



# Bourne, MA: Climate Resilience Investment System & Implementation Plan

Produced by the Southeast New  
England Program (SNEP)  
Network

*December 2021*

The SNEP Network is administered by:  
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This project has been funded, in whole or in part, by the U.S. Environmental Protection Agency's Southeast New England Program under Assistance Agreement SE-00A00655-0. The contents of the document do not necessarily reflect the views and policies of the U.S. Environmental Protection Agency, nor does the U.S. EPA endorse trade names or recommend the use of any products, services or enterprises mentioned in this document

**Background.** The following report was produced by [Throwe Environmental, LLC](#), on behalf of the Southeast New England Program (SNEP) Technical Assistance Network (“the SNEP Network”). The [SNEP Network](#) is comprised of over 15 different partner organizations from across the region. It offers a full complement of technical and financial services to communities in support of leadership development and peer-to-peer learning. The goal of SNEP is to help communities understand the stormwater management challenges they face in light of a changing climate and how to overcome implementation barriers through capacity building and innovative financing systems.

In March 2020, the SNEP Network released a “Call for Participants” to offer direct technical, financial, and training assistance to municipalities, tribes, and non-profits in the SNEP watershed. Assistance was offered through the SNEP Network’s existing capacity and members of its pre-approved consultant pool. Through a competitive process, the Town of Bourne, Massachusetts (“Bourne” or “the Town”) was one of the initial twelve applications approved to receive technical assistance. The SNEP Network’s project with Bourne officially launched in July 2020 and was implemented in two phases. Phase 1 was completed in January 2021. It provided an assessment of the Town’s resilience programs, focusing specifically on the impacts that climate change will have on stormwater, flooding, and drainage management. [The final Phase 1 project report](#) included a suite of recommendations focused on the necessary steps and actions for establishing and expanding a sustainable climate resilience planning-to-action strategy.

Phase 2, which began in Spring 2021 and was completed in October 2021, was designed to provide the Town of Bourne with a more thorough understanding of the actions and resources that will be necessary to achieve the Town’s resilience vision in the future. The SNEP Project Team and Town leaders worked collaboratively to prepare two products. The team first created the [Planning to Action: Climate Toolkit \(PACT\)](#) to provide a standardized approach and process for identifying assets, assessing climate risk, and prioritizing mitigation actions and projects. Using the Toolkit as a framework, the team then drafted a suite of next steps and recommendations to provide more detail regarding the resources and next steps needed to establish a comprehensive resilience financing system.

This report serves as a culmination of the SNEP Project Team’s engagement in the Town of Bourne. Part 1 of this report summarizes the capacity assessment and the corresponding recommendations prepared in Phase 1. It also describes the components of PACT. Part 2 provides the expanded recommendations produced in Phase 2, as well as next steps.

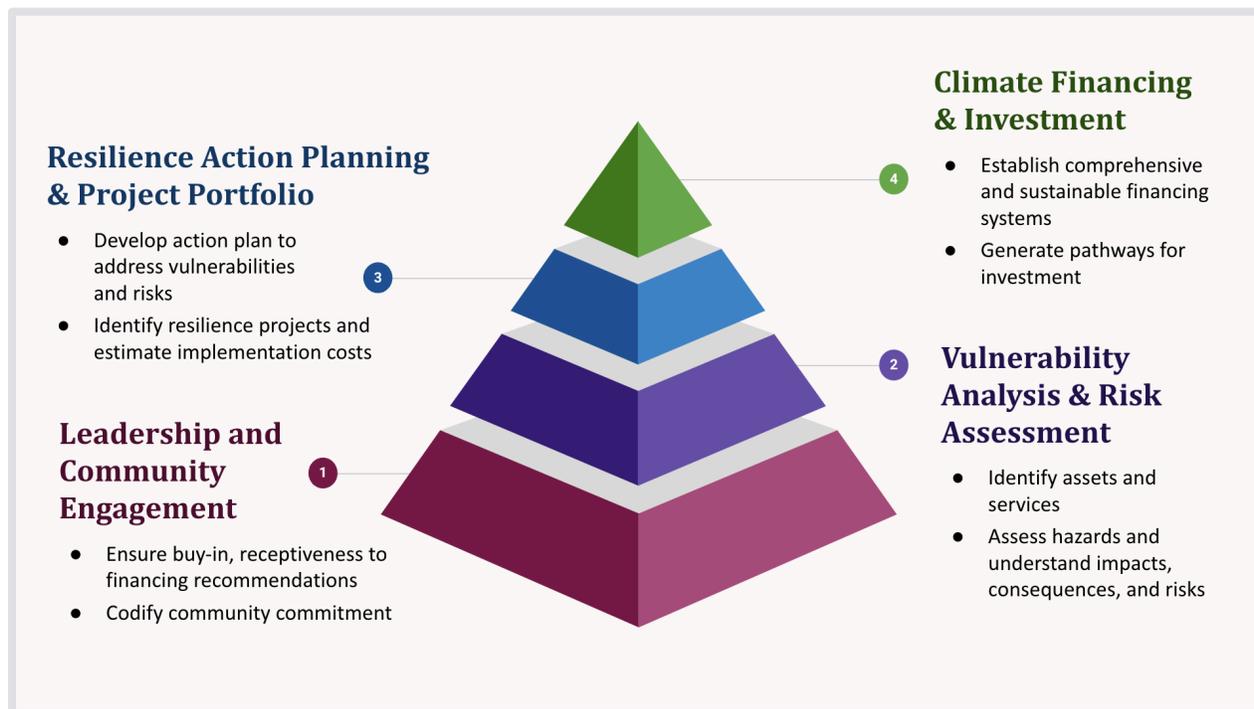
## **PART 1: BOURNE CLIMATE RESILIENCE ACTION STRATEGY.**

