TOWN OF PLYMOUTH CAPITAL IMPROVEMENT PLAN REQUEST
FY26 FALL TOWN MEETING

Department:	Energy and Environment	**Priority #:**	4
Project Title and Description:	Coastal Resilience Pilot Project	**Total Project Cost:**	327,150

Department/Division Head: David Gould

Check if project is: New ☐ Resubmitted ☐ **Cost estimate was developed**: Internally ☐ Externally ■

For project re-submittals, list prior year(s):

List any funding sources and amounts already granted: An application to Massachusetts Coastal Zone Management is pending.

Basis of Estimated Costs (attach additional information if available)			**If project has impact on 5 Year Plan and future operating budgets, insert estimated amounts.**		
Capital:	**Cost**	**Comments**	**Fiscal Year:**	**Capital**	**Operations & Maintenance**
Planning and Design	294,435	State grant amount requested	***FY27***		
Labor and Materials			***FY28***		
Administration			***FY29***		
Land Acquisition			***FY30***		
Equipment			***FY31***		
Other					
Contingency					
Total Capital	32,715	10% Town Match to Grant			

Project Justification and Objective: the Town will partner with InnSure, a non-profit insurance innovation hub based out of Boston, MA, to design, develop, and implement an AI-driven Total Cost of Risk Simulator.

This pilot is specifically focused on 500 residential and commercial properties located from Boundary Lane to the mouth of Eel River. This area has been selected based on the density of development throughout the corridor and the risk of sea level rise/storm surge, extreme precipitation, and stormwat

For Capital Project Requests:
Will this project be phased over more than one fiscal year? If yes, enter it on the 5 Year Plan Yes ☐ No ■
Can this project be phased over more than one fiscal year? Yes ☐ No ■

For Capital Equipment Requests:
☐ Check if equipment requested is replacement and enter the year, make & model, VIN and present condition of existing equipment

What is the expected lifespan of this new/replacement equipment:

Attach backup information, estimates, or justification to support this request.

Town of Plymouth
Department of Energy & Environment
26 Court Street, Plymouth, MA 02360

MEMO

To: Derek Brindisi, Town Manager

Lynne Barrett, Finance Director

From: Sarah McCormack, Natural Resources and Sustainability Specialist, Department of Energy and Environment

Re: Capital Request – Coastal Resilience Pilot Project

Date: July 29, 2025

Through his Coastal Resilience Pilot Project, the Town will partner with InnSure, a non-profit insurance innovation hub based out of Boston, MA, to design, develop, and implement an AI-driven Total Cost of Risk Simulator. This pilot is specifically focused on 500 residential and commercial properties located from Boundary Lane to the mouth of Eel River. This area has been selected based on the density of development throughout the corridor and the risk of sea level rise/storm surge, extreme precipitation, and stormwater/riverine flooding.

This pilot project will demonstrate the simulator's capabilities in supporting economic development and coastal resilience planning by 1) incorporating insurability metrics into municipal planning and decision-making processes; and 2) assisting in the creation and implementation of a pilot program that provides home and small business focused resilience audits, with the goal of educating residents and businesses about flood risks and potential solutions to enhance both physical and financial resilience.

This publicly available and user-friendly tool will estimate flood risk, economic impacts, and coverage gaps in specific locations. This model will be scalable and able to be implemented in other Plymouth neighborhoods and municipalities. Currently, 1,561 buildings, or 9% of all buildings in Plymouth, are vulnerable to a 100-year flooding event. Moreover, 81% of municipal owned critical facilities are located within a flood zone. Furthermore, data indicates a 24% increase in heavy rainfall events and 2.4 inches of sea level rise by 2050. These coastal hazards will cause failure of infrastructure, negative impacts to utilities, and substantial disruptions to critical emergency services and economic activity. Unfortunately, the insurance industry has largely struggled to adapt – as climate-related risks have increased, so, too, have coverage premiums. Through this project, the Town aims to identify innovative, reliable, and affordable insurance options for residents.

The Town applied for a two-year award from the Coastal Zone Management (CZM) Coastal Resilience Grant Program in the amount of $327,150. If awarded, the Town will be reimbursed $294,435. We are respectfully requesting the use of $32,715 (10% of project cost) from the Environmental Affairs Revolving Fund for match funds for this grant.

