

# **EPA's Augmented Alternatives Analysis (AAA) Process for Facility Upgrade Selection: Saco, Maine Water Resource Recovery Project**



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# **Saco, Maine Water Resource Recovery Project**

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**New England Water Environment Association (NEWEA)**



# Project History

2019

- Climate Adaptation Plan
- Significant Facility Flooding

2020

- Maine Climate Council
- EPA Partnership for AAA analysis
- Coastal Resiliency Committee

2021

- Long Term Facility Plan
- EPA Case Study
- Passed Local Bond to Fund Project

2022

- 30% Engineering Design Ongoing
- Applying for Grant Funding
- Continued Public Outreach



# Cost of Doing Nothing **\$43 million+**

Maine Climate Council's Cost of Doing Nothing Analysis estimates that if we do nothing, we could be faced with an expense of up to **\$43 million+**

# Storm & Flooding Events

Video of 2019 Flooding Event



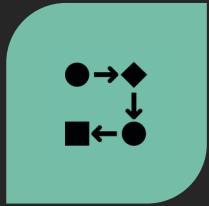
# Community Understanding of Project Need



COMMUNICATION



COLLABORATION



PROCESS



TRANSPARENCY



# Stakeholder Engagement



How do we engage our users in long-term investment decisions?



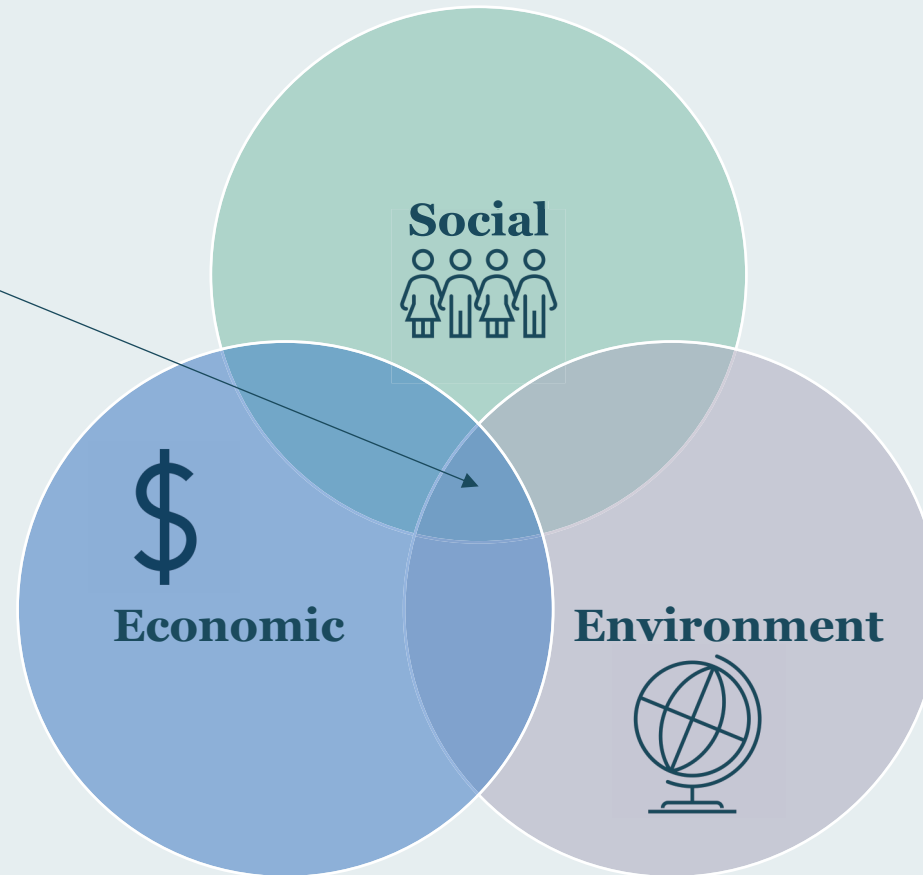
How do we create a set of shared community priorities?



How do we integrate those community priorities into our project goals?

# EPA Partnership & Coastal Resiliency Committee

Sustainable decisions happen at the intersection of this balance.







## **Improve System Resiliency**

Ensure water resource recovery facility is resilient to effects of increasing extreme weather events and flooding that cause operational disruptions, loss of plant access and functionality.



## **Ensure Financial Sustainability**

Maintain balance of funding needs by making smart investments that consider the long-term health of Saco's water resource recovery infrastructure.



## **Improve Ecological and Environmental Health**

Plan, maintain and operate Saco's water resource recovery infrastructure using sustainable methods that enhance ecological and environmental health.



## **Increase Public Awareness and Appreciation of the Value of Water Services**

Communicate the value of Saco's underground assets and water resource recovery facility as it relates to public health, the ecosystem, and community development through collaboration with Saco schools and engagement within the community.



## **Bolster Community Livability**

Encourage enhanced public access and greenspace use along river frontage near water resource recovery facility and plan for long-term use of the facility to support local community and economic development.

