than two pages) letter of request for a waiver to the Governor's Smart Growth Subcabinet explaining and demonstrating:

- a. Why a proposed project is unable to meet Program requirements and;
- b. How the project is eligible for a waiver based on one or more of the considerations listed above.

The waiver request should be provided in Microsoft Word or .PDF format for distribution, review and consideration by the Smart Growth Coordinating Committee and Smart Growth Subcabinet. Qualifying Agencies should allow up to eight (8) weeks for a response to waiver requests.

APPENDIX B-2: Coast Smart Criteria Waiver Form

Project Title: _____

Date Submitted: _____

Summary Description of Project:

Approval Requested by:

Agency:

Staff to present project to Smart Growth Coordinating Committee (SGCC):

Target date to be presented/ reviewed by SGCC:

Waiver Request (Identify siting and/or design criteria for which a waiver is being sought):

Waiver Justification(s):

- Positive Cost-Benefit Analysis
- Importance of the Services
- Unique Socio-Economic or Cultural Considerations
- Sufficient Structural Protection Measures
- Adequate Natural and Nature-Based Resiliency Measures
- Statutory/ Regulatory Conflict
- External Grant Funding Criteria
- Mapping Error
- No Foreseen Significant Danger to Public Health, Welfare, or Safety
- No Suitable Alternative Locations
- Emergency Response and Access
- Other _____

Materials Provided:

- *Coast Smart* Project Screening Form
- Project Site Plans and Designs
- Maps of project location, surrounding land use and road network

Project Funding:

Cost of Project: _____

Funding Source: _____

SGCC Decision:

_____ APPROVED

_____ APPROVED WITH CONDITIONS

_____ FORWARD TO SMART GROWTH SUBCABINET FOR CONSIDERATION

Comments:

APPENDIX C: Legislative Overview

2014

Chapter 415 of the 2014 Laws of Maryland established the Maryland Coast Smart Council in the Maryland Department of Natural Resources. Among other things, the legislation required the Coast Smart Council, in consultation with the Maryland Department of Natural Resources, to develop Coast Smart Siting and Design Criteria to address sea level rise and coastal flood impacts on capital projects planned and built by units of State government that were partially or fully funded with State funds. Beginning July 1, 2015, if a State capital project included the construction of a structure or the reconstruction of a structure with substantial damage, the structure must be constructed or reconstructed in compliance with those siting and design criteria. The Coast Smart Council was required to adopt the initial criteria by June 30, 2015. Until then, the legislation established the Maryland General Assembly's intent that units of State government that proposed capital projects for a new State structure or the reconstruction or rehabilitation of a substantially damaged State structure comply with the guidelines and requirements of Executive Order 01.01.2012.29.

The legislation also required that the siting and design criteria include: (1) guidelines applicable to the preliminary planning and construction of a proposed capital project; (2) a requirement that the first floor elevation of each structure located with a Special Flood Hazard Area is built at an elevation of at least two (2) feet above the base flood elevation; and (3) provisions establishing a process to allow a unit of State government to obtain a waiver from the Coast Smart Siting and Design requirements. Finally, the legislation required that the Maryland Department of Natural Resources, the Maryland Department of Budget and Management and the Maryland Department of General Services must review and incorporate the criteria developed by the Coast Smart Council into their appropriate instructions and policies.

2018

Chapters 628 and 629 of the 2018 Laws of Maryland expanded the applicability of the Coast Smart Siting and Design Criteria established by the Coast Smart Council. Under this legislation, the criteria apply to State and local projects for which at least 50% of the project costs are funded with State funds and which include the construction of a structure or highway facility or the reconstruction of a structure with substantial damage. The legislation also specified that the criteria do not apply to projects less than \$500,000. The 2018 legislation updated the first floor elevation requirement and expanded the participation of the Coast Smart Council. Finally, the legislation also required the establishment of specified plans and criteria relating to saltwater intrusion, the use of State funds for specified hazard mitigation, and nuisance flooding.

2019

Chapter 442 of the 2019 Laws of Maryland further clarified the applicability of the Coast Smart Siting and Design criteria to State and local capital projects (not all State and local projects). The legislation also delayed the implementation date of the Siting and Design criteria that were modified and made more broadly applicable under the 2018 legislation. Finally, the 2019 legislation delayed the deadline to develop nuisance flooding plans.