Proposal: AI-Driven Flood Total Cost of Risk Economic Simulator for Community Resilience, Home-hardening & Business Resilience.

Town of Plymouth Pilot Project

1. PROJECT OVERVIEW

The Contractor will design, develop, and implement an AI-driven Total Cost of Risk Simulator for the Town of Plymouth to support urban planning and climate resilience activities. This pilot project will focus on a selected community of approximately 500 residential and business properties to demonstrate the simulator's capabilities in supporting economic development and coastal resilience planning by

- Incorporating insurability metrics into municipal planning and decision-making processes.

- Assisting in the creation and implementation of a pilot program that provides home and small business focused resilience audits, with the goal of educating residents and businesses about flood risks and potential solutions to enhance both physical and financial resilience.

The simulator will leverage large language model (LLM) technology to create a user-friendly interface that integrates FEMA Hazus flood data, OSM building exposure datasets, and property databases to model flood risk scenarios and estimate economic impacts at the property and community levels.

2. PROJECT OBJECTIVES

1. Develop an AI-driven modeling tool that estimates flood risk and economic impact
    a. for specific locations in support of a proposed home and business resilience audit pilot initiative
    b. at a community level in support of town wide economic development planning.
2. Co-create the system with Town of Plymouth stakeholders to ensure practical utility for municipal planning processes.
3. Show how the system can be used to prioritize municipal investments in flood mitigation, including promoting and/or subsidizing home and business-level actions that could be implemented by stakeholders participating in home and business level resilience audits.
4. Catalyze and support innovation in insurance markets that promotes more affordable and accessible private flood insurance through improved risk modeling, quantification of resilience investment value and disruptive procurement practices that leverages the

collective purchasing power of the city and other municipal stakeholders. *(Take back control of insurance markets)*

5. Establish a prototype that can be expanded to other neighborhoods and potentially other municipalities.
6. Develop a scalable prototype that can be implemented in other neighborhoods and potentially other municipalities.
7. Utilize the Contractor's network of partners and related projects to share insights on best practices, innovations, and procurement strategies.

3. SCOPE OF WORK

3.1 Audit Program Development

- Home Resilience Audits
    - Share best practices on home audit designs from other projects (e.g. Salem).
    - Support application and ongoing development of audit practices for Plymouth stakeholders
- Business Resilience
    - Support development of business resilience audit for medium and small business located in the city center

Cost: $44,550 (198 hrs. @ $225/hr. blended rate)

3.2 System Architecture Development

- Design and develop the three core components of the system:
    - **Agent Interface**: User-facing component allowing structured and natural language queries
    - **Prompt Execution Engine**: LLM core for processing queries and executing risk assessments
    - **Prompt Library**: Collection of structured prompts for data retrieval, analysis, and report generation

Cost: $65,250 (290 hrs. @ $225/hr. blended rate)

3.3 Data Integration

- Identify, collect, and integrate relevant datasets and risk models such as:
    - FEMA flood hazard data and Hazus depth-damage functions
    - Massachusetts Coast Flood Risk Model
    - OpenStreetMap building exposure data
    - Municipal property assessment data

- Insurance market data for the pilot community
- Socioeconomic data for the pilot community
- Digital Elevation Models (DEM) and storm surge projections
- Historical flood claim data (as available)
- Coastal Measures Ocean Data
- Interruption vulnerability of business income models (as available)

Cost: $57600 (256 hrs. @ $225/hr. blended rate)

3.4 LLM Based Climate Risk Model Development

- Identify/develop risk assessment models that calculate:
  - Property-level flood exposure based on building characteristics and location
  - Expected damage using FEMA depth-damage curves
  - Economic loss projections including repair costs and property value impacts
  - Community-wide aggregated risk profiles
  - Loss cost reduction of investment in home resilience and/or insurance market interventions.
  - Cascading Impacts of Breach of Plymouth Beach (subject to scope limitations)

Cost: $50175 (223 hrs. @ $225/hr. blended rate)