The purpose of Phase 1 of the Climate Resilience Financing Assessment Project was to provide local leaders with the framework for a financing plan of action to address resilience infrastructure needs over time. The SNEP Project Team, led by the team at Throwe Environmental, worked in direct partnership with Bourne, MA leaders to address climate hazards and to identify opportunities to improve community resilience to anticipated climate impacts. The team conducted a detailed program assessment to identify the strengths and weaknesses of the Town’s existing resilience capacity and the conditions necessary for effectively financing critical infrastructure needs.

The SNEP Project Team used an assessment process based on the core components of the Coastal Resilience Action Strategy. It was designed to enable Bourne leaders to identify the necessary

conditions to effectively finance critical infrastructure needs and to evaluate the Town’s readiness to address those needs. In addition, the assessment was designed to be a dynamic system and process, thereby continually addressing how to enable conditions necessary to attract and incentive public and private investment. These enabling conditions are as varied and unique as the potential projects themselves. However, four key processes are common to virtually all resilience planning and financing systems. These are (1) leadership and community development; (2) climate risk and vulnerability assessments; (3) resilience planning and project portfolio development; and (4) funding, financing, and investment. These processes serve as the foundation for PACT, the Resilience Financing Framework (*see Fig. 1*), and the team’s assessment and recommendations to the Town of Bourne.

*Figure 1: Resilience Financing Framework (Source: Throe Environmental)*



**Leadership and Community Development.** A clear vision for the future is a foundational component of the resilience financing process. Resilience planning should be community-led and comprehensive, while also serving as a strategy for future implementation and financing activities. To that end, strong community leadership is essential to attract and mobilize investments in resilience.

The first step in the resilience assessment process is to understand what resilience is, what the threats to the community are, and the appropriateness of plans for becoming more resilient in the future. This requires defining resilience in a way that is community-specific and reflects the anticipated risks, future goals, and expected outcomes of its citizens. This process focuses on three key issues: what is needed, what is valued, and what are the necessary systems.

***Soak Up the Rain Webinar.*** The SNEP Project Team provided Bourne with a large-scale leadership engagement opportunity through the EPA Region 1 “Soak up the Rain” webinar program. This monthly webinar series highlights innovative approaches to addressing stormwater quality and quantity across New England, bringing these case studies to a national audience. In conjunction with EPA program staff, Throve Environmental developed an August 2021 webinar, entitled “Addressing Stormwater Flooding through Resilience Action Strategies and Sustainable Financing,” that featured two SNEP Network technical assistance projects in Portsmouth, RI, and Bourne, MA. Former Bourne Town Administrator Anthony Schiavi and Town Engineering Technician Timothy Lydon were featured as community panelists representing Bourne. The webinar highlighted the innovative approach of the Bourne/SNEP Network project, as well as the strong record of community and leadership engagement in the Town. Once publicly available, the webinar recording will be linked [here](#).

***Summary of Findings: Leadership and Community Development.*** The Town’s recently completed Hazard Mitigation Plan and Local Comprehensive Plan are important for advancing the resilience planning process. However, neither plan directly defines resilience in a uniform and community-specific way. The community has noted that the Town would welcome a clear definition for resilience that reflects its vision, and the Select Board has expressed openness to developing one internally.

**Climate Risk and Vulnerability Analysis.** Key to the resilience planning process is identifying and assessing a community’s future climate risks. A climate hazard becomes a climate risk when inhabitants and/or assets are exposed to and vulnerable to a particular hazard.

The Town can improve its resilience and its adaptive capacity to climate-related shocks and stresses by implementing climate adaptation actions. However, it is first necessary to develop a sound understanding of context-specific climate risks before developing such actions.

- **Climate change impacts.** In coastal communities, these changes will likely include increased coastal flooding; sea-level rise; intensified storms; more frequent drought and heat waves; changes in the distribution of disease vectors; and increased displacement and migration.<sup>1</sup>
- **Other environmental crises.** The interactions between climate change and existing environmental needs will only complicate the resilience financing challenges in coastal communities. For example, climate change and stormwater management in Bourne will have tremendous impacts on each other, as well as the community-at-large, in the future. This means the two issues must be addressed collectively.<sup>2</sup>
- **Economic changes.** While threats to physical systems must be considered in the context of climate resilience, so too must the threats to economic systems. For example, the rise or collapse of key industries; changes in financial or regulatory systems; and changes in wealth distribution can have tremendous impacts on local economies. While these impacts will often occur outside the framework of climate change, the reality of a changing climate will almost certainly be an influencing factor.<sup>3</sup>

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<sup>1</sup> Ibid

<sup>2</sup> Ibid

<sup>3</sup> Ibid

- **Social risks.** Complex social challenges will also be compounded by climate change. Climate change will further disadvantage marginalized communities. To truly address resilience, communities must consider how they will ensure their most at-risk populations are protected and strengthened.