APPENDIX D: Glossary and Useful Web-Based Resources

The following glossary of terms and links to web-based resources are provided to help State agency personnel and others become familiar with concepts and terminology used throughout the Program document as well as the questions in Appendix A: Coast Smart Project Screening Form.

Base Flood: A flood having a 1% chance of being equaled or exceeded in any given year; the base flood also is referred to as the 1% annual chance (100-year) flood.

Base Flood Elevation: The water surface elevation of the 100-year base flood in relation to the datum specified on Flood Insurance Rate Maps. In areas of shallow flooding, the base flood elevation is the highest adjacent natural grade plus the depth number specified in feet on the Flood Insurance Rate Map, or at least four (4) feet if the depth number is not specified.

Capital Project: A capital project typically includes the construction of State or local buildings and infrastructure, such as prisons, hospitals, public university buildings, and government office buildings. The key elements of defining a capital expenditure are that it is a tangible asset, that it has a useful life of at least 15 years, and that the cost is typically over \$100,000.

Climate Change: Any change in climate over time, whether due to natural variability or as a result of human activity. Climate refers to long-term trends in weather that extend multi-decadal periods.

Coast Smart: A construction practice in which preliminary planning, siting, design, construction, operation, maintenance, and repair of a structure or highway facility avoids or minimizes future impacts associated with coastal flooding and sea level rise inundation. Coast Smart includes design criteria and siting guidelines that are applicable throughout the entire life cycle of a project.

Coast Smart Climate Ready Action Boundary (CS-CRAB): The CS-CRAB is the corresponding horizontal landward boundary created by the CS-CRAB Elevation.

Coast Smart Climate Ready Action Boundary Elevation (CS-CRAB Elevation): A selected flood elevation fixed at the 100-year FEMA floodplain elevation, also known as the Base Flood Elevation, plus a three-foot vertical extent.

Critical and Essential Facilities: Buildings and other structures that are intended to remain operational in the event of extreme environmental loading from flood, wind, snow or earthquakes [Note: See Maryland Building Performance Standards, Sec. 1602 and Table 1604.5]. Critical and essential facilities typically include hospitals, fire stations, police stations, storage of critical records, facilities that handle or store hazardous materials, drinking water and sewage treatment facilities, airports, transit and highway access and other essential transportation, and similar facilities.

Design Criteria: Standard Structural specifications related to the shape, size, or form of a construction practice.

Design Life: The period of time during which, the structure is expected by its designers to work within its specified parameters; in other words, the life expectancy of the structure. It is the length of time between placement into service of a single structure and that structure's onset of wear-out, that is, where additional maintenance is no longer sufficient to prolong its life expectancy.

Dry Floodproofing: Measures that eliminate or reduce the potential for flood damage by keeping floodwaters out of the structure. Examples include installation of watertight shields for the doors and windows, reinforcement of walls to withstand the hydrostatic and hydrodynamic pressures and debris impact, and use of sealants to reduce seepage of floodwaters through walls.

Enclosure Below the First Floor: An unfinished or flood-resistant enclosure that is located below an elevated building, is surrounded by walls on all sides, and is usable solely for parking of vehicles, building access or storage, in an area other than a basement area, provided that such enclosure is built in accordance with the applicable design requirements specified in the Coast Smart Construction Program guidelines. Also see "First Floor."

First Floor: The lowest floor of the lowest enclosed area, including basement, of a building or structure; the floor of an enclosure below the lowest floor is not the lowest floor provided the enclosure is constructed with proper flood openings. The lowest floor of a manufactured home is the bottom of the lowest horizontal supporting member (longitudinal chassis frame beam).

Flood or Flooding: A general and temporary condition of partial or complete inundation of normally dry land areas from: (1) the overflow of inland or tidal waters, and/or (2) the unusual and rapid accumulation or runoff of surface waters from any source.

Flood Insurance Rate Map (FIRM): An official map on which the Federal Emergency Management Agency has delineated special flood hazard areas to indicate the magnitude and nature of flood hazards, to designate applicable flood zones, and to delineate floodways, if applicable. FIRMs that have been prepared in digital format or converted to digital format are referred to as Digital FIRMs.