3.5 Pilot Implementation Including LLM Prompt Updates/Releases

- Select a pilot community of approximately 500 residents and businesses within Plymouth City Center
- Tailor the system to address specific resilience challenges in the selected area
- Configure the system with community-specific data and risk parameters
- Conduct training sessions with Town of Plymouth staff on system use and interpretation of results
- Pilot promotion campaign and launch

Cost: $64575 (287 hrs. @ $225/hr. blended rate) ($6075 FY26 + $58,500 FY27)

3.6 Co-Creation Process

- Conduct workshops with Plymouth city planners, emergency management, economic development, and resilience teams
- Establish feedback mechanisms to iteratively improve the system design

- Incorporate stakeholder input into the agent interface design and prompt library development
- Document user requirements and how they are addressed in the system architecture

Cost: $21600 (96 hrs. @ $225/hr. blended rate)

3.7 Documentation, Knowledge Transfer & Community Engagement

- Develop comprehensive system documentation
- Create user guides and training materials
- Document data sources, model assumptions, and limitations
- Community engagement including select board, planning board, advisory & finance, Chamber of Commerce + 2 community workshops.
- Provide recommendations for system expansion beyond the pilot phase

Cost: $23,400 (104 hrs. @ $225/hr. blended rate)

Total Cost: $327,150

4. DELIVERABLES

The following deliverables represent the minimum viable project (MVP) outcomes. As an innovation project, these deliverables may evolve through the co-creation process, with the focus on achieving functional capability rather than comprehensive implementation across all possible use cases.

1. **Program & System Architecture Document**: Detailed technical specification of system components with details on how system supports Plymouth specific resilience audit pilot.
2. **Agent Interface**: Web-based user interface for interacting with the simulator
3. **Prompt Library**: Complete set of structured prompts for the LLM system
4. **Data Integration Report**: Documentation of all data sources and integration methods
5. **Risk Assessment Models**: Implemented models with documentation of methodologies (Need language here that describes to what extent 3p commercial models if needed or desired are included in the price or not)
6. **Pilot Implementation Report**: Results and findings from the pilot community implementation
7. **User Training Materials**: Guides and resources for City staff including 6 community engagement events throughout project

8. **Final Project Report**: Comprehensive documentation of the project, including
    a. Lessons learned
    b. Recommendations for system expansion/next steps
    c. Recommendations for insurance market intervention strategies potentially coordinated with other contractor supported pilot communities (See section 9)

5. PROJECT TIMELINE

The project will be completed within 14 months of contract execution, according to the following timeline:

Phase	Timeframe	Key Activities
Audit Program Design & Development	Months 1-12	Integration of tech and non-tech elements of resilience audit program (e.g. inspections, 3p referrals, etc.)
Community Engagement	Months 1-14	Community Engagement throughout project. 6 Events ○ Select Board results presentation (15 minutes) ○ Planning Board results presentation (15 minutes) ○ Advisory and Finance results presentation (15 minutes) ○ Chamber of Commerce results presentation (15 minutes) ○ Community Workshop prior to the project (1 hour) ○ Community Workshop results presentation (1hour)
System Architecture Design & Development	Months 2-6	Architecture development, data source identification, co-creation workshops
Data Integration	Months 2-6	Data collection, processing, and integration
Model Development	Months 4-8	Risk assessment model development and testing. Include LLM orchestration model development.
Pilot Implementation	Months 6-10	Agent interface development, prompt library creation, system integration into LLM

Pilot Deployment	Months 9-14	Deployment in pilot community, user training, feedback collection. Promote pilot and need for parallel new insurance innovation to capture the value of investments at insurance industry events to catalyze an industry R&D response.
Evaluation & Reporting	Months 12-14	System refinement, documentation finalization, final reporting

6. RESPONSIBILITIES

6.1 Contractor Responsibilities

- Design and develop all technical components of the system
- Lead the co-creation process with town stakeholders
- Identify and integrate necessary data sources
- Develop risk assessment models and implement them in the system
- Provide training and documentation
- Deliver working prototype system for the pilot community

6.2 Town of Plymouth Responsibilities

- Designate a project manager to serve as primary point of contact
- Facilitate access to relevant town data sources and systems
- Identify and engage key stakeholders for the co-creation process
- Select appropriate pilot community
- Participate in design workshops and provide timely feedback
- Support system testing and evaluation
- Provide venue and coordinate staff participation in training sessions