**Summary of Findings: Climate Risk and Vulnerability Analysis.** Bourne’s thorough understanding of its community hazards (erosion and shoreline change, flooding, extreme storms, high winds, severe winter weather, and sea-level rise) are well-documented in its 2018 Hazard Mitigation Plan update. Town officials have focused additional energy and resources on evaluating the impacts of flood risks and sea-level rise on Bourne’s important historic and cultural resources. More information is needed on specific threats that could worsen in the face of a changing climate and on the full spectrum of specific assets that are vulnerable to climate hazards. The SNEP Project Team determined that the Town would benefit from a standardized method to calculate the extent of an asset’s vulnerability, as well as its magnitude and probability of loss. PACT serves as a key resource that Bourne, and other communities, can utilize to conduct critical vulnerability and risk exercises.

**Climate Resilience Planning and Project Portfolio.** Before a financing strategy can be developed, it’s critical to understand anticipated infrastructure needs. While this planning process should be unique to each community, it should include the following key considerations:

- **Creating diversity and redundancy.** By nature, communities with more diversity in their economic base and decision-making and governance processes will be more resilient to disruptions to those systems. Unplanned redundancies can be inefficient and costly. However, planned redundancies ensure that the failure of any single component does not result in a system-wide crash.
- **Promoting equity and inclusiveness.** The planning process is typically associated with guiding land use and infrastructure development needs and issues. While this is important, especially in the context of financing climate change resilience, long-term resilience requires an equitable, inclusive planning process. Planners must be acutely aware of spreading anticipated risks and opportunities equally.
- **Proactively planning for innovation.** Resilient communities must develop new and innovative responses to risk and changing conditions. The capacity to innovate derives from many of the qualities just described. Diverse systems generate more opportunities for innovation than uniform ones. In social systems, innovation often comes from the margins. An inclusive society is better able to engage the agency and creativity of all its citizens.<sup>4</sup>

**Summary of Findings: Climate Resilience Planning and Project Portfolio.** The financing process and implementation system is predicated on a robust resilience plan; therefore, the planning process should be an immediate and ongoing priority. Developing an actionable, detailed, and comprehensive resilience plan should be a priority for Town leaders. Bourne is working to establish the necessary components, processes, and people to organize and prioritize action steps, especially those in the short-term. Current Town leadership aims to be proactive in its approach and seeks to emphasize efficiency in carrying out these action steps. While challenges

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<sup>4</sup> Bounce Forward report produced by the Kresge Foundation and Island Press. Citation: *Bounce Forward: Urban Resilience in an Era of Climate Change*. A Strategy Paper from Island Press and Kresge Foundation

related to prioritizing projects remain, the current Town leadership is in a good position to address these challenges. Assistance with prioritization methods will further enhance staff capacity.

**Creating A Resilient Financing System.** The planning and visioning processes that take place in the first three steps of the Resilience Financing Framework provide a foundation for developing and implementing a financing system that directs capital and investment in the most efficient, effective, and sustainable manner possible. The complex challenges ahead for financing large-scale infrastructure efforts are clear, especially in coastal communities. Therefore, communities need to develop innovative, scalable resilience financing institutions and systems that reflect their own needs. Financing systems must be designed to aid local leaders to make some very difficult and nuanced policy decisions. For example:

- **Balancing cost and benefit.** Resilience infrastructure projects require balancing short-term costs and long-term gains. It is very difficult to transform avoided costs into cash flow. This can put significant pressure on local revenues.
- **Achieving fairness in the financing system.** Fairness regarding infrastructure financing assumes that the cost burden reflects the benefits received from a project. This is often difficult to achieve when public revenues are creating significant private benefits in very specific places.
- **Ensuring equity in the financing and implementation process.** Achieving equity in the financing system, though important, has the potential to complicate resilience efforts. The ability to pay is a persistent issue regarding infrastructure financing, and it is often at odds with achieving fairness.
- **Expanding cooperation.** Effectively addressing climate change will require cooperation within and outside of local governments. Financing systems must function within a complex system that includes intra-community collaboration among agencies (planning, budgeting, and finance, operations, legal) as well as inter-community engagement and implementation efforts (local-state-federal).

Because of the long-term nature of the climate resilience issue, there may be the temptation to defer seemingly large-scale actions to a later date. However, the most productive reforms in local finance occur in small increments over the long-term.<sup>5</sup> In other words, current leaders are not tasked with addressing the entirety of the local resilience challenge, but rather with establishing the systems and processes that can serve as the foundation for future leaders to build upon. Current leaders can begin taking action by addressing the following three areas that are fundamental to any resilience financing system: (1) institutional structure and capacity, (2) revenue streams and cash flow, and (3) financing mechanisms and cash flow management.

***Institutional Structures and Capacity.*** Public institutions are the organizing mechanisms within financing systems, ensuring that rules, regulations, and codes of conduct are enforced. They establish and manage the procurement processes and provide structure to advance innovation and ingenuity within the public financing sector. In short, institutions will create the enabling conditions that are necessary for resilience financing processes to function effectively.

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<sup>5</sup> Bland, Robert L. A budgeting guide for local government: third edition. 2013. Page 5.