Flood Opening: A flood opening (non-engineered) is an opening that is used to meet the prescriptive requirement of 1 square inch of net open area for every square foot of enclosed area. An engineered flood opening is an opening that is designed and certified by a licensed professional engineer or licensed architect as meeting certain performance characteristics, including providing automatic entry and exit of floodwaters; this certification requirement may be satisfied by an individual certification for a specific structure or issuance of an Evaluation Report by the ICC Evaluation Service, Inc. [Note: See NFIP Technical Bulletin #1, "[Openings in Foundation Walls and Walls of Enclosures](#)."]]

Freeboard: For FEMA floodplain management purposes, a factor of safety above the Base Flood Elevation that compensates for uncertainty in factors that could contribute to flood heights greater than the height calculated for a selected size flood conditions, such as wave action,

obstructed bridge openings, debris and ice jams, climate change, and the hydrologic effect of urbanization in a watershed.

Habitat Adaptation Areas: Areas that may serve as wildlife habitat, wildlife corridors or support high priority aquatic and terrestrial living resources in the future. These include, but are not limited to areas with hydric soils suitable for future tidal wetland establishment and marsh-dependent breeding bird habitat, as well as species and habitat representation areas, ecosystem and habitat type replication areas, and refugia or relocation areas for climate-sensitive species.

Highway Facility: “Highway facility” is defined in §3-101(f)(2) of the Transportation Article as any one or more or combination of projects involving rehabilitation and reconstruction of highways in the State highway system to meet present and future needs and the development and construction in new locations of new highways necessitated by traffic demands to become parts of the State highway system, including federally-aided highway projects partially funded by this State and all incidental property rights, materials, facilities, and structures.

Historic Structure: Any structure that is:

- 1) Individually listed in the National Register of Historic Places (a listing maintained by the U.S. Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listings 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; or
- 4) Individually listed on a local inventory of historic places.

Infrastructure: Built infrastructure, including roads, bridges, sewer and water systems, drainage systems, and essential public utilities.

Inundation: The condition of formerly dry areas becoming permanently submerged, such as when the annual average elevation of Mean Lower Low Water (MLLW) rises relative to land.⁵

Limit of Moderate Wave Action (LiMWA): The LiMWA identifies areas that will be affected by waves with a 1.5-foot wave height or greater within the coastal A zone. While FEMA currently does not require special floodplain management standards or flood insurance purchase requirements based on LiMWA delineations, it is likely that properties and structures within the LiMWA will receive substantial damage from wave action during a 1% annual chance flood event. The LiMWA is a boundary that identifies the landward location of the 1.5 ft wave height delineating a zone called the "Coastal A Zone" where wave damage is substantial.

Natural and Nature-Based Features: Natural features are created and evolve over time through the actions of physical, biological, geologic, and chemical processes operating in nature. Natural coastal features take a variety of forms, including reefs (e.g., coral and oyster), barrier islands, dunes, beaches, wetlands, and maritime forests. The relationships and interactions among the

⁵ Strategic Environmental Research and Development Program. 2013. Assessing Impacts of Climate Change on Coastal Military Installations: Policy Implications. U.S. Department of Defense.

natural and built features comprising the coastal system are important variables determining coastal vulnerability, reliability, risk, and resilience. Nature-Based Features are those that may mimic characteristics of natural features but are created by human design, engineering, and construction to provide specific services such as coastal risk reduction. The combination of both natural and nature-based features is referred to collectively as natural and nature-based features.⁶

Nuisance Flooding: High-tide flooding that causes public inconvenience.

Permanent Structure: A structure, as defined herein, installed, used, or erected for a period of greater than 180 days.

Replacement Cost: At the time of reconstruction, the cost of reconstructing a structure and its surrounding property to full use with materials of the same kind and quality as the original materials. Replacement cost does not include the value of the land on which a structure is located or for tax purposes, a deduction for depreciation.

Resilience: Capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.⁷

Risk: Combination of the magnitude of the potential consequence(s) and the likelihood that the consequences(s) will occur.

Saltwater Intrusion and Salinization: Saltwater intrusion describes the movement of saltwater into aquifers. Salinization describes the process by which water-soluble salts accumulate in fresh surface waters or in soils within agricultural land, wetlands, and coastal forests.