7. ACCEPTANCE CRITERIA

This project is recognized as an innovation initiative with inherent risks associated with emerging technology development. The following acceptance criteria acknowledge these risks while establishing clear benchmarks for success:

1. System successfully processes user queries related to flood risk and economic impact, contingent upon data availability
2. Risk assessments incorporate FEMA Hazus methodologies and depth-damage functions to the extent that such data can be accessed and modeled effectively
3. Agent interface is accessible and usable by Town of Plymouth staff
4. System demonstrates ability to model multiple flood scenarios (10-year, 50-year, 100-year events), with the understanding that model accuracy depends on quality of available data
5. Economic impact calculations provide actionable insights for planning purposes.
6. All deliverables are completed and approved by the Town of Plymouth project manager.
7. System performance meets agreed-upon specifications

Innovation Risk Factors:

- Data availability or quality limitations may impact certain model capabilities
- Novel AI applications may require iterative refinement beyond initial deployment
- Integration of disparate data sources may present unforeseen technical challenges
- Model accuracy will be dependent on quality of input data and evolving LLM capabilities
- User adoption may require adjustment periods as staff become familiar with AI-driven interfaces

Both parties acknowledge these innovation risks and agree to address them collaboratively throughout the project lifecycle.

8. PROJECT MANAGEMENT

- Bi-weekly status meetings will be conducted throughout the project
- Bi-monthly written progress reports will be submitted
- Change management procedures will be established at project kickoff
- Risks and issues will be tracked and reported in status meetings

9. INSURANCE INNOVATION PRIZE (Optional)

This program element encourages innovation in the private flood insurance market through targeted innovation prize challenges. These challenges will provide financial, technical, and procurement support to innovators that meet selection criteria, which could include closing insurance coverage gaps or supporting underserved communities. Awards could include:

- Financial awards that to support R&D
- Procurement access (municipal, embedded in home resilience audits programs, promotion to business community to embed in benefits, etc.)

- Data access
- A suite of acceleration services to support early-stage innovators

9.1 Innovation Prize Design Challenge Management

Contractor would:

- Develop a comprehensive challenge statement focused on flood insurance innovation for underserved markets with an emphasis on capturing the value of investments made into proposed home resilience audit.
- Establish clear eligibility requirements and detailed selection criteria for awards leveraging Total Cost of Risk framework during evaluation process.
- Design multi-stage evaluation process including technical, market, and impact assessments.
- Create and execute program promotion strategy targeting insurtech startups, MGAs, and insurance innovators.
- Manage application submission process, including technical support for applicants.
- Coordinate judging panel activities, including recruitment of subject matter experts.
- Facilitate judging events and deliberations to ensure fair and transparent selection.
- Document and communicate selection decisions and feedback to all participants.

9.2 Accelerator Program and Award Management

Contractor would:

- Implement milestone-based award structure tied to specific development and implementation targets.
- Conduct capabilities needs assessment for each award winner to identify growth opportunities.
- Deliver 6-12 months of structured support services customized to each winner's needs.
- Provide regular progress oversight and performance monitoring against defined milestones.
- Offer specialized training programs on topics such as insurance regulatory compliance, risk modeling, and pricing.
- Provide consulting services on topics such as product design, go-to-market strategy, and capital requirements.
- Facilitate awardee introduction to relevant solution providers, data sources, and technical resources to support awardee success.
- Coordinate engagements between award winners and municipal stakeholders to ensure alignment with resilience goals.

10. TERMS AND CONDITIONS

10.1 Project Costs

The Client agrees to pay the Contractor a fixed fee of $327,150 (the "Fee") for the complete performance of the Services as defined in section 3. This Fee represents the total compensation for all work, materials, and deliverables required under this Agreement, subject only to properly approved Change Orders agreed to in writing by all parties.

10.2 Payment Schedule

Payment will be made according to the following schedule:

- 30% upon contract execution
- 20% upon completion of system design phase
- 30% upon completion of system implementation phase
- 20% upon project completion and final acceptance

10.3 Intellectual Property

The Contractor will retain ownership of all intellectual property, including software, methodologies, models, and algorithms developed under this contract. The Town of Plymouth will receive a perpetual, non-exclusive license to use the deliverables for municipal insurability planning purposes. The Town retains ownership of all Town-specific data provided during the project.