# EPA's AAA Evaluation Steps





# Alternative Zero: Do Nothing

- **No changes** or updates to the WRRF other than usual maintenance
- Estimated **damage costs of up to \$43 million**
- Existing and potential **flooding**
- **Unable to meet** potential future regulatory requirements
- **Unable to meet** future growth of community
- **Unable to provide** any enhancements to the Riverwalk or surrounding area

# Alternative One: Wet Weather Resiliency



- **Wet weather treatment expanded up to 11 MGD**
- Remove existing garage
- Install **500,000 gallon CSO tank** in former garage location
- **Increase height of site access above flood elevations** for critical areas
- **New headworks** and effluent pump station
- **Upgraded biosolids equipment**

# Alternative Two: Full Plant Upgrade – Aerobic Granular Sludge



- Incorporate **Innovative Aerobic Granular Sludge Technology**
- **Increase treatment capacity to 11 MGD** and accommodate growth within the community
- **Nutrient removal**
- **Restoration of land** for open green space
- Could Accommodate **solar arrays**, with **enhanced Riverwalk** space and **public amenities**
- **Raise Front Street**
- **Relocate** critical systems to **protect against flooding**
- Remove older buildings and structures susceptible to flooding and **construct newer, more resilient buildings and structures**

## Alternative Three: Full Plant Upgrade – Biological Aerated Filter



- Incorporate **Upflow biological aerated filter (BAF)** technology
- **Increase wet weather treatment capacity to 16 MGD**
- **Nutrient removal**
- **Restoration of land for open green space**
- Could accommodate **solar arrays**, with **enhanced Riverwalk space** and **public amenities**
- **Raise Front Street**
- **Relocate** critical systems to **protect against flooding**
- Remove older buildings and structures susceptible to flooding and **construct newer, more resilient buildings and structures**

# Project Goals Built on Community Priorities



## Goal 1: Improve System Resiliency to Enhance Environmental Health

- **Objective 1.1:** Protect facility from the effects of flooding, changing climate, and extreme weather events
  - **Criteria 1.1:** Reduce potential for future facility flooding and treatment capacity impacts
    - **Metric 1.1:** Elevations of site alternatives above 100-year flood elevation to be resilient against tidally influenced flooding

-5	-4	-3	-2	-1	0	1	2	3	4	5
Ability to protect for 0' above 100-year flood elevation		Ability to protect for 1' above 100-year flood elevation		Ability to protect for 2' above 100-year flood elevation		Ability to protect for additional 3' above 100-year flood elevation		Ability to protect for additional 4' above 100-year flood elevation		Ability to protect for additional 5' above 100-year flood elevation



# Project Goals Built on Community Priorities



## Goal 2: Ensure Financial Sustainability

➤ **Objective 2.2:** Maximize Grant Funding Opportunities

➤ **Criteria 2.2:** Actively explore and pursue appropriate grant funding opportunities

➤ **Metric 2.2:** Likelihood of success in obtaining grant and low interest project funding

-5	-4	-3	-2	-1	0	1	2	3	4	5
					No likelihood	Low likelihood		Medium likelihood		High likelihood

You can visit the Coastal Resiliency Committee's [webpage](#) for additional details.

# Scoring Site Alternatives

#	Metrics	Goal Weight	Alternative 1	Alternative 2	Alternative 3
1.1	Elevation above 100-year flood elevation to be resilient against tidally influenced flooding	10	1	1	3
1.2	Concentration of nitrogen in effluent of facility	10	3	5	5
1.3	Percent reduction in average annual CSO volume	10	3	5	4
2.1	Retain affordable, annual sewer user rates at 2% or less of median household income	8.8	5	5	3
2.2	Likelihood of success in obtaining grant & low interest project funding	8.8	3	3	3
2.3	Ability to phase upgrade(s) to control financial & timing aspects of construction	8.8	5	1	1

# Scoring Site Alternatives Cont'd.

#	Metrics	Goal Weight	Alternative 1	Alternative 2	Alternative 3
3.1	Percentage of existing site available for expansion for future growth & regulatory requirements	8.6	-1	1	5
3.2	Percentage increase in treatment capacity the facility can handle to accommodate growth	8.6	1	3	5
4.1	Increase in public amenities that offer educational opportunities for value of water services	7	1	1	3
4.2	Percentage of greenspace acreage around plant, particularly near Riverwalk	7	-1	3	3
Un-weighted Alternative Scores			20	28	35
<b>Weighted Alternative Scores</b>			<b>184.4</b>	<b>251.6</b>	<b>309.6</b>

Alternative Scores reported here include results from previous slide.

