EMERGENCY MANAGEMENT SUB-GROUP

Community Resilience Planning, Public Health, and Emergency Management Working Group

CONTACT

Co-Chair: Anne P. Fuchs

PHONE:
207-557-3669

EMAIL:
anne.p.fuchs@maine.gov

Maine Climate Council
Office of Policy Innovation and the Future
181 State House Station
Augusta, Maine 04333-0181

Dear Maine Climate Council Members,

On behalf of all members of the *Community Resilience Planning, Public Health, and Emergency Management Working Group*, and with support from the *Transportation Working Group*, I am proud to present this unified strategy on state supplemented adaptation funding.

The *Emergency Management Sub-Group* has spent the last seven months performing a rudimentary vulnerability assessment across all sixteen critical infrastructure sectors in the state of Maine. In collaboration with the *Scientific and Technical Subcommittee*, the group evaluated known and projected vulnerabilities across all recognized natural hazards, molding the discussion on strategies that would best safeguard the effects of climate change on Maine's critical infrastructure, residents, and economy.

This strategy considers the abundant resources available to state, tribal, local and non-profit agencies already, and addresses the remaining gap that keeps such agencies from planning for and adapting to changing conditions. This strategy supported by the *Community Resilience Planning Sub-Group's* technical assistance strategy, and the *Transportation Working Group's* comprehensive vulnerability assessment strategy highlight the exact and immediate needs in the state of Maine to best adapt to inevitable change.

There is a lot of work to do yet to best understand and prepare for changing conditions; however, we are so proud to present these preliminary steps for your consideration. Should you have any questions on this proposal, or our support of any others, please do not hesitate to reach out.

With Sincerest Gratitude,

Anne Fuchs (Jun 5, 2020 13:10 PDT)

Anne Fuchs
State Hazard Mitigation Officer
Maine Emergency Management Agency

Community Resilience Planning, Public Health, and Emergency Management Working Group

Emergency Management Sub-Group
Recommended Climate Strategies, Actions and Measurable Outcomes

1. Describe the Recommended Strategy and how it addresses Maine's climate resiliency and mitigation goals.

Develop and implement a non-disaster related "State Infrastructure Climate Adaptation Fund" that would allow municipalities and state agencies to access the funds needed to supplement the often-excessive local cost shares associated with adaptation projects.

Creation of this fund emphasizes the "whole-community" approach by emphasizing financial support across the federal, state, and local level. With both a backlog of $325 million in mitigation projects (listed across the sixteen County Hazard Mitigation Plans) and major state infrastructure at risk of changing climate conditions, there is a desperate need to address the current "gap" that restricts a large majority of these projects from moving forward. While there are currently abundant federal resources that state agencies and municipalities can tap into, the excessive financial burden carried from mandated cost shares often results in infrastructure remaining vulnerable. Development and implementation of state infrastructure climate adaptation funding directly addresses the most pertinent issue residing across Maine municipalities in their endeavor to reduce risk associated with changing climate conditions.

NOTE: Federal programs refer to risk-reduction projects as "mitigation", not adaptation as defined by the Maine Climate Council. Henceforth all "mitigation" funding is to refer to adaptation projects.

a. For adaptation strategies, what climate impacts does it address? How will this strategy reduce the vulnerability of Mainers to the impacts of climate change?

This adaptation strategy addresses climate impacts associated with both social and physical vulnerability across all critical infrastructure sectors and all Maine natural hazards. This strategy gives Mainers the financial assistance, and in turn ability, to reduce the vulnerability of their communities against a range of impacts, including but not limited to sea level rise, erosion, and inundation. Prioritization of funding may align with the natural hazards that pose the greatest projected risk to Maine infrastructure (as per MCC Science and Technical Subcommittee, Maine State Hazard Mitigation Plan, MEMA Risk Assessment Tool, Maine Climate Future Reports, National Climate Assessments), however risks across all natural hazards should certainly remain eligible based on lack of projection data for some Maine hazards (i.e. - drought and wildfire). Compounding impacts from multiple hazards should also be considered.

b. List any site-specific geographies where the strategy would be applied.
State-wide. To function as the Maine Climate Council was intended, this Emergency Management strategy extends to the entire State of Maine. The impacts of climate change are already known to be occurring and impacting communities across the State of Maine.

2. What is your measurable outcome for this strategy, assuming all recommended actions to implement the strategy are achieved?

For twenty-five years the National Institute of Building Sciences[1] has been performing and reporting out the results of disaster dollars avoided through use of pre-disaster mitigation investments across three federal grant programs. The results continue to show that every $1 invested in disaster mitigation results in $6 of avoided disaster damages. Disasters continue to become increasingly devastating and expensive, resulting in a non-sustainable model. If there is not more money invested in mitigation measures than no level of government will be able to support the ongoing recovery needs of this nation in the face of climate change.

As Maine prepares for the broad impacts of climate change, predominantly increased coastal flooding and storm surge, the state is liable to experience far more disaster declarations than in previous decades. The extent of vulnerable infrastructure, both critical and non-critical, residing within inundation zones highlights the extraordinary and immediate need for the state to join the whole-community approach in funding mitigation and resilience projects. The two case studies depicted in Section 6 of this strategy assist in portraying potential devastation should this strategy not be employed, and the analysis conducted by ERG further depicts the vulnerability of a large number of wastewater treatment facilities across the state of Maine.

For the fund to be effective, a supporting element will be to establish and improve on existing infrastructure project lists for the State of Maine, to create a master list and ultimately a "pipeline" of resilient project design proposals based on an in-depth statewide vulnerability assessment. Public funding should be allocated towards strong proposals for infrastructure improvement. In order to create the pipeline of projects and for localities to develop appropriate project proposals, an engagement and outreach component on best practices for whole community resilience and design and further assessment of infrastructure to create the underlying data to base assistance on is needed. This could be accomplished through existing outreach, but with this added focus area. Within that engagement, community resilience principles should be included so that projects are developed with social and physical vulnerability considerations.

NOTE: This strategy is strengthened by an additional focus on creating improved data for risk assessment to establish the underlying mechanism for improved infrastructure project considerations and design. If entities are provided with improved knowledge of their at-risk infrastructure, they can prioritize projects with substantive quantitative and qualitative data to use in grant and loan proposals for improvements. They are also in a better position to inform legislative and congressional needs for how to best allocate resources. Greater discussion on these supporting actions are identified in the comprehensive list of strategies developed by the Emergency Management Subgroup detailed in the appendix to the *2020 Climate Action Plan.* Some of that work could be accomplished through greater use of existing monitoring networks. Some work would require new research and information/data gathering using either use existing networks or through deployment of new technology and resources. Development of needed data may be absorbed into the current workforce but could also add new jobs depending on the scope of investment. At minimum, incorporation of emergency management, adaptation and preparedness principles into project prioritization and design could result in longer-term sustainability with less disruption to economy. In many cases these already have strong synergy with strategies recommended by other Maine Climate Council working groups.

[1] https://www nibs.org/news/381874/National-Institute-of-Building-Sciences-Issues-New-Report-on-the-Value-of-Mitigation htm

a. **For mitigation strategies:**
   i. **What is the estimated CO2e savings (metric tons) by 2025, 2030, 2050?**
   Not Applicable.

   ii. **What is the cost effectiveness of those reductions (cost per ton of CO2e reduced) and the total cost?**
   Not Applicable.

b. **Are outcomes measurable with current monitoring systems?**
   Maine Emergency Management Agency tracks mitigation dollars spent across FEMA mitigation programs, and absolutely has the ability to track disaster dollars saved with each event. MEMA is also working to expand its dataset outside of solely FEMA programs to create a more comprehensive analysis of successful mitigation projects and disaster dollars saved.

3. **What specific actions would be required to implement the strategy, including but not limited to legislation or regulation. Examples include: establish a program or a fund, conduct additional research, provide education or training, coordinate with other parties/agencies/states, etc. Considering the recommended actions listed, who, if they can be named, are the specific actors needed for implementation?**

Implementation of the strategy would likely occur as follows:

a. Assign a lead agency to oversee execution of the State Infrastructure Climate Adaptation Fund
   i. Identify sources of funding for the established fund
   ii. Identify uses and parameters for the established funds (i.e. – Required local match for state funds, eligible projects, loan vs. grant opportunities, etc.)
   iii. Identify state priorities across Maine infrastructure projects
   iv. Identify state priorities across Maine adaptation and resilience criteria
   v. Identify public outreach opportunities to disseminate state funding opportunity
b. Incentivize further mitigation measures based on tiered *or* percentage approach. Points or percentage to be determined for each action below (reference body formed in part "a" above).
   i. To receive a state match of up to 10% municipalities must:
      1. Have adopted an up to date County Hazard Mitigation Plan
      2. Possess an approved Climate Adaptation Plan
      3. Participate in the National Floodplain Insurance Program
   ii. To receive a state match of up to 15%, municipalities must additionally:
      4. Participate in FEMA's Community Rating System (CRS)
      5. Prohibit new structures in special flood hazard areas
      6. Implement a regional action (e.g. planning, green and grey infrastructure improvements, mutual aid/response activities)
c. Define parameters of State Infrastructure Climate Adaptation Fund oversite
   i. Identify and establish annual reporting requirements
   ii. Identify and establish rules governing the expenditure of funds

NOTE: This strategy would be strengthened through additional staff support provided to communities that adds capacity for achieving the required actions to receive state match. Capacity could be achieved from multiple different partner entities assisting communities. It is important to engage multiple partners on implementation of adaptation concepts into disaster risk management as a means to break the disaster recovery cycle.

4. What is the timeframe for this strategy?

	Short-term (2022)	Mid-term (2030)	Long-term (2050)	2070 -2100
To implement	**X**			
To realize outcomes		**X**	**X**	**X**

5. Please analyze the Recommended Strategy against the following criteria. (Each Working Group can add its own sector-specific criteria as appropriate.)

Workforce - Will the strategy create new jobs, prevent job loss, or cost the state jobs?	The agency tasked with oversight and execution of the new fund would have to build in the capacity to oversee the execution and oversight of the program. In numerous circumstances this strategy could curtail job loss for Maine workers that either utilize high risk infrastructure to get to work, that work in high risk infrastructure, or that are vulnerable to job loss due to high risk infrastructure in close proximity to their place of work. Pending level of investment, there could be an increase in overall amount of infrastructure projects in a given year that could result in additional design and construction jobs.
Benefits (non-workforce) - What are the expected co-benefits of this strategy (e.g., improved health, increased economic activity, wildlife habitat connectivity, reduce natural hazard risk, increased recreation, avoided damage)?	The benefits of the strategy include, but are not limited to: a. Increased participation in hazard mitigation and climate adaptation planning b. Increased participation in the National Flood Insurance Program, lessening the burden on the federal taxpayer c. Increased execution of large and small adaptation projects resulting in avoided disaster dollars d. Increased use of federal grant programs for large infrastructure projects, resulting in less stress on rate and tax payers Furthermore, this strategy leads to increased economic activity as coastal and shoreline areas are made safer for economic activity to continue, and for tourism to commence.
Costs – What are the estimated fiscal costs and other costs to carry out this program. To the state? To municipalities? What resources do you anticipate needing to inform Mainers about the strategy and the opportunity/costs of the strategy? Where would financing likely come from?	The costs of participating in the design and implementation of the State Infrastructure Climate Adaptation Fund is assumed to be based (1) upon the same volunteer efforts committed to by Maine Climate Council members, or (2) as an add-on responsibility to agency members already overseeing similar programs. Costs for oversite of the program are more likely to be built into the established salaries of state employees or to become the responsibility of a non-profit in the same manner that the Maine Disaster Recovery Fund administers its funding. As an example, "Administrator of the Maine Disaster Relief Fund" or "Administrator" means the private, non-profit organization composed of volunteers from industry and non-profit organizations, established to administer the privately funded Maine Disaster Relief Fund independent of State Government. The necessary technical assistance piece of administering such funds is elaborated upon within the "Improve Delivery System of Technical Assistance on Resilience to Municipalities" strategy put forth by the Community Resilience Planning sub-group. The actual funding of the State Infrastructure Climate Adaptation Fund could be modeled off any of the 13 examples listed under the "proven strategy and feasibility" portion of this strategy.

Community Resilience Planning, Public Health, and Emergency Management Working Group

Equity - Is this strategy expected to benefit or burden low-income, rural, and vulnerable residents and/or communities? What outreach has been/will be undertaken to understand the impact of the strategy on front-line communities?	This program would benefit low income, rural, and vulnerable residents and communities based on the fact that these precise entities struggle (1) to support costs shares associated with grant programs due to a minimal tax base, and (2) to recover from disasters. Within engagement and outreach for the program/fund community resilience principles could be included so that projects are developed with social vulnerability considerations and safeguards in project planning and design.