10.4 Confidentiality

The Contractor agrees to maintain the confidentiality of all Town data and information accessed during the project.

10.5 Termination

Either party may terminate this agreement with 30 days written notice. Payment for work completed and accepted prior to termination will be made according to the payment schedule.

FY26 Coastal Resilience Grant Budget Template

	GRANT												Total Task (Grant)	IN-KIND/CASH MATCH										Total Task (Match)	Total Task Cost
	Project Team hours funded through grant								Direct Costs					Project team hours provided as in-kind match or paid through cash match							Direct Costs					
	Blended Rate		Position/Title		Position/Title		Position/Title		Unit	Quanity	Unit Cost	Total		Blended		Position/Title		Position/Title		Position/Title		Unit	Quanity	Unit Cost	Total		
Hourly Rate	$225.00		$0.00		$0.00		$0.00		X	X	X	X		$225.00		$0.00		$0.00		$0.00		X	X	X	X		
Task 1: Audit Program Development	Hours	Total	Hours	Total	Hours	Total	Hours	Total						Hours	Total	Hours	Total	Hours	Total	Hours	Total						
Sub-tasks 1.1 - 1.6 Deliverables	52.6	$11,835.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$11,835.00**	145.4	$32,715.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$32,715.00**	**$44,550.00**
Total Task 1 Cost													**$11,835.00**													**$32,715.00**	**$44,550.00**
Task 2: System Architecture Development																											
Sub-tasks 2.1 - 2.3 Deliverables	290	$65,250.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$65,250.00**	0	$0.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$0.00**	**$65,250.00**
Total Task 2 Cost													**$65,250.00**													**$0.00**	**$65,250.00**
Task 3: Data Integration																											
Sub-tasks 3.1 - 3.3 Deliverables	256	$57,600.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$57,600.00**	0	$0.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$0.00**	**$57,600.00**
Total Task 3 Cost													**$57,600.00**													**$0.00**	**$57,600.00**
Task 4: LLM Based Climate Risk Mode Development																											
Sub-tasks 4.1 - 4.3 Deliverables	223	$50,175.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$50,175.00**	0	$0.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$0.00**	**$50,175.00**
Total Task 4 Cost													**$50,175.00**													**$0.00**	**$50,175.00**
Task 5: Pilot Implementation FY26																											
Sub-tasks 5.1 - 5.2 Deliverables	27	$6,075.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$6,075.00**	0	$0.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$0.00**	**$6,075.00**
Total Task 5 Cost													**$6,075.00**													**$0.00**	**$6,075.00**
Task 6: Co-Creation Process																											
Sub-task 6.1 - 6.4 Deliverables	96	$21,600.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$21,600.00**	0	$0.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$0.00**	**$21,600.00**
Total Task 6 Cost													**$21,600.00**													**$0.00**	**$21,600.00**
END OF FY26 (JUNE 30, 2026) TOTAL COSTS													**$212,535.00**													**$32,715.00**	**$245,250.00**
Task 7: Documentation, Knowledge Transfer & Community Engagement	Hours	Total	Hours	Total	Hours	Total	Hours	Total						Hours	Total	Hours	Total	Hours	Total	Hours	Total						
Sub-task 7.1 - 7.4 Deliverables	104	$23,400.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$23,400.00**	0	$0.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$0.00**	**$23,400.00**
Total Task 7 Cost													**$23,400.00**													**$0.00**	**$23,400.00**
Task 8: LLM Development & Pilot Implementation FY27																											
Sub-task 8.1 - 8.5 Deliverables	260	$58,500.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$58,500.00**	0	$0.00	0	$0.00	0	$0.00	0	$0.00				$0.00	**$0.00**	**$58,500.00**
Total Task 8 Cost													**$58,500.00**													**$0.00**	**$58,500.00**
END OF FY27 (JUNE 30, 2027) TOTAL COSTS													**$81,900.00**														
TOTAL PROJECT COSTS													**$294,435.00**													**$32,715.00**	**$327,150.00**