Sea Level Rise Inundation: The inundation of land from a sea level rise of 2 feet, as determined by the Council.

Sea Level Rise Vulnerability: The susceptibility of a coastal area to seasonally high-tides or prolonged or permanent inundation or submergence due to a combination of land subsidence and future rise in water level.

Siting Criteria: Specifications related to the location of a structure or highway facility.

Special Flood Hazard Areas: Land in the floodplain subject to a one-percent or greater chance of flooding in any given year and are designated by the Federal Emergency Management Agency in Flood Insurance Studies and on Flood Insurance Rate Maps as Zones A, AE, AH, AO, A1-30, and A99, and Zones VE and V1-30.

⁶ U.S. Army Corps of Engineers. 2015. North Atlantic Coast Comprehensive Study: Resilient Adaptation to Increasing Risk. USACE, Baltimore District, Baltimore, Maryland. Accessed at: [//nad.usace.army.mil/Portals/40/docs/NACCS/NACCS_main_report.pdf](http://nad.usace.army.mil/Portals/40/docs/NACCS/NACCS_main_report.pdf).

⁷ National Research Council. 2011. Committee on America's Climate Choices. National Academies Press. Washington, District of Columbia.

Storm Surge: An abnormal and significant rise of water generated by a storm, over and above the predicted astronomical tides. Storm surge is produced by water being pushed toward the shore by the force of the winds moving around the storm.

State-Funded: Partially or fully funded with State of Maryland monies.

Structure: That which is built or constructed; specifically, a walled or roofed building, a manufactured home, or a gas or liquid storage tank that is principally above ground. A structure, whether permanent or temporary, is not intended to include roads, bridges, rail tracks, dredge material containments facilities or other transportation infrastructure that are not roofed buildings.

Substantial Damage: Damage caused by any source that is sustained by a structure whereby the cost of reconstruction to its before-damaged condition is at least half of the structure's replacement cost before the damage occurred.

Substantial Improvement: Any reconstruction, rehabilitation, addition, or other improvement of a building or structure, the cost of which equals or exceeds 50% of the market value of the building or structure before the start of construction of the improvement. The term includes structures which have incurred substantial damage, regardless of the actual repair work performed. The term does not, however, include either:

- 1) Any project for improvement of a building or structure to correct existing violations of State or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official prior to submission of an application for a permit and which are the minimum necessary to assure safe living conditions; or
- 2) Any alteration of a historic structure, provided that the alteration will not preclude the structure's continued designation as a historic structure.

Tax Map/Grid/Parcel or SDAT Account Number: Tax maps, also known as assessments, property or parcel maps, are a graphic representation of real property showing and defining individual property boundaries in relationship to contiguous real property. The primary purpose of these maps is to help State tax assessors locate properties for assessments and taxation purposes. Tax maps are also used by federal, State and local government agencies as well as private sector firms for a variety of analyses and decision making processes. The Maryland Department of Planning (MDP) is responsible for maintaining electronic tax maps for the 23 counties in Maryland. The State's 2800+ tax maps are maintained in a combined GIS and Computer Aided Design (CAD) environment and updated on an annual cycle using new property plats and deed changes obtained from SDAT. These maps form the foundation for many of MDP's products and services, including [FINDER Online](#).

Temporary Structures: Structures or uses intended to be in place for 180 consecutive days or less in any given calendar year.

Vulnerability Assessment: Practice of identifying and evaluating the effects of climate change and climate variability on natural and human systems, so as to understand system sensitivity, exposure, and adaptive capacity.⁸

Water Dependent Use: A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes aquaculture machinery, docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities, but does not include long-term storage or related manufacturing facilities.

Wet Floodproofing: Permanent or contingent measures applied to a structure or its contents that prevent or provide resistance to damage from flooding by allowing floodwaters to enter the structure. Such measures include the design of openings for intentional flooding of enclosed areas below the design flood elevation, use of flood-resistant building materials below the design flood elevation, and protection of the structure and its contents, including utilities.

Wetland Migration: Long-term inland and upward movement of tidal wetlands, limited by human and geological barriers, in response to changes in sea level.

⁸ Strategic Environmental Research and Development Program. 2013. Assessing Impacts of Climate Change on Coastal Military Installations: Policy Implications. U.S. Department of Defense.