Proven strategy & feasibility – Has this strategy been implemented successfully elsewhere? Is it feasible with today's technology? What barriers to implementation exist (e.g., financial, structural, workforce capacity, public/market acceptability)?	Examples range across states and their respective agencies, as do the priorities that lie within their respective programs. In a poll of all fifty states, the federal district, and the five permanently inhabited, incorporated territories, a total of 13 states were found to provide a non-federal cost-share percentage to applicants pursuing federal "mitigation" grant programs. Even though the following is representative of state cost-shares associated with FEMA mitigation grant programs, it is highly important that the proposed fund be independent of FEMA programs and available for use as a cost-share across any federal mitigation, adaptation, or resilience funding opportunity. **Alaska** – *State Disaster Relief Fund* provides complete non-federal coverage under FEMA's Hazard Mitigation Grant Program (75% Federal / 25% State / 0% Local) **Georgia** – *Governor's Emergency Fund* covers a portion of the non-federal cost-share under FEMA's Hazard Mitigation Grant Program for declared counties (75% Federal / 10% State / 15 % Local) **Kentucky –** *General Fund* covers a portion of the non-federal cost-share under FEMA's Hazard Mitigation Grant Program (75% Federal / 12% State / 13 % Local) **Iowa** – *Performance of Duty Fund* covers a portion of the non-federal cost-share under FEMA's Hazard Mitigation Grant Program (75% Federal / 10% State / 15% Local). Current legislation in review for 10% state cost share coverage of FEMA Pre-Disaster Mitigation grant and Flood Mitigation Assistance. **North Carolina** – *State Emergency Response and Disaster Relief Fund* provides complete non-federal coverage under FEMA's Hazard Mitigation Grant Program (75% Federal / 25% State / 0% Local), and may provide a state cost share under FEMA's Flood Mitigation Assistance grant program (depending on the project) **North Dakota** – *State Disaster Fund* covers a portion of the non-federal cost-share under FEMA's Hazard Mitigation Grant Program (75% Federal / 10% State / 15 % Local) **Pennsylvania –** *State Disaster Fund* provides complete non-federal coverage under FEMA's Hazard Mitigation Grant Program (75% Federal / 25% State / 0% Local) **South Dakota** – *State Disaster Fund* covers a portion of the non-federal cost-share under FEMA's Hazard Mitigation Grant Program and Pre-Disaster Mitigation grant (75% Federal / 10% State / 15 % Local) **Tennessee** – *State General Fund* covers a portion of the non-federal cost-share under FEMA's Hazard Mitigation Grant Program (75% Federal / 12.5% State / 12.5% Local) **Texas** – *Federal Matching Account* covers a portion of the non-federal cost-share under FEMA's Hazard Mitigation Grant Program, Pre-Disaster Mitigation grant, and Flood Mitigation Assistance program (75% Federal / up to 19% State / % Varies Local) **Washington** – *Disaster Response Account* covers a portion of the non-federal cost-share under FEMA's Hazard Mitigation Grant Program (75% Federal / 12.5% State / 12.5% Local) **West Virginia** – *Governor's Contingency Fund* provides complete non-federal coverage under FEMA's Hazard Mitigation Grant Program, Pre-Disaster Mitigation grant program, and Flood Mitigation Assistance program (75% Federal / 25% State / 0% Local) **Wisconsin** – *General Purpose Revenue (GPR)* covers a portion of the non-federal cost-share under FEMA's Hazard Mitigation Grant Program (75% Federal / 12.5% State / 12.5% Local) **Arizona** is currently in the process of drafting a proposal to utilize their *Governor's Emergency Fund* to fund state cost-share match for mitigation projects under the Hazard Mitigation Grant Program.

Legal authority - Does the strategy require new statutory (legal/legislative) authority?	Yes. The legislature will need to review, pass, and authorize creation and use of the fund.

NOTE: The *Maine Disaster Recovery Fund* and the *Maine Disaster Relief Fund* **(Appendix A)** prioritize use of available funding for individuals and families affected by a disaster. State cost-share under the Public Assistance program is eligible for use of the fund; however, Public Assistance funds are meant to assist municipalities in bringing damaged structures back to their pre-disaster condition. Currently, there is no state investment in assisting state and local agencies in their pursuit to adapt to rising sea levels and increased storm surge outside of planning. All current funding mechanisms target post-disaster recovery, and no state funding source exists to assist with pre-disaster mitigation or climate adaptation. "Public assistance" means supplementary federal assistance provided under the Stafford Act to state and local governments or certain private, nonprofit organizations, other than assistance for the direct benefit of individuals and families.

6. Rationale/Background Information

Maine currently has a backlog of 1,798 mitigation projects at a proposed $325,000,000 listed across all sixteen counties. Every five years, counties are required to update their County Hazard Mitigation Plans to stay eligible for FEMA mitigation funding, with 313 projects listed as deferred due to lack of funding. Maine municipalities, larger cities, and state agencies all struggle to fund small to large infrastructure projects with such a limited tax base. Development of a non-disaster related "State Infrastructure Climate Adaptation Fund" is intended to help move projects from the backlog list and implement them over time at a more expedited rate than they would otherwise be able to, ultimately reducing the risk and liability to Maine people from this infrastructure, maintaining a continuity of operations during disaster events, and working towards the ultimate goal of breaking the disaster recovery cycle.

While a more intricate vulnerability assessment is required across all sectors and coastal communities, TABLE ONE lists the fourteen major infrastructure sites that have been identified as posing significant risk to Maine's economy, public health, and safety. This short list of major projects demonstrates where some needs are within the critical infrastructure/lifeline sectors, and where there is a current risk that may need to be adapted to in place in the near term. The major project list should not interfere with concerted efforts to focus on projects of differing scales – including large scale projects as well as small scale projects that affect local emergency management and are critically important in a relative way to smaller communities. It may be determined, for example to focus funding, or a portion of funding, on smaller communities and that make up a big part of the state collectively. The importance of the current cumulative project backlog is meaningful to communities on a smaller scale. Two case studies have also been provided to further highlight the need for the state to participate in a whole-community funding approach as a means to best protect Maine infrastructure, Maine residents, and the economy.

TABLE ONE: Major At-Risk Infrastructure to Sea Level Rise per Scientific and Technical Subcommittee Recommended Sea Level Rise Scenarios

INFRASTRUCTURE	TOWN	ADDRESS	INFRASTRUCTURE TYPE	SEA LEVEL RISE INUNDATION [1]	X	Y
Saco Wastewater Treatment Plant	Saco	68 Front St	Water and Wastewater	1.6 ft	-70.440673	43.494079
York Sewer District	York	21 Bay Haven Rd.	Water and Wastewater	3.9 ft	-70.607602	43.181145
Ogunquit Sewer District	Ogunquit	Marshview Lane	Water and Wastewater	1.6 ft	-70.588589	43.265375
Kennebunk Sewer District	Kennebunk	71 Water St	Water and Wastewater	1.6 ft	-70.538902	43.379973
Gardiner Wastewater Treatment Plant	Gardiner	540 River Avenue	Water and Wastewater	3.9 ft	-69.758009	44.193423
Machias Wastewater Treatment Plant	Machias	2 Kilton Ln	Water and Wastewater	1.6 ft	-67.453483	44.720178
City of Bangor Wastewater Treatment Plant	Bangor	760 Main St	Water and Wastewater	3.9 ft	-68.78326	44.778922
City of Calais Wastewater Treatment Plant	Calais	50 Elm St	Water and Wastewater	3.9 ft	-67.271894	45.188958
Wiscasset Wastewater Treatment Plant	Wiscasset	69 Water St	Water and Wastewater	1.6 ft	-69.66143	44.004983
South Berwick Sewer District	South Berwick	16 Liberty St	Water and Wastewater	1.6 ft	-70.808491	43.225347
Route 1 Woolwich Corridor	Woolwich	Rt 1	Transportation	1.6 ft	-69.793042	43.925178
Deer Isle Causeway	Deer Isle	800 N Deer Isle Rd	Transportation	3.9 ft	-68.681185	44.279301
Arrowsic Causeway	Arrowsic	100 Rt 127	Transportation	1.6 ft	-69.7977342	43.903474
Stonington Fire Department	Stonington	9 Atlantic Ave	Emergency Services	1.6 ft	-68.662871	44.155253

NOTE: The sites were evaluated using ArcGIS Pro and using the highest resolution/most resent ortho imagery available in the MEGIS server for the locations identified. Inundation polygons obtained from the Maine Geological Survey Sea Level Rise/Storm Surge Scenarios. Each site was observed manually at each inundation level to see when the site was inundated. It should be noted effects of sea level rise are likely to occur to some sites such as waste water treatment facilities prior to inundation due to back flow issues. The MEGS dataset is based on the highest astronomical tide using the 1983-2001 Tidal Datum Epoch. The data set is a "bathtub" model using LiDAR topographical data to add water elevation based on the 50% confidence intervals of the USACE Sea-Level Change Curve Calculator.

[1] Sea Level Rise Inundation is represented by feet of Sea Level Rise (SLR) over the highest astronomical tide (HAT)

IMAGE ONE: Maine's Coast with 1.6 feet of Sea Level Rise Over Highest Astronomical Tide

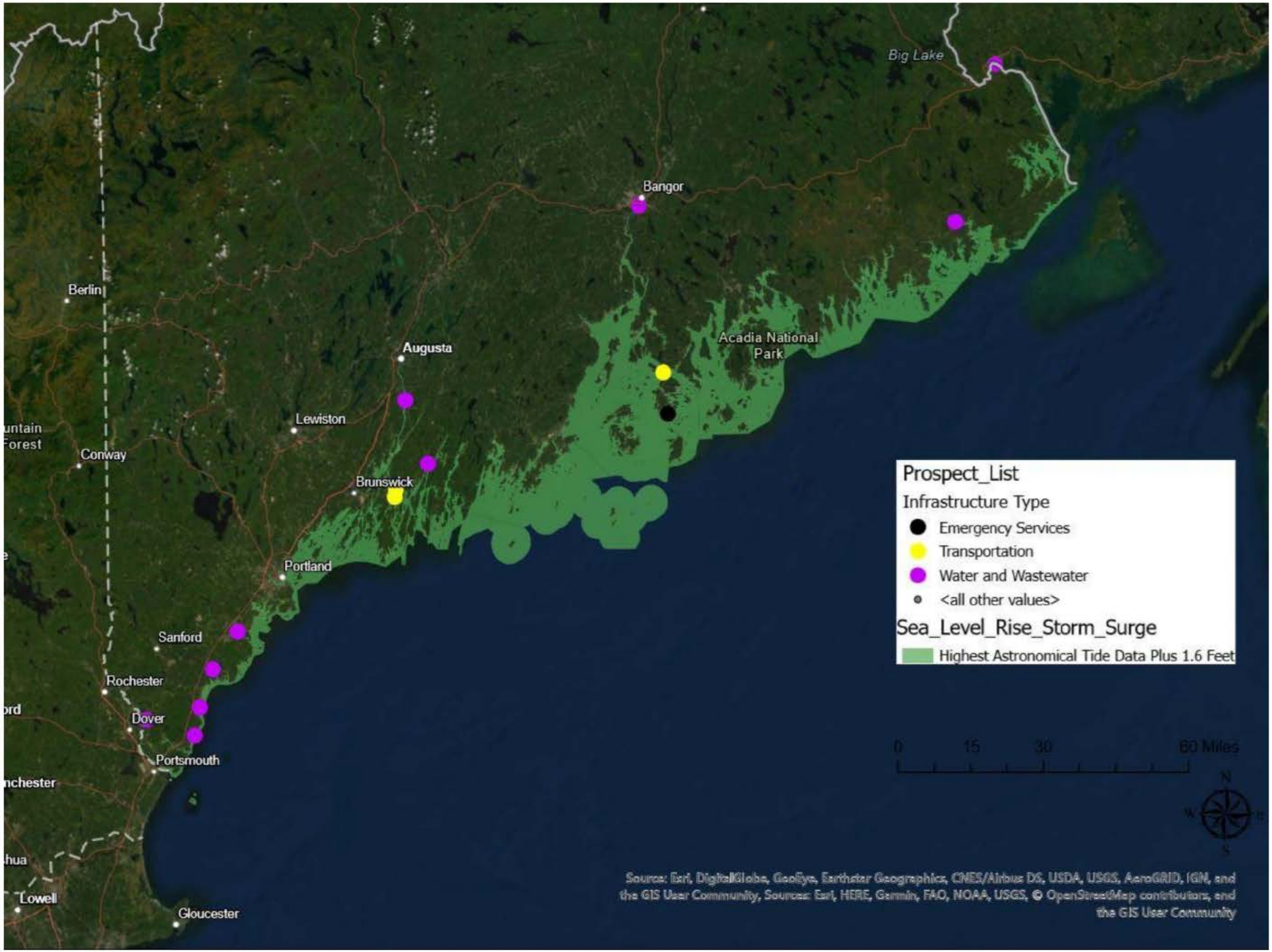
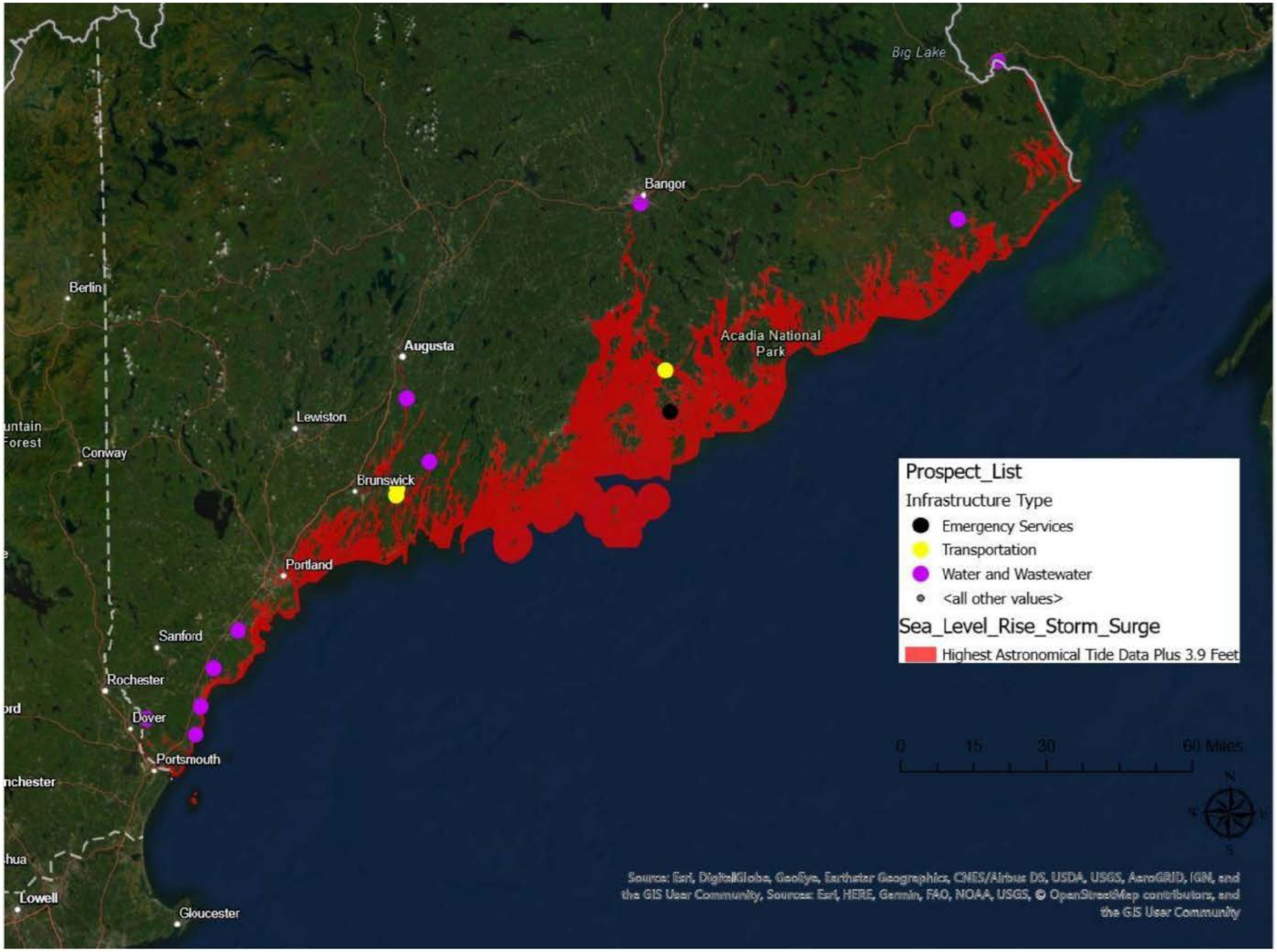