There are a variety of ways that institutions can be structured and capitalized; though their purpose in the financing process is relatively universal:

- **Mobilize public and private capital.** The primary role of financing institutions is to ensure sufficient investment in resilience and civic infrastructure. This requires identifying and leveraging a variety of funding and revenue sources.
- **Incentivize investment in infrastructure.** Financing institutions apply and utilize a variety of mechanisms (e.g., bonds, loans, grants). Institutions must provide long-term financing primarily in the form of tax-free revenue and conduit bonds.
- **Accelerate infrastructure development and construction.** Finally, a dedicated financing institution should be enabled to make existing design, permitting, contracting, and construction processes more efficient and effective. This requires serving as an organizational or focal point of multiple public agencies, departments, and processes. The financing institution in many ways becomes an important organizing element of the policy development and project investment process.

**Revenue Streams and Cash Flow.** Revenues are paramount to the financing process. Ultimately, the scale of revenues needed to support resilience activities will require a more thorough understanding of the anticipated impacts, assets at risk, and necessary mitigation activities.

**Financing Mechanisms and Cash Flow Management.** Resilience financing institutions also have the ability to utilize innovative financing and investment processes. There are opportunities associated with three innovative processes: (1) value capture; (2) alternative bonds and debt financing tools; and (3) performance-based financing.

- **Value capture.** Value capture is a type of public financing that recovers some or all the value that public infrastructure generates for private landowners. The public sector is often responsible for the large financial investments and maintenance of infrastructure required to support urban development. The financing of such projects often leans heavily on government bodies themselves.
- **Alternative bonds and debt financing tools.** Debt financing is the key type of long-term borrowing that localities use to raise money for building and constructing long-lived infrastructure assets. About 90% of state and local capital spending is financed by debt, primarily through municipal bond markets. Bond financing will likely remain a significant and popular financing resource. However, local leaders are beginning to adopt alternative financing mechanisms to address infrastructure needs, especially as they relate to mitigating the impacts of climate change. These alternative financing mechanisms provide local governments with cost-effective and flexible ways to pay for infrastructure systems.<sup>6</sup>
- **Paying for performance and outcomes.** Finally, performance-based financing focuses on achieving desired outcomes, rather than the means for getting there. If

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<sup>6</sup> *Infrastructure Financing: A Guide for Local Government Managers*. A Policy Issue White Paper Prepared on behalf of the ICMA Governmental Affairs and Policy Committee, January 2017. Can Chen, Florida International University, and John R. Bartle, University of Nebraska at Omaha. Page 15.

infrastructure investments can be evaluated based on desired environmental, economic, or social outcomes, investors would be able to target funds to projects that achieve those outcomes at the lowest cost. This provides incentives to private firms to find the most cost-effective and highest-performing technologies and practices.

These three alternative and innovative financing mechanisms are representative of broader financing innovations occurring at the local level; as the impacts of climate change and the need for resilient infrastructure grows over time, so too will the need to adapt financing systems and processes.

***Summary of Findings: Creating a Resilience Financing System.*** While Bourne's current financing position is favorable, the impacts of climate change require an expansion of Town capacities over time. Bourne will need to expand its institutional capacity to suit the scale of its short- and long-term capital and civic infrastructure needs.

It is a very encouraging sign to see that the Town is beginning to dedicate particular revenue streams for the sole and specific purpose of supporting investments in resilience infrastructure. Until recently, this was not the case; the Town has generally funded resilience projects out of its General Fund. That said, the NextGrid solar project has created an opportunity for the Town to establish a dedicated and sustainable flow of revenues supporting resilience projects and programs. This project is innovative, scalable, and a signal to the community of the Town's long-term commitment to protecting its viability.

Bourne's history of strong financial management and budgeting serves the Town well as it pursues innovative resilience financing options moving forward. The Town's current rules, processes, and procedures have led the community to the point that it achieves budget surpluses in some years. The strong foundation described in this Phase 1 summary serves as the basis for the following recommendations from Phase 2.

## **PART 2: OPTIONS AND RECOMMENDATIONS FOR MOVING FORWARD**

The Town of Bourne has a foundation in place for developing and advancing a strategic resilience vision and plan moving into the future. The Town's financing processes have the capacity to address existing and short-term infrastructure, social, and environmental needs. However, the anticipated scale and complexity of addressing future climate change impacts will require the Town to make some significant changes and augmentations to its financing processes.

**Recommendation 1: Establish a Director of Resilience position within Town government.** An important first step in establishing a sustainable resilience program within the Town of Bourne is to establish a Resilience Director position. The position should report directly to the Town Administrator and should be structured to ensure the coordination and efficiency of resilience programs across the entire town government. The Resilience Director would work directly with other agency directors, thereby ensuring that infrastructure investments are meeting the collective goals and vision of the Town. The Director position will establish an organizational foundation for creating a more formal and expansive institutional structure in the future, should it be necessary.

**Recommendation 2: Create a clear vision and plan of action.** An important function of the Resilience Director will be to guide the community through the process of creating a clear resilience vision and plan of action for achieving that vision. This first plan of action will provide the

foundation for the Town's resilience programs and infrastructure implementation into the future. The resilience vision and plan will:

- Create a broad coalition of constituency groups and civic organizations dedicated to addressing climate change resilience and mitigation throughout the community.
- Identify the specific infrastructure projects that are critical for addressing climate change threats and achieving resilience goals and the estimated fiscal resources necessary for implementation.
- Create a framework for transforming the Town's economy to leverage the benefits and opportunities provided by investment in resilience infrastructure.