## Capital Cost Summary

Capital Costs include:

- 30% Contingency
- 10% General Condition & Overhead
- 5% Contractor Profit
- 1.5% Bonds, Insurance, Permits & Inspections
- Infrastructure grants not utilized
- Land acquisition costs excluded

Alternative	Capital Cost
Alt Zero	<b>\$43.0 Million</b>
Alt One	<b>\$36.7 Million</b>
Alt Two	<b>\$54.4 Million</b>
Alt Three	<b>\$70.8 Million</b>

# Benefit-Cost Ratio Results

	<b>Alt. 1 Score</b>	<b>Alt. 2 Score</b>	<b>Alt. 3 Score</b>
<b>Weighted Alternative Scores</b>	184.4	251.6	309.6
<b>Annualized Project Capital and O&amp;M Cost (\$)</b>	\$2.12	\$2.87	\$3.70
<b>Benefit-Cost Ratio</b>	<b>87.0</b>	<b>87.7</b>	<b>83.7</b>

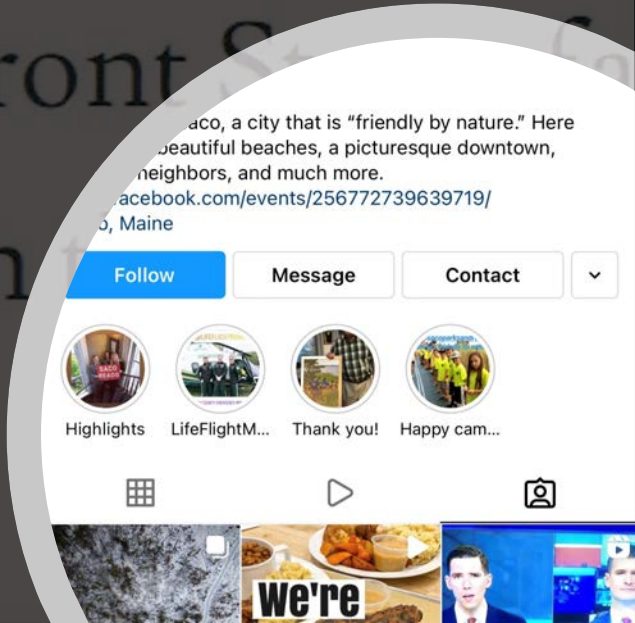
# EPA Case Study

## Making the Right Choices for Your Utility: Using Community Priorities and Sustainability Criteria for Water Infrastructure Decision-Making





# Public Awareness Highlights



# Where is Saco Now?

Saco Residents  
**Approved**  
November 2021  
Bond Question

Saco completing  
**30%**  
**engineering**  
design

Saco pursuing  
**state & federal**  
**grants & funding**  
opportunities



# Thank You & Credits

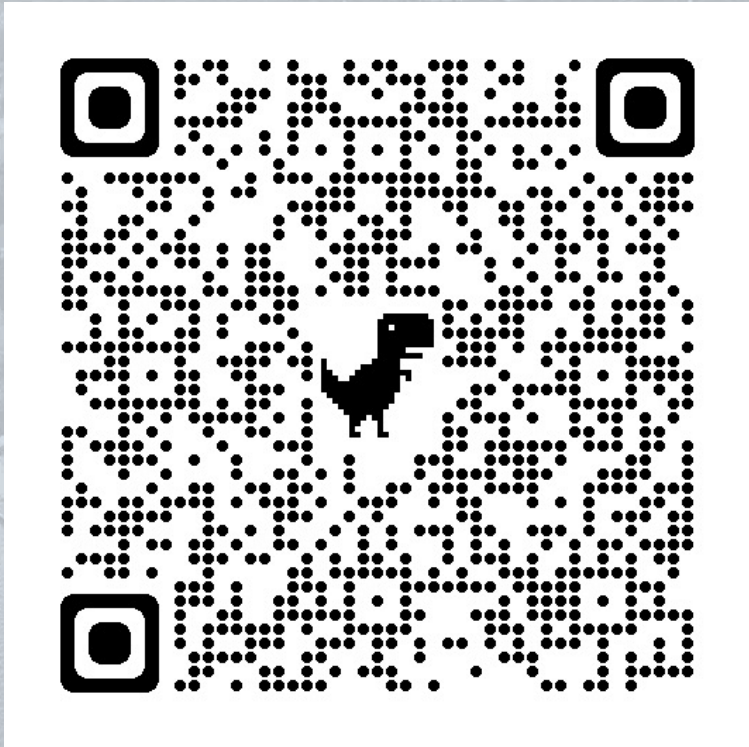
## Thank You:

- US Environmental Protection Agency (EPA)
- Ross Strategic & Ed McCormick (EPA's consultants)
- Saco's City Council, Coastal Resiliency Ad-hoc Committee & Communications Department

## Credits & References:

- Andrew Dickinson, Saco's Communications Coordinator
- US EPA logo (slide 2)
- Maine Climate Council image (slide 2)
- US EPA, Making the Right Choice for Your Utility, 2015 (slide 9 & 22)
- Saco-Old Orchard Beach Courier, 09.02.19 (slide 21)
- Saco's Social Media & YouTube account images (slide 21)

# Contact Information



We're happy to answer any questions.

If you think of them afterward, here's our contact:

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