IMAGE TWO: Maine's Coast with 3.9 feet of Sea Level Rise Over Highest Astronomical Tide



Assessing the Impacts Climate Change May Have on the State's Economy, Revenues, and Investment Decisions: Cost of Doing Nothing Analysis

It is important to note that the following information has been pulled from the preliminary analysis conducted by the ERG team. The final version of all documentation will be shared with Maine Climate Council members, and the following information summarizes only ERG findings to date. All results, methodologies, assumptions, and limitations will be available upon completion of the analysis. This analysis focuses primarily on the three SLR scenarios summarized below.

TABLE TWO: SLR Scenarios Applied in the ERG Analysis

Flood Hazard Scenario	Year	Climate Projection
HAT + 1.6 ft SLR	2050	Likely Range 67% Probability SLR is between 1.1 – 1.8 ft in 2050
HAT + 3.9 SLR	2100	Likely Range 67% Probability SLR is between 3.0 – 4.6 ft in 2100
HAT + 8.8 SLR	2100	Central estimate for a high SLR scenario for 2100 *OR* HAT + 3.9 ft of SLR + 1% Annual Chance Storm Surge

In addition to evaluating the impact of flooding on communities, business, and transportation assets, the ERG analysis includes a review of the 10 wastewater treatment plants or sewer districts classified by the Emergency Management Sub-Group in TABLE ONE as critical infrastructure vulnerable to flooding. Flooded wastewater treatment plants or sewer district facilities pose a significant threat to community resilience and public health. When one of these critical facilities floods, raw sewage can contaminate community drinking water and surrounding bodies of water causing extensive environmental and safety hazards. Furthermore, these treatment plants and sewer district facilities represent significant community investment, and flooding can be costly. The working group further indicated that the Saco and Machias Wastewater Treatment Plants (further supported within this strategy via case studies) were considered prime examples of facilities requiring protection against rising sea levels.

In determining the cost of doing nothing to protect wastewater treatment plants and sewer district facilities, ERG considered two types of flooding scenarios. They considered one-time or 1-in-100-year floods and inundation flooding from SLR. One-time floods represent flood scenarios in which water levels ultimately recede and wastewater treatment plants can continue to operate after addressing damages. Conversely, the ERG team argues that inundation flooding from SLR results in complete loss of facilities, as flood waters will not recede, leaving facilities permanently inundated and thus, inoperable. It is important to note that just because they refer to a one-time flood as such, or a 1-in-100-year flood, this does not mean that it is impossible for many of these floods to happen, even in the same year. They use the term "one-time flood" to highlight that the waters will recede, unlike inundation flooding from SLR which is sustained or permanent flooding.

In TABLE THREE, the ERG team quantifies the exposure of the 10 wastewater treatment plants, that the working group identified as particularly vulnerable, to permanent inundation flooding as a result of SLR. They quantify vulnerability to inundation flooding by presenting lower and upper bound replacement costs for each of the 10 treatment plants. For example, the Saco Wastewater Treatment Plant would cost between $14.3 million and $43 million to replace if it were impacted by SLR inundation flooding. Thus, if the State of Maine does nothing, approximately $14.3 million and $43 million will be exposed or "at stake" via the Saco WWTP.

CASE STUDY #1 – Saco Water Resource Recovery Facility (Executive Summary – Appendix B)

The City of Saco Water Resource Recovery Department (WRRD) provides services to enhance the public health, comfort and well-being of the community, while protecting the environment and promoting economic development and retention.

Build Date: 1971 (major upgrades in 1988)

Population Served: The current sewered population is 15,474, with 4,746 residential users connected to the sewer.

Infrastructure Issues: As the department projects forward to a changing climate, strains have been identified on the resiliency of the Water Resource Recovery Facility's (WRRF) due to flooding impacts from the following factors: sea level rise, quantity and quality of wastewater entering the facility and on-site stormwater management. In an analysis completed by engineering consultant Tighe&Bond in 2019, recommended mitigation efforts to protect the facility and maintain operations for the next fifty years (based on a 100-year storm event plus three feet of sea level rise) resulted in a $10,800,000 "opinion of probable cost."

Engineering Analysis Cost: $80,000

Proposed Mitigation Costs: $10,800,000

Cost of Doing Nothing (ERG Analysis): $14,300,000 - $43,000,000

Notes: Several resources exist to assist coastal communities and municipalities in funding a preliminary vulnerability assessment; however, the issue lies in bringing recommended mitigation efforts to fruition. Even if Saco Water Resource Recovery Department were to receive a grant with a 75% cost-share, the excessive burden of covering the remaining $2,700,000 makes this project infeasible. In a cursory analysis conducted by Maine Geological Survey, and verified by Maine Emergency Management Agency, a total of ten coastal wastewater treatment facilities are liable to suffer the same financial burdens as sea levels rise increase, highlighting the need for multi-level and whole-community approach across local, state, and federal levels.

TABLE THREE: WTTP Exposure to SLR Inundation Flooding

Treatment Plant/Sewer District	SLR Inundation (feet) [a]	Replacement Cost ($2018)	
		Lower Bound	Upper Bound
Saco Wastewater Treatment Plant	1.6	$14,591,072	$43,773,216
York Sewer District	3.9	$15,633,291	$46,899,874
Ogunquit Sewer District	1.6	$4,446,803	$13,340,409
Kennebunk Sewer District	1.6	$4,551,025	$13,653,074
Gardiner Wastewater Treatment Plant	3.9	$15,633,291	$46,899,874
Machias Wastewater Treatment Plant	1.6	$3,126,658	$9,379,975
City of Bangor Wastewater Treatment Plant	3.9	$62,533,165	$187,599,495
City of Calais Wastewater Treatment Plant	3.9	$5,211,097	$15,633,291
Wiscasset Wastewater Treatment Plant	1.6	$2,153,920	$6,461,760
South Berwick Sewer District	1.6	$2,084,439	$6,253,317

[a] This refers to the SLR inundation level at which the WWTP is vulnerable to flooding per the Science and Technical Subcommittee (STS) findings.

CASE STUDY #2 – Machias Downtown Resilience (Executive Summary – Appendix C)

The Machias Downtown Area is primarily comprised of commercial development and includes the Waste Water Treatment Plant that is considered critical infrastructure. Highway Route 1 runs through this area and is considered the primary regional artery for north-south traffic.

Machias Population: 2,072

Infrastructure Issues: Much of the Downtown Waterfront area is located below or only slightly above the Base Flood Elevation (BFE) as established by FEMA. In addition to regular tidal fluctuations, storm surge, wave action, and riverine flooding, another potentially significant factor in the future water elevations experienced in Downtown Machias is Sea Level Rise. The Wastewater Treatment Plant is in the Downtown Waterfront Area and is partially within a FEMA mapped Special Flood Hazard Area along with 21 other buildings that could be inundated several times a year by 2100. UMM-GIS found inundation at the base flood elevation (BFE = 10.7 feet) could cause $700,000 in damage and take two months for recovery with relatively minor ecosystem impacts. The Town had experienced two floods near BFE in recent years. With floods two or more feet above BFE-increasingly likely due to climate change--potential impacts rise dramatically: BFE plus two feet could cost $8 million with six months recovery. BFE plus 4 feet could cost $17 million with 11 months recovery and major impacts on shellfisheries.

Engineering Analysis Cost: $200,000+

Proposed Mitigation Costs: Yet to be determined by Machias contractor

Cost of Doing Nothing (ERG Analysis): Yet to be determined by ERG

Notes: The Town of Machias was a recipient of a 2018 Pre-Disaster Mitigation Advance Assistance grant to help determine the best seawall system design to pursue to protect the town from project flood measures, while also protecting the local salt march and coastal environment. Machias has a small tax base, and like many coastal communities will run into extraordinary challenges in obtaining enough funding to bring any proposed project to fruition, once again highlighting the need for multi-level and whole-community approach across local, state, and federal levels.

APPENDIX A: MAINE DISASTER RECOVERY FUND

15 DEPARTMENT OF DEFENSE, VETERANS AND EMERGENCY MANAGEMENT

214 MAINE EMERGENCY MANAGEMENT AGENCY

Chapter 5: MAINE DISASTER RECOVERY FUND

SUMMARY: This rule governs the process for the expenditure of funds from the Disaster Recovery Fund, established pursuant to Title 37-B M.R.S. §745.

SECTION 1. DEFINITIONS

1. **Administrator**. "Administrator of the Maine Disaster Relief Fund" or "Administrator" means the private, non-profit organization composed of volunteers from industry and non-profit organizations, established to administer the privately funded Maine Disaster Relief Fund independent of State Government.

2. **Agency**. "Agency" means the Maine Emergency Management Agency within the Department of Defense, Veterans and Emergency Management.

3. **Alternate Project**. "Alternate Project" means a project under the FEMA Public Assistance program proposed by the applicant when it has determined that the public welfare would not best be served by restoring a damaged facility or its function to the pre-disaster design.

4. **Consumer Price Index**. "Consumer Price Index (CPI)" means a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services, published by the US Department of Labor, Bureau of Labor Statistics.

5. **Disaster**. "Disaster" has the same meaning as set forth in Title 37-B M.R.S. §703(2)

6. **Disaster Case Manager**. "Disaster case manager" means a trained staff person at a voluntary organization who works with individuals and families affected by a disaster to help link them to programs and services to address their disaster-caused unmet needs.

7. **DRT Agency**. "DRT Agency" means a member agency of the State Disaster Recovery Team (DRT) either designated by Executive Order or added on an ad hoc basis.

8. **Emergency Work**. "Emergency Work" means work which must be done immediately to save lives and to protect improved property and public health and safety, or to avert or lessen the threat of a major disaster.

9. **Federal Disaster Declaration**. "Federal disaster declaration" means a determination by the President of the United States under the provisions of Section 401 of the *Robert T. Stafford Disaster Relief and Emergency Assistance Act*, 42 U.S.C. §5170 (Stafford Act), and implemented by 44 CFR §206.36 that a natural catastrophe, or, regardless of cause, any fire, flood, or explosion, in any part of the State of Maine, has caused damage of sufficient severity and magnitude to warrant major disaster assistance to supplement the

efforts and available resources of the State, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused by such disaster.