The effectiveness of the Town's resilience planning efforts will rely in large part on its success in mobilizing and incentivizing the citizens of Bourne to action. As a coastal community, Bourne is already directly experiencing the impacts of climate change, specifically regarding tidal flooding, sea-level rise, and major storm events. Town leaders and citizens are aware of many of the hazards, vulnerabilities, and risks that are likely to occur in the future. The Town's resilience vision must expand on this existing community awareness. This, in turn, requires clear leadership coupled with an actionable implementation plan.

The resilience plan should articulate the Town's response to long-term resilience by clearly stating the resilience goals and outcomes within each Town agency and program. Resilience represents one of those rare public priorities that will require virtually every agency and public employee to engage to at least some degree. Some agencies have a very direct connection to resilience—these include public safety and emergency preparedness; public works; planning; and environmental programs. Other agencies and programs have a less direct connection. However, the scale, complexity, and comprehensive nature of resilience planning and implementation will require an equally comprehensive response from the entire government system.

The Resilience Director will be catalytic to the entire resilience planning, implementation, and financing process. Specifically, the Director will create important connections between risk and vulnerability analysis, project portfolio development, and, perhaps most importantly, the financing and investment process. In short, establishing this position within the Bourne government will ensure program accountability and leadership, coordinated local government response to climate impacts, and effective community engagement and participation in the resilience planning and implementation process.

**Recommendation 3: Implement a thorough risk and vulnerability assessment.** The Town's long-term resilience plan must be predicated on the most up-to-date information and science associated with the anticipated climate hazards. The Municipal Vulnerability Preparedness (MVP) program provided Bourne with an effective baseline understanding of climate risks facing the community. A more thorough and granular assessment will be required to ensure effective and efficient long-term investments. The next step is to build on the results of the MVP by conducting a more refined assessment of anticipated climate impacts to the community. A robust climate risk and vulnerability assessment will provide Town leaders with a better understanding of the exposure, sensitivity, and resilience capacity of current systems to the impacts of climate change. This will in turn enable Town leaders to better understand these risks and identify the actions they can take now to be more prepared and resilient.

There is no standard method or framework for conducting a risk and vulnerability assessment. However, there are specific components of that assessment that are critical to the financing and implementation process. Specifically, the assessment should include four key elements:

1. An inventory and detailed summary of the climate hazards facing the community. This part of the assessment should build on the MVP process, thereby reassessing the hazards that are of the greatest concern to the community as well as the communities and neighborhoods that are likely to be adversely impacted.
2. An inventory of the assets and resources within the Town that are at risk, including publicly owned assets such as bridges, roads, public building, and stormwater conveyance systems; privately owned assets such as residential and commercial buildings, private roads, and power and energy delivery systems; and natural assets and resources, including wetlands, beaches, forests.
3. An evaluation of each asset's vulnerability and sensitivity to the climate hazards as well as the adaptive capacity of the asset to recover from the climate impacts.
4. An evaluation of the risk of adverse impacts to the assets, including the probability that an impact may occur and the potential magnitude of the impact should it occur.

The combination of these four elements will enable Bourne's community leaders to prioritize climate resilience action and investments.

**Recommendation 4: Establish a detailed project portfolio.** The risk and vulnerability assessment, coupled with the asset inventory, will provide the structure for a detailed mitigation strategy and project portfolio. The portfolio will enable Town leaders to codify a resilience plan of action. The action plan should be organized around three key elements: (1) project and programs typology, (2) the anticipated timing of impacts and associated project implementation, and (3) the expected cost of taking action.

**1. Resilience project typology.** Local resilience projects can and will take a myriad of forms. However, from a management perspective, they can be categorized based on three basic typologies.

1. **Baseline** projects and programs provide structure to the Town's resilience system, including staffing support (specifically the Resilience Director), necessary studies and assessments (such as the risk and vulnerability analysis), as well as catalytic project implementation.
2. **Enterprise** or outcome-based projects and programs are focused on many of the essential services that the Bourne government provides to its residents and businesses. Climate resilience will overlap a variety of enterprise programs and outcome-based needs in the community, including wastewater/watershed management, drinking water management and delivery, solid waste management and recycling, emergency services, and stormwater/drainage mitigation. Many of these outcome-based programs are codified through an established enterprise program/fund, while others such as stormwater management are addressed programmatically throughout various Town government agencies. All of them will be impacted by the Town's resilience implementation process in some way.
3. **Capital** and infrastructure projects are the primary focus of the resilience financing process. These projects can be embedded within baseline or enterprise processes, but they are often implemented as a result of specific community needs, including:

- **Protecting an essential asset.** The most targeted project approach is associated with protecting specific assets that are threatened by climate change (a particular community building, for example).
- **Protecting an asset class or system.** Many community resilience projects are designed to a suite of assets within a particular system. This can include protecting road and transportation networks, residential and commercial buildings, or essential public utilities. Projects designed to protect an asset class are often coupled with regulatory or permit changes (i.e., Building codes, floodplain management, etc.).
- **Protecting threatened geographies or communities.** Large-scale resilience projects are often designed to protect specific communities or neighborhoods from a variety of climate hazards and threats. These projects can include flood mitigation/abatement and transportation enhancements.
- **Incentivizing outcomes.** Finally, resilience projects may be designed to address a particular hazard or desired outcome. These projects are often associated with enterprise fund activities, but they can also include other community priorities such as habitat restoration and protection.