10. **FEMA**. "FEMA" means the Federal Emergency Management Agency within the United States Department of Homeland Security, exercising its statutory authority to provide disaster assistance under the Stafford Act.

11. **Fund**. "Fund" means the State managed Disaster Recovery Fund established by Title 37-B M.R.S. §745.

12. **Improvement Project**. "Improvement project" means a project proposed by an applicant to make improvements to a damaged facility, over and above restoring the facility to its pre-disaster condition, which the applicant is willing to fund.

13. **Incident Period**. "Incident period" means the time interval during which the disaster-causing incident occurred.

14. **Individual Assistance**. "Individual assistance" means assistance that is essential to meet necessary expenses or serious needs of individuals and families caused by a disaster which cannot otherwise adequately be met.

15. **Large Project**. "Large project" means approved projects under the FEMA Public Assistance program estimated to cost the same or more than the large project threshold amount set by FEMA (see 44 CFR §206.203) for the current federal fiscal year.

16. **Maine Disaster Relief Fund**. "Maine Disaster Relief Fund" means the charitable fund created and managed by a not-for-profit organization for the purpose of receiving tax-deductible donations to serve the unmet needs of individuals and families affected by disaster in the State of Maine.

17. **Maine Public Assistance Program (MEPA)**. "Maine Public Assistance Program" means disaster recovery assistance that is provided through the Fund to local governmental units following a disaster that is not federally declared.

18. **Mitigation**. "Mitigation" has the same meaning as set forth in Title 37-B M.R.S. §703(3-A).

19. **Municipality**. "Municipality" has the same meaning as set forth in Title 30-A M.R.S. §5903(7).

20. **Private nonprofit organization**. "Private nonprofit organization" means any nongovernmental agency or entity that currently has an effective ruling letter from the U.S. Internal Revenue Service granting tax exemption under section 501 (c), (d), or (e) of the *Internal Revenue Code of 1954*; and presents satisfactory evidence from the State that it is duly incorporated under the laws of this State or authorized to carry on activities in this State.

21. **Other Needs Assistance**. "Other needs assistance" means the FEMA Individual Assistance program which assists individuals who have disaster-related necessary expenses or serious needs other than housing (pursuant to 44 CFR §206.119) and for

which the State, in accepting the assistance, assumes an obligation to pay 25% of the cost pursuant to 44 CFR §206.110(i)(2)(ii).

22. **Permanent Work**. “Permanent work” means that restorative work that must be performed through repairs or replacement, to restore an eligible facility on the basis of its pre-disaster design and current applicable standards.

23. **Public Assistance**. “Public assistance” means supplementary federal assistance provided under the Stafford Act to state and local governments or certain private, nonprofit organizations, other than assistance for the direct benefit of individuals and families.

24. **Public Entity**. “Public entity” means an organization formed for a public purpose whose direction and funding are provided by one or more political subdivisions of the state.

25. **Public Facility**. “Public facility” means the following facilities owned by the State or local government: any flood control, navigation, irrigation, reclamation, public power, sewage treatment and collection, water supply and distribution, watershed development, or airport facility; any non-Federal aid, street, road or highway; and any other public building, structure, or system, including those used for educational, recreational, or cultural purposes; or any park.

26. **Recovery**. “Recovery” has the same meaning as set forth in Title 37-B §703(6).

27. **Response**. "Response" means those activities designed to provide emergency assistance to victims of a disaster, reduce the likelihood of secondary damage, or to accurately assess resource needs of municipalities and their populations, but which do not include winter snow clearance and road treatment costs.

28. **Small Project**. “Small project” means approved projects under the FEMA Public Assistance program estimated to cost less than the large project threshold amount set by FEMA (see 44 CFR §206.203) for the current federal fiscal year.

29. **Standards**. “Standards” means codes, specifications or standards required for the construction of facilities.

30. **State Disaster Recovery Team**. “State Disaster Recovery Team” (DRT) means the team established by Governor’s Executive Order 2015-010, October 14, 2015, consisting of representatives of 24 State and quasi-state agencies plus members from additional agencies which may be appointed on an ad hoc basis by the Director of the Agency, with the expertise, programs or resources that can assist individuals, families, businesses and communities following a disaster.

31. **Unmet Need**. “Disaster Caused Unmet Need” or “Unmet Need” means an un-resourced item, support, or assistance that has been assessed and verified by representatives from State, Tribal, local, and Federal governments and/or voluntary and faith-based organizations as necessary for the survivor to recover from the disaster. Unmet needs may also include basic immediate emergency needs such as food, clothing, shelter or first aid and long-term needs such as financial, physical, emotional or spiritual well-being.

32. **Voluntary Organization**. “Voluntary organization” means any chartered or otherwise duly recognized tax-exempt local, state or national organization or group which has

provided or may provide needed services to the State, local governments, or individuals in coping with an emergency or a major disaster.

SECTION 2: ACTIVATING USE OF THE FUND

1. **Conditions for Activating the Fund**. The State will utilize the Fund as the first resource whenever the Governor has proclaimed a state of emergency due to a disaster pursuant to Title 37-B M.R.S. §742(1), or the President has declared that a major disaster exists in the State pursuant to Title 37-B M.R.S. §744. Use of the Fund may be activated with the Governor's approval, in response to a recommendation by the Agency. When approval is granted, the Governor will specify an incident period that defines the period of time during which any damages or costs must have been incurred in order to be covered.

2. **Limitations on Use of the Fund**. If the Agency knows that the balance in the Fund is insufficient to meet the estimated need, the Agency will not recommend use of the Fund unless:

   A. The Fund would be used to provide matching funds for a federally declared disaster, and by requesting and accepting federal assistance the State has already incurred a financial obligation;

   B. The Legislature is expected to take action to replenish the Fund within the next 90 days;

   C. The Governor has directed a transfer of funds from another State account into the Fund within 60 days to meet the estimated need; or

   D. It appears that the current balance plus expected replenishment will be sufficient to meet the Agency's best estimate of the need, even if a short-term unfunded obligation may be created during the administration of disbursements for the current incident.

When the Fund balance is at or below its reserve balance (see Section 10 below) but more than zero, the State may activate a Priority 1 (see Section 4 below) use of the Fund to the extent of the existing balance.

SECTION 3. ROLE AND AUTHORITY OF DISASTER RECOVERY TEAM AGENCIES

1. **Role of DRT Agencies**. All agencies that are designated as part of the State's Disaster Recovery Team ("DRT") pursuant to Executive Order 2015-010, dated October 14, 2015, entitled "An Order Updating the State of Maine Emergency Response and Disaster Recovery Teams," ("ERT/DRT Executive Order") are available upon request of the Agency to assist in short-term, mid-term, and long-term recovery from a disaster in the State of Maine.

2. **Authority**. The Agency's authority to request or direct the participation of DRT Agencies is derived from the ERT/DRT Executive Order. The authority of DRT Agencies to perform their roles in disaster recovery, including the implementation of this

rule, is derived from the ERT/DRT Executive Order and the agencies' respective enabling statutes.

3. **Priority**. Upon request by the Agency, each DRT Agency will give first priority to those activities within its primary mission that are necessary to reduce or eliminate the effects of the emergency conditions and/or support the short-term recovery of communities and individuals.

SECTION 4. PRIORITIES FOR USE OF THE FUND

Once the Fund has been activated pursuant to section 2 above, authorized uses of the Fund will be allocated according to the following priorities:

1. **Priority 1** - Disaster recovery assistance to individuals and families in absence of a federal disaster declaration. The Agency will give first priority for use of the Fund to providing assistance to individuals and families when the State has requested, but has not received, a major disaster declaration by the federal government. See Section 5(3).

2. **Priority 2** - Matching funds for assistance to individuals in a federally declared disaster. The second priority for use of the Fund will be to provide the State match for federal funds to assist individuals recovering from a federally declared major disaster. See Section 5(4).

3. **Priority 3** - Disaster-related unmet needs of individuals and families in a federally declared disaster. The third priority for use of the Fund will be to cover the unmet needs individuals and families recovering from a federally declared major disaster. See Section 5(5).

4. **Priority 4** - Disaster recovery assistance to local governmental units in absence of a federal disaster declaration. The fourth priority for use of the Fund will be to provide assistance to local governments for infrastructure repair and response when the State has requested, but has not received, a major disaster declaration by the federal government. See Section 6.

5. **Priority 5** - State agency emergency response costs. The fifth priority for use of the Fund is to reimburse state agencies for costs incurred to respond to emergencies. See Section 7.

6. **Priority 6** - Matching funds for state and local governmental units in a federally declared disaster. The sixth priority for use of the Fund is to provide State matching funds under the federal Public Assistance ("PA") program. See Section 8.

7. **Priority 7** - Low-interest loans to businesses in absence of a federal disaster declaration. The seventh priority for use of the Fund is to provide low-interest loans to businesses recovering from a disaster when the State has requested but has not received a major disaster declaration by the federal government. See Section 9.

The Fund may be activated to address more than one priority use in response to a single event if appropriate to the identified need. The assigned priority will govern use of the Fund when the available balance is not sufficient to meet all identified disaster needs.

SECTION 5. DISASTER RECOVERY ASSISTANCE TO INDIVIDUALS AND FAMILIES

1. **Assessment of Damage**. Following any disaster event, the Agency will review damage assessments gathered by County Emergency Management Agencies and other sources, including but not limited to the 211 Maine referral system and affected municipalities, and will consult with voluntary organizations and DRT Agencies serving those individuals and families affected by the disaster. The Agency will assess the numbers of individuals and families affected; the number of homes damaged; essential needs of those affected as compared to available programs; anticipated insurance coverage; anticipated unmet needs; and the balance in the Fund available to address anticipated needs.

2. **Agency Recommendation**. Based on the assessment of damage, the Agency will make a recommendation to the Governor concerning activation of the Fund, which includes the estimated amount needed to address the needs of those affected and the most expedient method to administer the assistance (see subsections 3(C) – (E)). If the initial assessment of damages to housing and other individual and family needs approaches the applicable thresholds to qualify for the Individual Assistance program administered by FEMA, the Agency will recommend that the Governor seek a federal disaster declaration before activating the Fund.

3. **Use of the Fund to Assist Individuals and Families in the Absence of a Federal Disaster Declaration**

   A. **Limitations on Use of the Fund**. The Fund may be used to supplement or complement, but not supplant, assistance to individuals and families provided by voluntary organizations or through existing programs that are administered by DRT Agencies. The Agency will provide no direct monetary grants to individuals or families from the Fund, but will instead offer assistance by donating funds to a voluntary organization, a DRT or voluntary organization, or to the Maine Disaster Relief Fund, as outlined in paragraphs C through E below. This is a Priority 1 use of the Fund.

   B. **Eligible Forms of Assistance**. The Agency's focus for providing aid to individuals and families (consistent with the types of assistance offered by FEMA under FEMA's Individual Assistance program following a federal disaster declaration) will be on meeting immediate safety and health needs, including but not limited to such items as:

      (1) Safe, sanitary and secure housing (e.g., assistance with clean-up, mold remediation, minor home repairs, or temporary housing if warranted);

      (2) Clothing;

      (3) Essential furnishings or tools;

      (4) Essential medical supplies or appliances;

      (5) Disaster-related mental health and medical services; and

      (6) Disaster-related funeral services.

C. Support to Voluntary Organizations

(1) Based upon a recommendation by the Agency, the Governor may make a donation from the Fund to one or more voluntary organizations to reimburse costs incurred by those organizations in meeting the needs of individuals and families adversely affected by a disaster. Priority will be given to voluntary organizations not affiliated with a national organization that could provide additional resources.

(2) Any voluntary organization that receives a donation from the Fund will be asked to report to the Agency at the close of recovery operations for the particular disaster for which the donation was made on the support provided to clients from this disaster. Unspent funds must be returned to the Agency.

D. Support to DRT, Municipal and Voluntary Organization Programs

(1) Where a program administered by a DRT Agency, Municipality or voluntary organization exists that may effectively serve individuals and families adversely affected by a Maine disaster, such individuals will be encouraged to apply for assistance under existing program rules. Appropriate programs are those that address immediate safety and health needs, as described under subsection 3(b), above.

(2) If the program does not have sufficient funds to serve those who qualify, and can legally accept a transfer from the Fund, the Agency will execute or activate an existing a Memorandum of Understanding with the DRT Agency or voluntary organization governing the process for requesting and fulfilling such a transfer. See Section 11.

(3) Provision of monetary support from the Fund does not confer any management responsibilities on the part of the Agency or the State in the operation either of the DRT Agency program that is providing direct aid to those affected by the disaster. Any program that receives monetary support from the Fund will serve clients according to its established rules and procedures.

(4) If a voluntary organization is not specified in the ERT/DRT Executive Order as a DRT Agency, it will be added to the DRT on an ad hoc basis to ensure full coordination with the Agency and other DRT members.

E. Support to the Maine Disaster Relief Fund

(1) Based upon a recommendation by the Agency, the Governor may make a donation from the Fund to the Maine Disaster Relief Fund to address the needs of individuals and families affected by the disaster. The Administrator of the Disaster Relief Fund must first provide the Agency with a credible estimate of the needs that cannot be met by the current resources of the Disaster Relief Fund. Any donation from the Fund to the

Maine Disaster Relief Fund must be distributed in accordance with the bylaws and appropriations guidelines established by the Administrator.