*Figure 2: Bourne MVP Projects Across Resilience Project Typologies (Source: Throwe Environmental)*

Baseline	Enterprise (like)	Infrastructure
<ul style="list-style-type: none"> <li>▪ Climate Risk and Vulnerability Assessment</li> <li>▪ Integrated Water Resources Management Plan</li> </ul>	<ul style="list-style-type: none"> <li>▪ Flooding and Drainage</li> <li>▪ Watershed Restoration</li> <li>▪ Shoreline Erosion</li> </ul>	<ul style="list-style-type: none"> <li>▪ Academy Drive</li> <li>▪ Circuit Avenue</li> </ul>
<ul style="list-style-type: none"> <li>▪ Climate Resilience Action Plan</li> <li>▪ Communications/Outreach</li> <li>▪ Program Management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Stormwater Management</li> <li>▪ Wastewater Management</li> <li>▪ Drinking Water Management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Town Hall</li> <li>▪ Buzzards Bay Fire Station</li> </ul>
<ul style="list-style-type: none"> <li>▪ Grant Development and Management</li> <li>▪ Financing Plan and Strategy</li> </ul>	<ul style="list-style-type: none"> <li>▪ Solid Waste and Recycling</li> <li>▪ Emergency Management and Response</li> </ul>	<ul style="list-style-type: none"> <li>▪ Community Buildings</li> <li>▪ Historic Structures</li> <li>▪ Buzzards Bay District</li> </ul>

**2. Project timing.** Climate impacts are expected to evolve and intensify over time. The community response to mitigate risks will also need to evolve. This will require that the resilience systems and processes – including financing processes – be dynamic. The project portfolio should address short-, mid- and long-term implementation needs and time horizons. Categorizing projects in this way will be critical for creating a sustainable revenue plan.

- **Short-term risks and infrastructure needs (0-3yrs).** Short-term risks represent immediate infrastructure and financing needs. The financing components necessary for addressing short-term needs include:

- Codified, stable funding streams, whether they be supported by general obligation bonds and general funds or through enterprise programs and dedicated fees; and,
  - A clear understanding of the project’s useful life, i.e., how long the project will sufficiently address changing resilience needs.
- **Mid-term risks and infrastructure needs (3-15yrs).** Mid-term risks and infrastructure needs are the systems that will replace or augment existing short-term infrastructure. Given the impacts of climate change, it is likely that the scale of mid-term needs will grow over time. Revenue streams in support of mid-term needs are not necessarily required immediately, but efforts should be made now to establish the processes necessary for generating revenue and investment in the future.
  - **Long-term risks and infrastructure needs (15yrs+).** Long-term risks and infrastructure needs will address the most significant climate impacts (i.e., major infrastructure projects to address sea-level rise, temperature and precipitation changes, and catastrophic storms). Given the anticipated scale of the need, community leaders need to begin establishing the necessary financing systems and processes in the short-term with a vision towards the long-term. This includes establishing the conditions necessary for investment, identifying anticipated revenue streams, and building capacity by establishing appropriate financing institutions.

**3. Anticipated project costs.** The third organizing element for the implementation plan and project portfolio is anticipated project costs. Project cost estimation is the process of forecasting the financial and other resources needed to complete a project within a defined scope. Cost estimation accounts for each element required for the project and calculates a total amount that determines a project’s budget. Cost estimates for projects within each project category will be essential for estimating necessary revenue needs and for determining when specific resilience projects can move forward. As climate resilience infrastructure projects move through the design and implementation process, it is essential to accurately account for all direct and indirect expenses, including labor, materials and equipment, facilities, and all associated risk. However, the initial resilience planning and implementation processes require a high-level or cursory evaluation of project costs, within each category over time. This high-level evaluation will enable community leaders to identify the appropriate institutional and revenue systems necessary for achieving long-term resilience.

**Recommendation 5: Establish a Climate Resiliency Infrastructure Fund.** In Phase 1, it was recommended that the Town of Bourne consider establishing a new program or institution to serve as the lead or center point of the resilience action planning and implementation process. After further conversations with Town leaders and evaluation of existing financing capacities, the recommendation is for the Town to establish an *internal* Climate Resiliency Infrastructure Fund (“the Resiliency Fund”). The primary purpose of the Resiliency Fund would be to expand resilience investments by creating efficiencies, economies of scale, and political synergies for addressing resilience infrastructure needs. The Resiliency Fund would provide Bourne with a variety of benefits, including:

- *Prioritizing resilience infrastructure projects within the financing system.* The targeted nature of the Resiliency Fund would enable it to focus fiscal resources on those projects that are most critical to the resilience implementation and planning process. The project prioritization process would not necessarily be implemented outside of existing processes but would provide a necessary focus to the financing process.
- *Accelerating and scaling the financing process by leveraging public and private revenue streams.* The Resiliency Fund would have the focus and capacity to target investments in projects identified in the resilience plan. If structured appropriately, the Resiliency Fund would be able to incentivize private investment in support of infrastructure and resilience projects.
- *Establishing more effective partnerships with the private sector.* Public-private partnerships are the foundation of local resilience design, implementation, maintenance, and financing. These partnerships will need to expand in scale, sophistication, and impact as climate change intensifies. The Resiliency Fund would have the capacity to develop and advance innovative relationships with a broad spectrum of private firms and actors.
- *Reducing stress on Town budgets.* The Resiliency Fund will not eliminate the need for public investment in resilience infrastructure. Local infrastructure will always require local government leadership and investment. However, the Resiliency Fund would potentially reduce pressure on local budgets by creating efficiencies, leveraging private investment, and reducing the cost of capital.
- *Stimulating and advancing innovation and economic growth.* In addition to streamlining and scaling financing processes, the Resiliency Fund can also be charged with incentivizing investment in those industries and businesses that will be integral to the Town's resilience efforts. This dual economic development/financing role will place the Resiliency Fund in a position to ensure that infrastructure investments serve multiple roles and provide multiple community benefits.
- *Creating more effective connections between climate change mitigation and adaptation activities and projects.* Establishing a Resiliency Fund would enable the Town to link climate change resilience and adaptation efforts with climate change and carbon mitigation efforts, which is important for several reasons. First, the Town of Bourne is being directly impacted by climate change. It has a unique need and responsibility to remain resilient to those impacts and reduce the pollution that is causing those impacts. Second, by linking adaptation and mitigation programs and strategies, the Town will create more potential revenue streams, more investment opportunities, and greater community/business engagement in the process. The Town is well-positioned to benefit directly from the mitigation-adaptation connection through the NextGrid solar project. The revenues generated from this new and innovative public-private partnership will create critical revenue flows while at the same time reducing the Town's carbon footprint. This creates a very effective revenue model for the Town's Resiliency Fund moving forward.

***Resiliency Fund Revenues.*** The Resiliency Fund would support key functions and activities in support of the Town's resilience action plan. This Fund would provide a system for coordinating resilience programs and project investments. In some respects, the Resiliency Fund would function as an enterprise program, thereby coordinating and implementing climate mitigation and

adaptation programs within the Town government. In addition, it would target investments to those projects and programs that are directly associated with the Town's resilience action plan. While enterprise programs usually rely on single revenue streams, primarily in the form of service or regulatory fees, the Resilience Fund will have the capacity and perhaps even the mission to identify, secure, and leverage multiple revenue sources. An important function of the Resilience Director, through the auspices of the Resiliency Fund, will be to develop a resilience infrastructure revenue plan that addresses the unique resource needs of the three project typologies: baseline, enterprise, and capital infrastructure.

Revenue sources supporting resilience programs and infrastructure will be by necessity, diverse; however, potential revenue sources will fall within the three categories mirroring the project typologies: operational or baseline revenues, enterprise or ongoing revenue streams, or project-specific revenues. There is any number of potential revenues sources in the form of fees, taxes, and grants that have the potential to provide either temporary or permanent support for the Resiliency Fund and its activities. Key issues to consider when assessing the potential efficacy of a revenue source include its connection to the resilience issue; the potential scale of the source; the potential longevity of the source; and the impacts—positive or negative—on the community (specifically how the revenue source impacts fairness and equity). Specific opportunities within each of the three revenue categories include the following

- **Operational-baseline revenues.** Operational funds are those funds that, in theory, support any institutional activity. In actuality, they support those activities that are often not directly included in the project financing costs. In other words, operational funding would support administration *and* program-related activities. In the case of the Resiliency Fund, operational funds would potentially support all expenses, direct and indirect. Potential revenue sources include general fund revenues, targeted revenues from taxes and/or special service fees (i.e., the solar project funding), grant funding, and enterprise program funds (exclusive to enterprise programs).
- **Enterprise revenues.** Enterprise funds are used to support activities for which a fee is charged to external users for goods or services. While the Resiliency Fund will not officially be an enterprise program, it will likely have important characteristics of an enterprise fund, including sustained revenue streams in the form of fees supporting activities directly associated with the assessment and collection of those fees. Additionally, enterprise and enterprise-like funds support all expenses associated with the enterprise—direct and indirect. Therefore, they are appropriate for supporting administrative, programmatic, and infrastructure capital costs.
- **Project-specific revenues.** Project-specific funds refer to those revenues that are assessed and leveraged specifically to support a particular project. Though they can be in the form of taxes and fees, grants, or other investment revenues, they are often in the form of fees or infrastructure revenues. As is the case with enterprise funds, project funds can support administrative costs and direct project costs. Potential project-specific revenue sources include general funds; property taxes (specifically through Special Taxing Districts and/or Tax Incremental Financing Districts); private capital through public-private partnerships and concession agreements; and private and nonprofit philanthropic investment, including donations, grants, and program investments.

There are clear overlaps between the three primary revenue categories. For example, fees generated through enterprise funds can cover all three revenue categories, while project-specific funding can, and really must, cover associated administrative costs. However, the distinctions between these three categories will enable Town leaders to identify potential sources of revenues most effectively.