(2) The Administrator of the Maine Disaster Relief Fund must report to the Agency at least annually and/or at the close of recovery operations for the disaster for which a donation from the Fund was made, on the status of support provided to clients from this disaster. The Agency will not request return of unspent funds, provided the Administrator agrees to hold those funds in reserve for future disasters.

4. Use of the Fund to Provide State Match when a Federal Disaster is declared

A. If a federal disaster is declared that includes Individual Assistance and the Other Needs Assistance (ONA) program is activated by FEMA, the State may use the Fund to meet its obligation under federal law to contribute 25% of the ONA costs, to the extent that the match cannot be met through in-kind contributions or previously-incurred costs. This is a Priority 2 use of the Fund.

B. Disbursements from the Fund to meet the remaining billed obligation will be made according to established State of Maine accounting practices. If there is an insufficient balance in the Fund to meet the remaining state obligation, the Agency will consult with the Department of Administrative and Financial Services and the Governor's office to determine how the obligation will be met.

5. Use of the Fund to Address Unmet Needs of Individuals and Families when a Federal Disaster is Declared

A. If a federal disaster is declared that includes authorization of Individual Assistance from FEMA, then individuals in the declared areas will apply directly to FEMA for disaster assistance. The Agency will also provide to FEMA a list of additional state programs that may be able to provide assistance to individual applicants.

B. If there are unmet needs after individuals have exhausted the aid available to them from FEMA and private insurance, the Fund may be used to provide assistance in the same manner as described in subsection 3. This is a Priority 3 use of the Fund.

SECTION 6. DISASTER RECOVERY ASSISTANCE TO LOCAL AND COUNTY GOVERNMENTAL UNITS – MAINE PUBLIC ASSISTANCE PROGRAM

1. Scope of Maine Public Assistance Program

A. The Fund may be used to reimburse local and county governmental units as well as private nonprofit organizations when a major disaster is not declared by the President of the United States under the *Robert T. Stafford Act* (Priority 4), pursuant to the Maine Public Assistance (MEPA) program described in this section.

B. All uses of the Fund for this purpose will be for reimbursement only, based on submission of required documentation by eligible applicants.

C. Winter road snow clearance and road treatment costs are not eligible for reimbursement from the Fund under this program.

2. **Assessment of Damage**. Following any disaster event, the Agency will review local and county damage assessments gathered by County Emergency Management Agencies and consult with DRT Agencies serving those local and county governmental units affected by the disaster. Following the FEMA Public Assistance program format, the Agency will assess the degree of damage and estimated costs for recovery according to the categories outlined below.

A. Emergency Work

(1) Category A (Debris Removal)

(2) Category B (Emergency Protective Measures)

B. Permanent Work

(1) Category C (Roads and Bridges)

(2) Category D (Water Control Facilities)

(3) Category E (Buildings and Equipment)

(4) Category F (Utilities)

(5) Category G (Parks, Recreational Facilities, and Other Items)

3. **Agency Recommendation**. Based on the assessment of damage, the Agency will make a recommendation to the Governor concerning activation of the Fund, which includes the estimated amount needed to address the recovery costs of those affected local and county governmental units. If the initial assessment of damages approaches the applicable thresholds to qualify for a Presidential major disaster declaration administered by the Federal Emergency Management Agency, the Agency will recommend that the Governor seek a federal disaster declaration before activating the Fund for MEPA.

A. The Agency will assess the degree of damage and estimated costs for recovery using the criteria outlined below. The per capita benchmarks referenced in this section will be adjusted annually according to the Consumer Price Index (CPI). Due to varied populations and number of jurisdictions statewide, no specific County-level per capita benchmarks have been established.

(1) Multiple communities (5 or more) reporting $10.00 per capita or greater in disaster related costs and damages;

(2) Single communities reporting $30.00 or more per capita in disaster related costs and damages; and

(3) Additional impacts described by the applicant such as economic and community disruption, and overall demographic and economic factors in the affected jurisdiction.

B. For each disaster event in which the Fund is activated for MEPA, the Governor will set an eligibility threshold for applicants based on assessed local damages and costs. In general, the threshold will not be less than the current FEMA minimum per project cost threshold or $10.00 per capita, whichever is higher.

C. The Governor may allow applicants with less than $10.00 per capita costs, as long as their assessed costs meet or exceed the current minimum per project cost established by FEMA.

D. The Governor may set a higher per capita threshold for applicant eligibility based on economic factors as well as the available balance in the Fund.

4. Eligibility for Assistance

A. In order to be eligible for assistance from MEPA, municipal applicants must be:

(1) participants in good standing with the National Flood Insurance Program (NFIP) as authorized in 42 USC Chapter 50; and

(2) have formally adopted a current FEMA-approved County or Local Hazard Mitigation Plan (HMP) as required under the Stafford Act.

B. In order to be eligible for assistance from MEPA, municipal and county applicants must maintain a current Emergency Operations Plan (EOP) that has been revised within the past three (3) years. The EOP must have been formally activated during the applicant's response to the disaster event.

5. Cost Sharing, Incentives, and Mitigation Activities

A. **Basic Cost Share**. For all eligible applicants, and so long as the Fund has not reached its Reserve Balance (see Section 10) the Fund will reimburse at least 50% of eligible damages and costs.

B. **Incentives to Obtain Higher Reimbursement Rates**. Certain actions and conditions (incentives) met by municipal applicants may qualify those entities to receive a higher percentage of reimbursement from the Fund, not to exceed 65% of eligible damages and costs. Each of the following conditions, if met by the municipal and/or county applicant (as applicable), will result in an additional 5% in recovery costs paid from the Fund, not to exceed 65% of the applicant's total eligible damages

(1) Participation in the Community Rating System (CRS) of the National Flood Insurance Program;

(2) Documentation that the municipality has completed a mitigation project identified in the HMP under which it is covered, or a similar project identified after the HMP was approved, within the last 5 years, supported

by any funding source. Documentation is subject to verification by the Agency, or the appropriate subject matter DRT member agency; and

(3) Adoption of the *Maine Uniform Building Code* as defined in Title 10 M.R.S. Chapter 1103.

(4) Exercises focused on the Emergency Operations Plan (EOP) in the last two years which have been documented and submitted to the respective County EMA.

C. **Improvement Projects**. An applicant may propose to improve a damaged site to standards designed to reduce or prevent future damage. Such proposals to mitigate future damages will be reviewed by the Agency and the appropriate DRT Agency technical experts. If approved, up to 15% of the estimated cost of the improvement may be added to the cost of the project for which the applicant is seeking reimbursement.

6. Application Process, Timelines, and Reimbursement

A. **Forms**. Applications must be submitted on an official MEPA application form adopted by the Agency. The Agency may adopt the FEMA application forms, or create a separate MEPA form.

B. **Briefings**. The Agency, along with the applicable County Emergency Management Agency will hold public briefings in each County or region in which heavily impacted jurisdictions have been identified. Potential applicants may apply for assistance by filling out an official MEPA application form at the briefing, or by submitting it within 30 days from the Governor's activation of the Fund for MEPA.

C. Project proposal development and review

(1) Applicants must utilize MEPA Project Worksheets (MEPA-PWs) and provide supporting documentation to request approval of projects to repair damages or recoup response costs.

(2) MEPA-PWs must identify the eligible scope of work and must include a quantitative estimate for the eligible work.

(3) Each project must meet or exceed the current FEMA minimum per project cost threshold.

(4) Multiple MEPA-PWs must be submitted for separate damage sites and cost categories.

(5) MEPA-PWs will be reviewed by Agency staff as well as staff from DRT Agencies as appropriate. Any errors or omissions in MEPA-PWs will be conveyed to the applicant so that it has an opportunity to correct them within a specified time period.

(6) All MEPA-PWs must be submitted within 60 days after the Governor's activation of MEPA.

(7) The Agency will notify the applicant of approval or disapproval of MEPA-PWs within 45 days of receipt of an application that includes all required information.

(8) Approval of a project by the Agency constitutes a financial obligation on the part of the State to reimburse the amount of the State share of the project.

D. Project Timelines

(1) Applicants must complete approved Emergency Work projects within six (6) months of project approval.

(2) Applicants must complete approved Permanent Work projects within eighteen (18) months of project approval.

(3) Any additional mitigation activities must be completed within eighteen (18) months of project approval.

(4) No extensions will be granted for Emergency Work.

(5) Applicants may request an extension of the timeline to complete Permanent Work for up to an additional twelve (12) months. Under extraordinary circumstances, a further extension of up to six (6) months may be requested and will be considered on a case-by-case basis.

E. Project Reimbursement

(1) All reimbursements will be based on the actual costs, for which detailed documentation must be submitted.

(2) Billings for actual costs may be submitted to the Agency at any point during the project, using the appropriate forms and including all supporting documentation that the Agency may request.

(3) Acceptance and approval of any billing is subject to a site visit by Agency or DRT Agency staff.

(4) A reimbursement request that is returned to the applicant for correction or additional information will not be approved and scheduled for reimbursement until the corrected or completed version is returned and accepted.

(5) Reimbursement will not exceed 75% of the State's obligated share of a project, pending a final inspection of the completed project by the Agency or appropriate DRT Agency.

(6) The Agency may decline to reimburse costs if the inspection indicates that the project is not complete, or work was carried out in a manner not consistent with applicable codes and standards governing the type of work.

(7) If reimbursement requests exceed the available balance in the Fund, the Agency may delay or pro-rate reimbursements upon notice to the applicants. The Agency will also inform the Governor of any funding shortfall.

F. **Appeals Process**. Appeals from Agency decisions on project eligibility determinations will be heard by the Commissioner of the Department of Defense, Veterans and Emergency Management (DVEM) or his or her designee.

(1) Appeals must be filed within 30 days after the date of the decision which is being appealed.

(2) Appeals by the applicant must include supplemental evidence and documentation not included in the original project proposal to support the applicant's claim that a particular project is eligible for assistance from the Fund.

(3) The appeal will be heard and a final decision rendered within 60 days of the receipt of the appeal.

G. **Administrative Costs**. In order to provide administrative oversight of the MEPA program, as well as to provide technical assistance to local and county applicants recovering from a disaster, the Fund may be used to reimburse DRT Agencies for the following activities:

(1) Overtime costs or travel expenses incurred by DRT Agency personnel during damage assessment, conducting public briefings, provision of direct technical assistance to applicants, review of MEPA-PWs, or project inspections; and

(2) Costs of contracting with additional personnel directly assigned by a DRT Agency to any of the above-listed functions.

SECTION 7. STATE AGENCY EMERGENCY RESPONSE COSTS

1. **Eligible state agencies**. Any state agency that has performed tasks to support disaster response and recovery and has incurred costs that exceed its budgetary allotments and may jeopardize the agency's ability to carry out a mandated function may apply for reimbursement from the Fund. This is a Priority 5 use of the Fund. Agencies must request assistance within 30 days of the start of a disaster incident, and Agencies will only be reimbursed for costs that occurred within a 180-day period following the start of a disaster incident.

2. **Ineligible costs**. Winter snow clearance and road treatment costs are not eligible for reimbursement from the Fund.

3. **Review Process**. The Agency will review each request and make a recommendation regarding reimbursement to the Department of Administration and Finance and the Governor's Office. Reimbursement may be at 100% or a lesser amount depending on such factors as the balance in the Fund, the time remaining in the fiscal year, and the requesting agency's demonstration of need.

4. **Payments**. Approved reimbursement requests will be processed in accordance with established State of Maine accounting practices.

SECTION 8. MATCHING FUNDS FOR ASSISTANCE TO STTE AND LOCAL GOVERNMENTAL UNITS IN A FEDERALLY DECLARED DISASTER

If the State obtains a public assistance (PA) grant from FEMA following a federal disaster declaration, the Fund may be used to provide the State match for reimbursement requests from eligible public entities that are approved. This is a Priority 6 use of the Fund. In order to obtain a federal public assistance grant, the State must commit to paying twenty-five percent (25%) of the total amount of public assistance requested. Pursuant to 37-B M.R.S. §744(2-A)(A), the State must pay fifteen percent (15%) of eligible recovery costs, and local jurisdictions pay for the remaining ten percent (10%) of the total amount of assistance requested.

SECTION 9. LOW-INTEREST LOANS TO BUSINESSES FOR DISASTER RECOVERY ASSISTANCE IN THE ABSENCE OF A FEDERAL DISASTER DECLARATION

1. **Limitations on Use of the Fund for Small Business Loans**. The Agency will not make direct loans to businesses but may enter into an agreement with a federally or state recognized lending institution to administer a loan program in the event this use of the Fund is activated. This is a Priority 7 use of the Fund.

2. Conditions for this Use of the Fund

A. This use of the Fund will be activated only when the following conditions are met:

(1) The State has not received a federal disaster declaration for Individual Assistance;

(2) The Agency has determined that the number of businesses impacted is not enough to qualify for assistance from the U.S. Small Business Administration;

(3) There are businesses in the disaster impact area that would benefit from and wish to apply for low-interest loans;

(4) There is sufficient balance in the Fund to provide such loans; and

(5) A voluntary organization has been identified that can administer such loans.

B. If the conditions described in paragraph A are satisfied, and the Governor approves activation of the Fund for this purpose, the Agency will execute or

activate an existing Memorandum of Understanding (MOU) with the identified voluntary organization to administer loans to qualified applicants.

C. The Memorandum of Understanding with the voluntary organization for this purpose must establish:

(1) An interest rate equivalent to low-interest disaster loans administered by the United States Small Business Administration;

(2) A loan repayment schedule equivalent to the term for low-interest disaster loans administered by the United States Small Business Administration;

(3) The amount of any administrative fees to be charged by the partner agency;

(4) A requirement for the voluntary organization to return to the Fund any unexpended balance at the end of the loan term;

(5) An obligation by the voluntary organization to report annually to the Agency setting forth the number and amount of all loans issued and the status of such loans.

3. **Transfer of Funds**. The Agency will transfer monies to cover the amount of any loans issued under this section upon notification of loan approval by the voluntary organization.

SECTION 10. RESERVE BALANCE

When use of the Fund is authorized for Priorities 2 through 7, the Agency will to the extent possible maintain a reserve balance of not less than 5% of the statutory maximum balance in the Fund, in order to ensure that resources are available for a Priority 1 use of the Fund. When use of the Fund is authorized for Priority 1, the entire Fund balance may be expended, in accordance with the priorities established by this rule.

SECTION 11. MEMORANDUM OF UNDERSTANDING FOR CERTAIN USES OF THE FUND

1. **Memorandum Required for Certain Priority Uses of the Fund**. No monies may be distributed from the Fund to a voluntary organization for Priorities 1 or 3, or to a recognized lending institution for Priority 7, without the Agency first executing a Memorandum of Understanding (MOU) with the recipient voluntary organization or lending institution.

2. **Contents**. The MOU must define the purpose(s) for which monies from the Fund are being transferred to the voluntary organization or lending institution, the process for requesting and fulfilling such a transfer, and how those funds will be administered. The MOU will include a requirement for the voluntary organization or lending institution to report to the Agency at least annually and/or at the close of recovery operations on clients served and funds expended. Unspent funds must be returned to the Agency.

3. **Review**. The Agency will review all existing MOUs with voluntary organizations or lending institutions each year and revise, extend, reauthorize or terminate as the Agency deems appropriate.

SECTION 12. ANNUAL REPORT

By January 15 of each year, the Agency will submit a written report to the Governor and the Legislature, pursuant to Title 37-B M.R.S. §745(5), including:

* The balance of the Fund;

* Expenditures from the Fund;

* Unfunded obligations of the Fund;

* The statutory maximum balance of the Fund as adjusted on July 1st based on the Consumer Price Index, in accordance with Title 37-B M.R.S. §745(4);

* The amount that would be required to bring the balance of the Fund to its statutory maximum balance, as defined in Title 37-B M.R.S. §745(4); and

* A listing of current Memoranda of Understanding with DRT Agencies for administration of any specific uses of the Fund.

STATUTORY AUTHORITY: 37-B MRS §745

EFFECTIVE DATE:
June 10, 2017 – filing 2017-073 (Final adoption, major substantive)

APPENDIX B: SACO WATER RESOURCE RECOVERY FACILITY EXECUTIVE SUMMARY

Water Resource Recovery Facility Effluent Pump Station, Wet-Weather Treatment Improvements, and Climate Adaptation Plan

Saco Water Resource Recovery Facility
Saco, Maine
July 2019

Tighe&Bond

Executive Summary

Project Understanding and Goals

The purpose of this study is to develop a resiliency plan for the City of Saco's Water Resource Recovery Facility (WRRF) located on Front Street and adjacent to the Saco River. The WRRF's direct proximity to the tidally influenced Saco River puts this facility at significant risk to the effects of sea level rise as well as flooding during extreme weather events. The facility has recently experienced known hydraulic impacts due to increases in wet weather sewerage flows and higher than normal tides elevations. Hydraulic backups throughout the plant process can be visually observed during periods of high tide and heavy rainfall. These concerns have prompted the City to seek measures for resiliency to protect the facilities and personnel from the effects of climate change. This study accounts for the three sources of the flooding that could potentially impact the operation of the WRRF including increase wastewater flows, stormwater collected at the site and sea level rise.

The key goals of this project for the City of Saco were to:

- Ensure that the Saco WRRF is resilient to flooding impacts from the following factors: sea level rise, quantity of wastewater entering the facility and site stormwater.
- Understand the hydraulic capacity of the WRRF to determine if additional wastewater flows could be directed to the plant in order to reduce the activity of or eliminate CSO #004.
- Develop a plan to provide improved treatment for wet weather flows at the WRRF to improve the effectiveness of the Wet Weather Treatment process.

The City of Saco and Tighe & Bond have developed a holistic approach in order to meet these key goals for this project which is described further below. The approach compared multiple resiliency guidelines, finding that TR-16 standards as the basis of the design to account for flood level protection based on a 100-year storm event + 3 feet of elevation, compares well with the other guidelines and is appropriate for the protection of the WRRF for the next 50 years. The recommended design coastal flood elevation for this site is elevation 12 feet based on NAVD88 vertical datum. Figure E-1 depicts the potential impact to the WRRF without flood protection measures based on the designated elevation of 12 feet.

Recommended Plan

Due to the multi-component nature of the study, the project was broken down into several sub components to determine the preferred methods to meet each goal of the project. These sub-components were as follows:

- Wastewater flow flood mitigation and wet weather flow treatment
- Sea level rise resiliency for both flooding and plant hydraulics
- Stormwater flood mitigation

To determine the most beneficial means to handle each of these flood risks, the City of Saco and Tighe & Bond conducted an alternatives analysis for each sub-component of the project. Several alternatives were evaluated for effectiveness, constructability and cost.

Wastewater Flood Mitigation and Wet Weather Flow Treatment

In order to determine the flood risk due to increased sewerage flows, a hydraulic model of the WRRF was developed using elevation data collected from a limited field survey as well as record drawings provided by the City of Saco. The hydraulic model estimated that the maximum hydraulic capacity of the WRRF without the use of the StormKing bypass system was 10.8 million gallons per day (mgd), which does not account for biological treatment capacity, therefore treatment ability would be impacted when the WRRF receives flows of this magnitude. With the StormKing bypass, the overall hydraulic capacity was estimated to be 17.8 mgd. The model also concluded that tide levels significantly impact the hydraulic capacity of the WRRF.

In order to maximize the WRRF's available hydraulic capacity, several pump station alternatives, sized for 11 mgd wastewater flows were evaluated. The use of a pump station would allow the facility to continue to discharge sewerage flows even in the event of experiencing high tide elevations up to 12-feet. The alternatives included repurposing the existing outfall distribution box as a pump station as well as a new pump station location adjacent the existing dechlorination structure. Three alternatives were analyzed and evaluated.

Based on discussions with key stakeholders, Alternative #3 which utilizes an overflow pump station located adjacent to the dechlorination structure was selected due to the ability to mitigate potential flooding risk and its minimized cost and impacts associated with maintaining plant operations during construction.

Additionally, alternatives to improve wet weather treatment capability at the WRRF were also evaluated. Several technologies including additional chlorine contact tanks, ultraviolet (UV) disinfection systems, cloth disk filters, additional StormKing capacity and a new CSO tank were included in the analysis.

Alternative #5, the CSO tank option, conceptually sized for 750,000 gallons to maximize available space constraints was selected for several reasons including:

- The CSO tank provides additional hydraulic capacity for the WRRF which is valuable in decreasing flood risk due to the wastewater flows.
- The new tank would reduce the flow to the StormKing, which allows for improved disinfection through this system as design flows would not be exceeded. The current means of disinfection would not require improvement.
- This alternative would limit use of CSO #004 and allow this flow to receive proper treatment through the WRRF.

Sea Level Rise Resiliency

Based on the design coastal flood elevation of 12 feet, several areas of the WRRF would become inundated including the majority of the facility's treatment works as well as the plant access drive, Front Street.

To mitigate the coastal flooding impacts to the plant, several options were evaluated including the design and construction of a steel sheet pile sea wall limited to the critical areas where flooding is anticipated as well as a driveway dike alternative. An option of incorporating an alternative access point on the northern portion of the WRRF property was also evaluated. Based on discussions with key stakeholders, Alternative #1 was selected which includes the following features:

- Regrading portions of Front Street which are at risk of flooding to 12 feet and the construction of a retaining wall.

- Resetting the existing boat ramp off Front Street to account for the new street elevation.

- Design and construction of a new sheet pile flood wall at the southernmost portion of the WWRF property. The flood wall would be designed for a top elevation of 13 feet to provide freeboardand tolerance for some wave action at the design flood level. Additional resiliency measures anticipated include the ability to pump floodwater/stormwater from behind the floodwall during peak storm surge when gravity storm drains are not flowing.

- Incorporating a section of the riverwalk to be located up and over the new flood wall

- New check valves to be located at the stormwater and wastewater discharges to restrict flow from the river back into the WRRF site.

- Demolition of the existing Department of Public Works (DPW) garage for construction access (for both CSO tank construction and regrading of Front Street).

Stormwater Flood Mitigation

With the construction of a new flood wall, the potential for flooding due to the collected stormwater at the WRRF site increases. A stormwater hydraulic model was conducted to determine the potential stormwater flows rates during a 100-year storm event at the WRRF site. A preliminary analysis indicates that approximate peak stormwater flows at the site were calculated to be 16,000 gpm. This flow rate does not include the upland hill adjacent to the WRRF site. The City of Saco and Tighe & Bond determined that the most effective approach to mitigating storm water flood impacts would include the following:

- Limit additional flows to the WRRF from the upland hill by diverting stormwater flows from this location by incorporating new stormwater collection systems and tie into existing infrastructure

- Purchase a new standby trailer mounted pumping system which can mobilized during extreme weather events which has a capacity of 16,000 gpm. The pumping system would be staged near a downstream stormwater manhole and discharge to the existing drainage system outfall.

The overall recommended plan which includes the aforementioned flood mitigation components is depicted on Figure E-2.

Opinion of Probable Cost

A budgetary opinion of probable cost is broken down for each of the sub-components of the project in Table E-1 below.

TABLE E-1 Recommended Plan Summary and Opinion of Probable Cost

PROJECT COMPONENT	SELECTED ALTERNATIVE	ALTERNATIVE DESCRIPTION	PLANNING LEVEL OPCC[1,2]
Pump Station (Report Section 3)	3	New Pump Station Located Next to Dechlorination Structure (11 MGD)	$4,100,000[3]
Wet Weather Treatment (Report Section 3)	5	New CSO Tank	$3,600,000[3]
Sea Level Rise Resiliency (Report Section 4)	1	Fill Front Street Entrance, Sheet Pile Flood Wall and Additional Drainage	$2,400,000[4]
Stormwater Flood Mitigation (Report Section 5)	1	Trailer or Skid Mounted Stormwater Pumps	$700,000[5]
		Total Opinion of Probable Cost	***$10,800,000***

1. This is an engineer's Opinion of Probable Construction Cost (OPCC). Tighe & Bond has no control over the cost or availability of labor, equipment or materials, or over market conditions or the Contractor's method of pricing, and that the estimates of probable construction costs are made on the basis of Tighe & Bond's professional judgment and experience. Tighe & Bond makes no guarantee nor warranty, expressed or implied, that the bids or the negotiated cost of the Work will not vary from this estimate of the Probable Construction Cost.

2. The OPCC presented is currently at concept level. Expected accuracy for concept level OPCC's is currently +40% to -25%.