***Project financing and cash flow management.*** The Resiliency Fund will have the capacity to facilitate financing transactions, directly or indirectly, in support of restoration projects and practices throughout the Bay watershed. The SNEP Project Team recommends that the Resiliency Fund be established as an internal program and/or agency within the Bourne government system. This has two advantages. First, the resources supporting the Resiliency Fund's activities will be restricted to those activities. This provides system oversight and accountability. Second, the financing activities associated with the Town's resilience action plan will be conducted within the existing systems, agencies, and structures. This will allow the Resiliency Fund to be established in a manner that leverages the strengths of that system and ensure that the resilience process is efficient and effective. The Resiliency Fund will likely focus on three types of leveraging tools and processes: bond financing; value capture; and public-private partnerships.

- **Bond financing.** The use of municipal or publicly issued bonds is ubiquitous regarding infrastructure financing. Borrowing is essential for large-scale infrastructure projects and the use of tax-free bonds provides local and state governments with a relatively inexpensive source capital with long-term payback time horizons. The capacity to issue traditional tax-free revenue bonds will be important for many of the large-scale structural practices and projects in the Town's project portfolio.
- **Value capture.** As previously discussed, this type of public financing recovers some or all the value that public infrastructure generates for private landowners. "Capturing" the subsequent increase in value, governments can recuperate funds, which can ultimately be used to generate additional value for communities in the future. Specific types of value capture financing mechanisms include:
  - **Special assessment districts** are independent, special-purpose governmental units, other than school district governments, that exist as separate entities with substantial administrative and fiscal independence from general-purpose local governments. Special district governments provide specific services that are not being supplied by existing general-purpose governments. Most perform a single function, but in some instances, their enabling legislation allows them to provide several, usually related, types of services.
  - **Tax increment financing (TIF)** is a tool used by municipal governments to stimulate economic development in targeted geographical areas. TIFs are used to finance redevelopment projects or other investments using the anticipation of future tax revenue resulting from new development. When a TIF district is established, the "base" amount of property tax revenue is recorded using the status quo before improvements. To the extent such efforts are successful, property values rise, leading to an increase in actual property tax receipts above the base. While the base amount of property tax revenue (the level before redevelopment investments) continues to fund city services, the increase in tax revenue is used to pay bonds and reimburse investors and is often captured as city revenue and allocated toward other projects.

- **Joint development** projects involve integrated development of public infrastructure improvements, with projects physically or functionally related to commercial, residential or mixed-use development. Public and private investments are coordinated between agencies and developers to improve land owned by a public agency. Projects are designed to benefit both public and private entities and share costs among project partners.
- **Public-private partnerships.** A public-private partnership (P3) is a cooperative arrangement between two or more public and private sectors, typically of a long-term nature. In other words, it involves government(s) and business(es) that work together to complete a project and/or to provide services to the population. P3s have become an increasingly popular way to get major infrastructure projects built. Compared with traditional procurement solutions, P3s can also spread a project's cost over a more extended period and can thus free up public funds for investment in sectors in which private investment is impossible or otherwise inappropriate. In short, P3s can be very effective tools for delivering effective, cost-efficient projects and associated services. As governments seek to upgrade infrastructure and address the challenges of climate change, among other objectives, the need for private-sector involvement has grown. P3s will likely become important mechanisms for addressing climate risks in coastal communities like Bourne given their capacity to manage certain types of risk.

### PART 3: NEXT STEPS

Since the completion of Phase 1, the Town of Bourne has continued to show leadership on climate resilience planning and financing issues. With the strong desire to continue building a more prepared and resilient community, Bourne has become a model for resilience on Cape Cod and across the East Coast. By establishing a financing system that is dedicated to addressing climate resilience, Bourne will be in an excellent position to draw in outside capital and make the necessary investments in its community's civic and capital infrastructure.

The NextGrid project and the decision by the Board of Selectmen to establish the Climate Resiliency Infrastructure Fund have created a very effective and innovative foundation for scaling a sustainable resilience financing system. We recommend the following next steps to build on the momentum that Bourne leaders have generated.

- Establish the Resilience Director position.
- Convene a community task force charged with producing a detailed resilience plan. The plan should address the specific projects necessary for ensuring long-term resilience. In addition, the process should engage community and regional leaders from across Cape Cod to ensure effective coordination and synergies.
- Commission a detailed risk and vulnerability analysis parallel to the resilience planning process.
- Draft a strategic plan for the Resilience Fund, including programmatic goals and functions, administrative structure, and necessary funding support. The strategic plan should include a detailed revenue "map" that addresses each of the project typologies.

These four next steps, coupled with the five key recommendations above, will provide Bourne leaders with an effective road map for addressing long-term climate resilience. There are no easy solutions to the challenges facing the Town of Bourne and other coastal communities like it. However, the processes provided in this report will provide the Bourne community with an opportunity to stay resilient and vibrant regardless of the challenges ahead.



*This report was produced by the dedicated team at [Throwe Environmental, LLC](#) in the company's role as a core partner within the SNEP Network. Throwe Environmental is committed to developing climate resilience, environmental finance, and policy and governance solutions for its public, private, and nonprofit clients. As a SNEP Network partner organization, Throwe Environmental focuses on financing, training, and leadership development. Throwe Environmental is based in Bristol, RI and helps communities nationwide address their climate challenges.*