3. OPC includes 40% contingency, engineering and 15% for General Conditions.

4. OPCC includes 40% engineering and contingency and 15% for General Conditions.

5. OPCC includes 30% engineering and contingency.

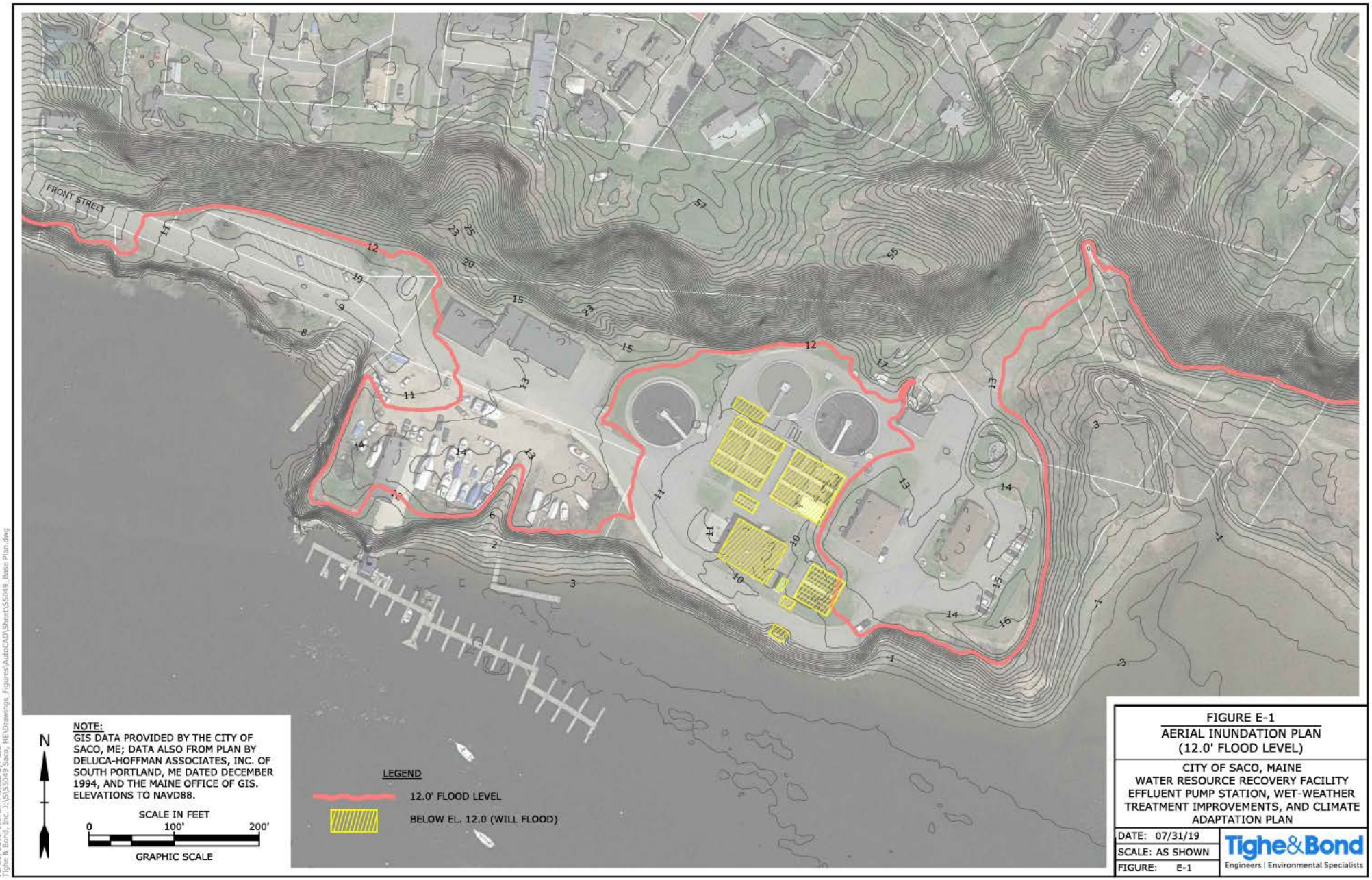


FIGURE E-1
AERIAL INUNDATION PLAN
(12.0' FLOOD LEVEL)

CITY OF SACO, MAINE
WATER RESOURCE RECOVERY FACILITY
EFFLUENT PUMP STATION, WET-WEATHER TREATMENT IMPROVEMENTS, AND CLIMATE ADAPTATION PLAN

DATE: 07/31/19
SCALE: AS SHOWN
FIGURE: E-1

Tighe&Bond
Engineers | Environmental Specialists

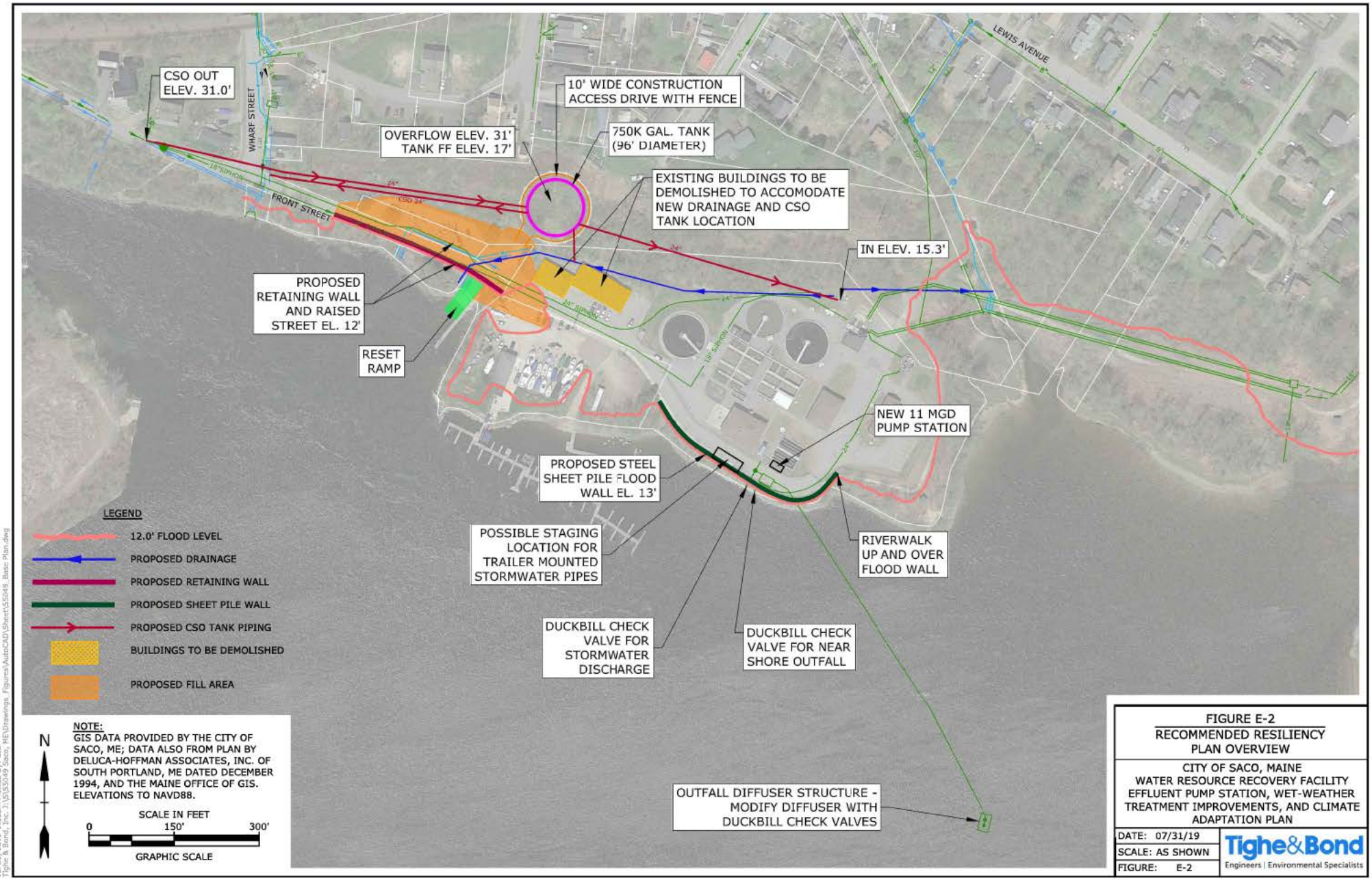


FIGURE E-2
RECOMMENDED RESILIENCY PLAN OVERVIEW

CITY OF SACO, MAINE
WATER RESOURCE RECOVERY FACILITY
EFFLUENT PUMP STATION, WET-WEATHER TREATMENT IMPROVEMENTS, AND CLIMATE ADAPTATION PLAN

DATE: 07/31/19
SCALE: AS SHOWN
FIGURE: E-2

Tighe&Bond
Engineers | Environmental Specialists

1. Executive Summary

The Machias Downtown Resilience and Renewal Study was made possible by a Maine Coastal Program Community Grant awarded to the Town Machias. The grant enabled the Town to retain a consultant team led by Baker Design Consultants, Inc. (BDC) to investigate and define the risk of flood damage to downtown Machias and to develop a concept engineering design for a flood protection system. On the BDC Team were West Falls Surveying (WFS) and Ransom Consulting (Ransom) who provided topographic survey and flood analysis respectively.

This study has drawn from related work programs undertaken and in progress by the Town of Machias, the Washington County Council of Governments and the University of Maine at Machias GIS Service Center. Refer to the APPENDIX located on page 27.

1.a. Introduction

The catalyst for this study is the periodic flooding that occurs in the historic Machias Downtown Area. The section of the 2017 FEMA Flood Map provided in Figure 1 below shows areas mapped as Special Flood Hazard Areas (1SFHAs). One SFHA extends east from the Route 1 Dyke into the Machias Downtown Area. Another isolated SFHA is next to the Machias Waste Water Treatment Plant. These areas and adjacent properties define the area considered for this project.

A separate initiative, in progress by the Maine Department of Transportation, includes design development for rehabilitation or replacement of the Route 1 Dyke with consideration of the Dyke location within the SFHA and tidal flow on the Middle River.

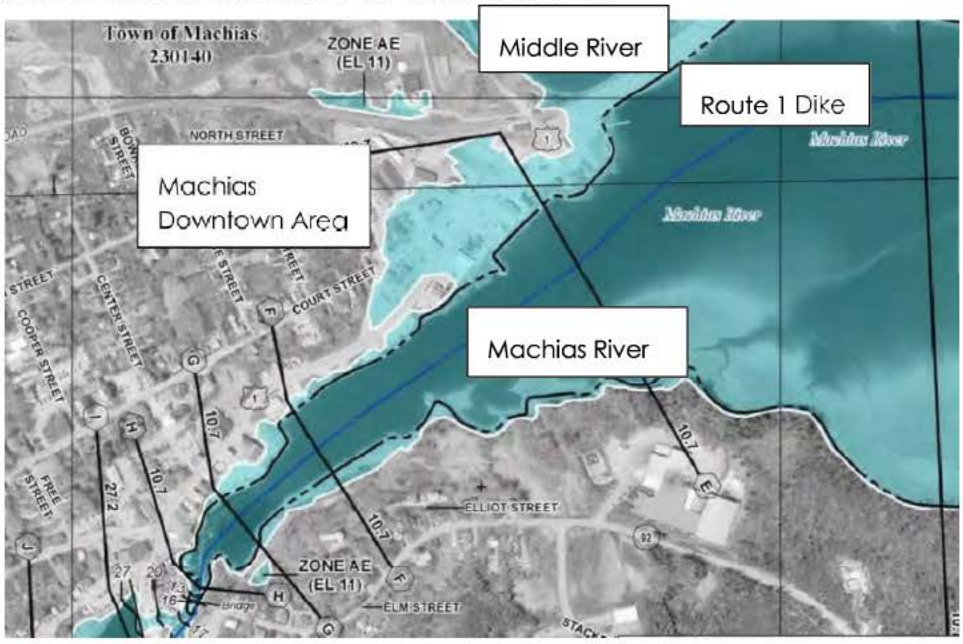


Figure 1 – Down town Machias on 2017 FEMA Flood Insurance Rate Map

[1] Special Flood Hazard Areas are where a flood that exceeds the Base Flood Elevation (BFE) is expected to occur with a probability of 1%. The BFE = 11 NAVD88 for the isolated Zone AE SFHA on the Town WWTP property. The BFE = 10.7 NAVD88 for those downtown area along the Machias River and across the Dyke.

1.b. Work undertaken for this Study

A summary of the concurrent activities that have been undertaken by the Baker Design Consultants Team and stakeholder are summarized below.

- West Falls Surveying (WFS) provided detailed mapping of the Machias downtown area using aerial survey drone technology rectified by and supplemented with detail ground measurements to determine building floor elevations.
- Ransom Consulting (Ransom) completed a flood hazard synopsis that considered current conditions, historical events and future sea level rise modeling to generate probability predictions for future flooding with sea level rise. This work is described in a report that is in *APPENDIX B-Present and Future Flood Risk.*
- The BDC team completed an inventory of buildings and properties in the downtown area in order to evaluate the impacts associated from a variety of flood inundation events that ranged from BFE+0-ft to BFE+6-ft.
- Staff and students from the University of Maine at Machias GIS Department completed a damage assessment modeling for the same series of flood inundation scenarios based on the building inventory, infrastructure and resources impacted by the flooding. This information provides an early cost-benefit indicator for the flood protection system concept design.
- The Washington County Council of Governments provided project management. Stakeholder selection and communication and collected oral history narratives referencing conditions in the Downtown area. Several Public Meetings were scheduled and well attended.
- BDC developed a concept design for a seawall system to protect the Downtown area based on the research, fieldwork and stakeholder input to date. The design is illustrated in drawings that are provided in Appendix E of this report.
- BDC prepared an estimate of construction cost based on the concept design presented in Appendix E. Refer to *Appendix D – Seawall System Program Costs*
- To move the project forward, BDC worked with the Town of Machias, Washington Council of Governments and the Maine Emergency Management Agency to define a Pre-Disaster Mitigation Advance Assistance Program for additional fieldwork and design necessary to move the project forward. Program tasks, costs and timeline are provided in *Section 6-Next Steps to move the Project forward.*

Figure 2 –Historical Development on Machias River looking downstream. Downtown Area is on left of River

Figure 3 –2018 picture looking upstream with remnants of cribwork that supported former docks.

1.c. The need for Flood Protection to the Downtown Area`

Based on the work completed for this study, a seawall system is needed to protect the Machias Downtown Area from flooding and associated property damage.

The Machias Downtown Area is primarily comprised of commercial development and includes the Waste Water Treatment Plant that is considered critical infrastructure. Highway Route 1 runs through this area and is considered the primary regional artery for north-south traffic.

The cost and property impact for single storm events at several flood inundation levels were estimated by staff and students from the University of Maine at Machias GIS Service Center. Inventory information for each property and plans that illustrate the extent of flooding for each inundation event are provided in *APPENDIX C- Flood Impacts to Machias Downtown Property*. It is not surprising that the number of properties impacted, and the cost associated with each storm event increases exponentially as the flood inundation level increases. What is also apparent is the acute reduction in primary road network access to the area that directly impacts fire, rescue and emergency response. Not only will a seawall protection system make the area safer by reducing the risk of flooding, but it will also reduce costs to property owners by effectively eliminating flood damage. With the installation of a Seawall System, the mapped SFHA areas are effectively removed from the FEMA FIRM with a Zone X designation.

Flood scenarios are summarized in the Table 1 below and illustrated in Figures 2 to 6 that follow.

Flood Event/Elevation	Total Economic Impact	No of Buildings Inundated	Route 1 Status	Notes
Base Flood	$ 713,297	1	Passable	Court Street Flooded
Base Flood Plus 2-ft	$ 7,918,338	12	Flooded for Length of Dyke	Many Buidings surrounded by water
Base Flood Plus 4-ft	$ 16,889,819	22 including WWTP		Significant Risk to Shellfish Habitat
Base Flood Plus 6-ft	$ 23,699,916	23 including WWTP		

Table 1 – Building Inundation and Estimated Costs per Flood Event

The Downtown Area topography was mapped using drone technology that resulted in a very detailed survey that allowed for a more accurate determination of the Base Flood boundary and corresponding SFHA areas than currently shown on the 2017 FEMA FIRM (larger light blue area in . Figure 2 below.

APPENDIX D –SUMMARY LIST OF EMERGENCY MANAGEMENT SUB-GROUP DISCUSSIONS

The Emergency Management subgroup determined a comprehensive list of actions, some small and discrete, and some larger and complex, that were further sorted into the two overarching strategies for continued discussion. Members anticipate working with the entire Community Resilience Work Group, along with other bodies of the Climate Council and key stakeholders to further detail and define these strategies so they are actionable, meaningful and feasible for implementation in 2021 and beyond. Primarily, these adaptation strategies further support the strategy to develop and implement a non-disaster related "State Infrastructure Climate Adaptation Fund". For the fund to be effective, additional focus on creating improved data for risk assessment to establish the underlying mechanism for improved infrastructure project considerations and design is needed. So, the intent of this compilation list of strategies is to provide localities with improved knowledge of their at-risk infrastructure so they can prioritize those projects with substantive quantitative and qualitative data to use in grant and loan proposals for improvements. Entities would also be in a better position to inform legislative and congressional needs for how to best allocate resources.

In many cases these already have strong synergy with strategies recommended by other bodies of the Climate Council. An initial list of overlapping issues and related strategies are:

- Coastal Community Resilience (laws, rules/regulations, planning)
- Getting out of Harm's Way (building design, land use, equity, investments, emergency response)
- Energy and Sustainability (grid infrastructure and resilient technology practices)
- Nature-based Solutions (carbon sequestration, runoff and pollution, floodplain protections)
- Building Codes
- Climate change education

Some of the work outlined could be accomplished through greater use of existing activities. Some work would require new research, information/data gathering, and/or coordination using either existing networks or through deployment of new technology and resources. Development of needed data may be absorbed into current workforce but could also add new jobs depending scope of investment. At minimum many or all the actions would be beneficial to incorporating emergency management, adaptation and preparedness principles into project prioritization and design of infrastructure that could result in building or re-building in a more resilient way for longer-term sustainability such as for less overall disruption to economy.

The timeline for these strategies will range greatly; however, it is anticipated that much of the groundwork is in place and so a considerable amount of work can be leveraged and begun in the short-term (2022) with implementation and ability to realize outcomes in the mid-term and beyond (2022-2100). In most cases they could be accomplished, at least to get underway, utilizing existing authorities.

	Short-term (2022)	Mid-term (2030)	Long-term (2050)	2070 -2100
To implement	X	X		
To realize outcomes		X	X	X

Strategy Compilation List

The comprehensive list of strategies is focused in two primary areas. These support overarching strategy to develop a State Infrastructure Climate Adaptation Fund.

1. **Develop a non-disaster related "State Infrastructure Climate Adaptation Fund"**

2. **Resilient Infrastructure: Improving Local Vulnerability Risk Assessment and Design Implementation Practices** – to develop the knowledge needed to accurately access risk to built-infrastructure.

   Investment in Risk Assessment Data & Resources

   i. Invest in further coastal and riverine gauges for a better analysis and early detection purposes
   ii. Perform a state-wide comprehensive Vulnerability Assessment of At-Risk Infrastructure through expanded use of flood inundation mapping
      - Invest in obtaining parcel level data
   iii. Continued risk assessment for lifeline sectors to populate infrastructure improvement project pipeline
      - Assess risks to sites and transport of chemicals in priority areas
      - Obtain additional and more complete knowledge of the locations of chemical storages
      - Provide technical support for local vulnerability assessments of at-risk infrastructure through expanded use of flood inundation mapping - see Community Resilience Planning Technical Assistance Strategy.

   Design Practices

   iv. Expand deployment of distributed grid technologies (specific focus on renewable resources to link with achieving state GHG reduction goals)
   v. Emergency Management subgroup with other Maine Climate Council members across working groups should develop a guidance document addressing policy options for development practices
   vi. Facilitate DEP and LUPC adoption of MaineDOT culvert sizing guidance as regulatory standard

3. **Breaking the Disaster Recovery Cycle** – to engage multiple partners on implementing best practices for disaster risk management that incorporates adaptation concepts.
   i. Increase engagement with community officials to raise emergency management and adaptation/resilience as a priority.
      - Land Use and Land Use Development
      - Case Studies

	Data/Resources
Sector	ALL SECTORS
Strategy	**1. Invest in further coastal and riverine gauges for a better analysis and early detection purposes.**
Rationale	In order to properly manage our water resources, we must have the means to measure them. Stream gages measure the quantity and variability of our surface water resources. When flooding occurs, stream gages are indispensable as tools for flood/drought forecasting and warning along rivers and streams.
Agencies	USGS, MEMA,DEP,DOT
$	Grant Funding (for initial gauge) supported by General Fund (annual maintenance)
Strategy Drafted?	No. Initiative supported by the "State Infrastructure Climate Adaptation Fund."
Strategy	**2. Perform a state-wide comprehensive Vulnerability Assessment of At-Risk Infrastructure through expanded use of flood inundation mapping.**
Sector	*TRANSPORTATION (focus area)*
Rationale	The idea behind using this hydrologic-based model is that several different maps are developed showing different flood events, and therefore can be used to determine management. This is a uniquely different approach than models based on global circulation models. And, it is based on data that we have – LiDAR, temp, precipitation, etc. and gives us maps to show flood inundation depths and geographic extent without needing to focus to heavily on the confidence levels that climate models forecast given different greenhouse gas concentrations effecting the climate system. Moreover, this is important for critical locations, downtowns, etc. It may not be cost effective everywhere but could prioritize key areas where critical infrastructure that is to be prioritized exists – on ½ mile or couple of mile reaches on a river. Fort Kent is the only place in Maine where we currently are doing this in Maine. Model is built, and now it can be calibrated to different flood events. Model is typically paid for by town or county. Also, can be used towards CRS credits. Could potential start in on this for 2020 work, and then highlight what is needed to work plan for Community Resilience Work Group in 2021.
Agencies	MEMA, MEGIS, MEDOT, DEP, CONTRACTOR
$	Grant Funding supported. Possibility of using Community Development Block Grants. FEMA has paid for some in the past – ex. by adding on marginal cost to an update to the FIRM. E.g. $20K instead of $250 as a standalone project.
Strategy Drafted?	No. Initiative supported by the "State Infrastructure Climate Adaptation Fund", "Comprehensive Review of Maine Laws to Achieve Resilience in the Face of Climate Change", and "Adapt Maine's Infrastructure Critical to State" strategies.
Sector	ALL SECTORS
Strategy	**3. Continued risk assessment for lifeline sectors to populate infrastructure improvement project pipeline**
Sector	*ALL SECTORS – CHEMICAL (focus area)*
Strategy	**3A. Assess risks to sites and transport of chemicals in priority areas.**
Rationale	Given available resources, known higher risk chemicals, sectors (industries/businesses), and areas (geographic or sector specific) could be prioritized (types/mounts of chemicals stored and risks to public health, etc.) for risk assessment.
Agencies	TBD - Multiple based on scope of end products included
$	NA
Strategy Drafted?	No. Initiative supported by "Adapt Maine's Infrastructure Critical to State" strategy.
Strategy	**3B. Obtain additional and more complete knowledge of the locations of chemical storages**
Rationale	Data is obtained from facilities/businesses that are required to report and, in some cases, only above reporting thresholds for certain chemicals. Improvements are needed to obtain data and in format (e.g. for use in GIS) that can be mapped for risk assessment.
Agencies	TBD - Multiple based on scope of end products included
$	NA
Strategy Drafted?	No. Further discussion needed.

Sector	*ALL SECTOR - COMMERCIAL FACILITIES (focus area)*
Strategy	**3Ci. Provide technical support for local vulnerability assessments of at-risk infrastructure through expanded use of flood inundation mapping**
Rationale	Some localities do not understand their current and future vulnerabilities, nor do they have the capacity to develop a resilience response. Others have a better understanding of their vulnerabilities yet lack the capacity to secure funding or manage their response.
Agencies	All
$	NA
Strategy Drafted?	No. Initiative supported by "Comprehensive Review of Maine's Laws to Achieve Resilience in the Face of Climate Change" and "Improve Delivery System of Technical Assistance on Resilience to Municipalities" strategies.
Sector	*ALL SECTOR - GOVERNMENT FACILITIES (focus area)*
Strategy	**3Cii. Provide technical support for local vulnerability assessments of at-risk infrastructure through expanded use of flood inundation mapping**
Rationale	Some localities do not understand their current and future vulnerabilities, nor do they have the capacity to develop a resilience response. Others have a better understanding of their vulnerabilities yet lack the capacity to secure funding or manage their response.
Agencies	All
$	TBD
Strategy Drafted?	No. Initiative supported by "Comprehensive Review of Maine's Laws to Achieve Resilience in the Face of Climate Change" and "Improve Delivery System of Technical Assistance on Resilience to Municipalities" strategies.
	## Funding
Sector	ALL SECTORS
Sector	*ENERGY (focus area)*
Strategy	**4. Expand deployment of distributed grid technologies (specific focus on renewable resources to link with achieving state GHG reduction goals)**
Rationale	Reduce number of power outages, reduce likelihood of fuel oil spills (~1.5 per day in SOM)
Agencies	GEO, MEMA, PUC, LUPC, DEP
$	Example, PACE
Strategy Drafted?	No. Requires further discussion.
	## Regulation
Sector	ALL SECTORS
Strategy	**5. Develop a guidance document addressing policy options for development practices across working groups**
Rationale	Update and strengthen repair and replace language across "resilience". Needs to specify 'improvements' and 'standards. Should include the need for prioritizing of natural "green" over built "grey" infrastructure when possible. There is also a growing need to think about infrastructure in terms of where it needs to occur in the future in light of climate change – so should not just look at where current infrastructure is, but also to look at where future growth areas, incorporate into planning and focusing efforts to resilient design of infrastructure in that area. Could incorporate determination criteria for prioritizing projects (e.g. acute versus chronic hazard events and changes, criticality of asset, areas/infrastructure with repeat damages, frequency of damages, loss of life, displacement, economic impact, environmental impact, social impact, cultural impact)
Agencies	Interagency / Maine Climate Council stakeholder led effort
$	Coordination using in-kind time and likely grant or additional funding support to engage multiple stakeholders and to develop and publish materials/products
Strategy Drafted?	No. Requires further discussion.

Sector	TRANSPORTATION
Strategy	**6. Facilitate DEP and LUPC adoption of MaineDOT culvert sizing guidance as regulatory standard**
Rationale	Will improve consistency between efforts and organizations designing and maintaining assets; sets higher standards
Agencies	DEP, MEDOT, LUPC
$	As defined by Transportation Working Group
Strategy Drafted?	No. Initiative supported by "Adapt Maine's Infrastructure Critical to State" strategy put forward by Transportation Working Group.
	Engagement, Outreach, and Coordination
Sector	ALL SECTORS
Strategy	**Increase engagement with community officials to raise emergency management and adaptation/resilience as a priority**
Rationale	Planning is most effective at the local level, however municipalities in Maine have historically lacked the resources (financial and personnel) to participate in climate adaptation planning. State supplied support would allow interested communities to better plan for sea level rise and changing climate conditions. Examples, could include: - Promoting involvement in Community Rating System (State regulation in place currently meets basic level for communities to enter), links with Community Resilience Work Group Technical Assistance Strategy and creation of CRS assistance positions (component of job description) - At federal level there has been a push to have building codes adopted. Maine doesn't currently qualify for additional emergency aid. Bring local, county and state governments to discuss and elevate appropriate response at higher jurisdictional levels. Overlap with Buildings, Infrastructure, and Housing Working Group. - Teaching on what is the best way to go forward – need for example pilot projects so people can see it and experience it, know it, trust it. Need to fund pilot projects and get message out there.
Agencies	All
$	As defined by Community Resilience Planning sub-group
Strategy Drafted?	No. Initiative supported by "Improve Delivery System of Technical Assistance on Resilience to Municipalities" strategy put forward by Community Resilience Planning sub-group.