

NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM **SWANSBORO**

Final Deliverable - Resilience Strategy

MAY 2022



SUBMITTED BY

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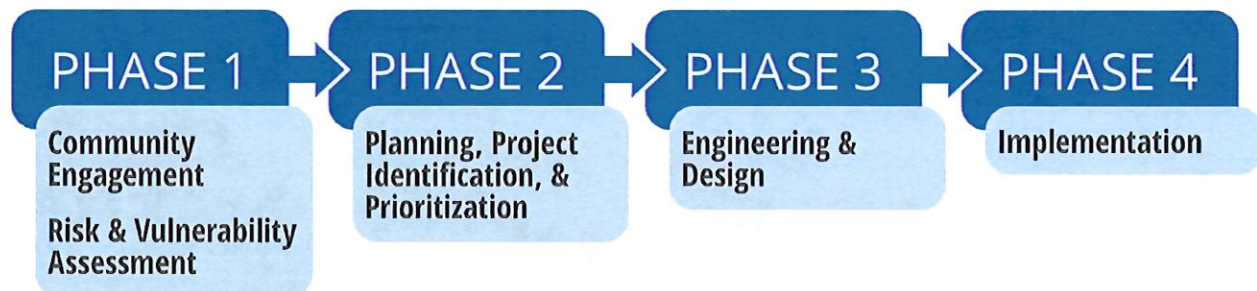
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SUMMARY

The Resilient Coastal Communities Program (RCCP) is a grant program administered by the North Carolina Division of Coastal Management (NCDCM). The program objectives are to address barriers to coastal resilience in North Carolina, to assist communities in the preparation of risk and vulnerability assessments and the development of projects to address community risks, to advance coastal resilience projects to construction, and to link communities to funding streams for project implementation. The RCCP emphasizes the identification of, and outreach to, traditionally underserved communities. It also emphasizes the incorporation of natural or nature-based solutions (NNBS) to address community vulnerabilities. As of May 2022, the first two phases of the RCCP are underway, with two additional phases scheduled to begin later in 2022 and subsequent years. The phases of the RCCP are illustrated below.



The Town of Swansboro, North Carolina was selected for Phase 2 of the RCCP in 2021. The Town previously completed a Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) analysis in 2018 that identified critical infrastructure and assessed the Town's risk and vulnerability to coastal hazards. During Phase 2 of the RCCP process, using information from the VCAPS, the recent CAMA Land Use Plan Update, other regional planning efforts, and input from a Community Action Team (CAT), the Town identified and prioritized a series of projects to address coastal hazards.

Project Portfolio Focus

- Stormwater Mapping
- Halls Creek Stream Restoration
- Hawkins Creek Stream Restoration
- Water Street Rehabilitation
- Public Engagement and Education Campaign

Community input and the CAT identified flooding damage, especially along the waterfront areas, from various storm events as a primary concern. The same input identified a series of roadways and several stream and wetland systems as critical assets of concern. To address the vulnerabilities to these assets, the resulting project portfolio emphasizes stormwater asset mapping and condition assessment as well as targeted stream restoration to improve ecosystem health and water quality. The CAT identified seven projects for the RCCP project portfolio, which may be implemented under later phases of the RCCP or under other federal, state, or local resilience programs. The enclosed report provides a more in-depth look at the RCCP process and the major outcomes of the effort.



I. Vision and Goals

Swansboro is surrounded on three sides by water, bounded by the White Oak River, Queens Creek, Hawkins Bay, and the Intracoastal Waterway. As a result, the Town experiences flooding from coastal storm surge, tidal and riverine flooding, and heavy rainfall events. Based on input from the Community Action Team (CAT), Swansboro's desire is to be prepared for the future – specifically the challenges of rising water levels and climate change – in order to preserve the Town's character and critical assets, including historic downtown Swansboro. To meet this vision, the Town is focused on implementing the 2019 CAMA Land Use Plan, reassessing and updating the results from the VCAPS analysis, addressing stormwater infrastructure needs, and restoring streams and wetlands.

Community Vision

Be prepared for the future - specifically for rising water levels and climate change – in order to preserve the Town's character and critical assets, such as historic downtown Swansboro.



II. Community Action Team (CAT)

The Resilient Coastal Communities Program (RCCP) process requires each community to establish a multi-disciplinary CAT composed of diverse stakeholders to provide input throughout the process and to engage the community. Under-represented communities should be reflected in the CAT and in community engagement efforts. Swansboro's CAT was established through input from Town staff and is listed in **Table 1**.

CAT meetings were held in November 2021 and March 2022; a summary of each meeting is included in **Appendix A**. The CAT membership included Town staff and officials with a range of experience and provided insight on historic hazard planning efforts and infrastructure needs. The CAT noted general community support for resilience efforts and for options that included natural or nature-based solutions (NNBS) where feasible. While the Town had recently completed the Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) process and the 2019 CAMA Land Use Plan, the CAT noted that there were some concerns with the findings in the VCAPS (as it was completed on a limited timeframe) and that further vulnerability analysis was warranted.

TABLE 1: COMMUNITY ACTION TEAM

NAME	POSITION
Frank Tursi	Mayor Pro Tem / Board of Commissioners
Scott Chadwick	Planning Board Chairperson
Christina Ramsey	Planning Board Vice-Chairperson
John Freshwater	Engineer, Flood Management Appeals Board Chairperson
Paula Webb	Town Manager
Alissa Fender	Town Clerk/Admin Services Director
Jennifer Ansell	Planner

In the initial discussion of potential project opportunities, the CAT cited disaster recovery, stormwater management, and hurricane response as primary needs to be addressed. The initial projects recommended for consideration included stormwater system mapping, establishing a pump system similar to other area communities, and relocating utility lines underground.

The CAT recommended a two-pronged approach for public involvement in order to provide multiple participation opportunities during the COVID-19 pandemic. In-person meetings that utilized an open house/drop-in approach were preferred, but an online component was recommended for those who could not attend. A public meeting and corresponding online survey were developed in response to these recommendations; the public engagement effort is detailed in **Section III**.



Following the public meeting, the CAT reviewed the public feedback and refined the proposed project portfolio. As discussed in **Section VI**, community-wide stormwater infrastructure mapping as well as stream restoration along Halls Creek and Hawkins Creek were cited as top community priorities. However, the CAT expressed disappointment over the relatively low participation in the public meeting and corresponding online survey; in response, a recommendation for an ongoing public engagement and education program focused on sea level rise impacts and resilience improvement was included in the project portfolio. In order to address current stormwater management challenges in the historic downtown area, the CAT also recommended the inclusion of the proposed Water Street Rehabilitation project in the portfolio.

III. Stakeholder Engagement Strategy

Public engagement efforts used a combination of an online survey and in-person meeting to reach as much of the community as possible while adhering to safety guidelines due to the COVID-19 pandemic.

The purpose of the public engagement was to capture feedback on the types of hazards that impact the Town of Swansboro and the locations that have experienced impacts. The engagement effort also sought feedback on proposed options to address these hazards and the types of projects that should be implemented.

An online survey was created and vetted with the CAT before being posted on the Town of Swansboro's website. The survey was available from February 8 through March 21, 2022. Additionally, a drop-in meeting was held on February 23, 2022 from 4:00 p.m. – 6:00 p.m. at Town Hall and provided the community an opportunity to learn more about the RCCP, ask questions, and provide input. The public meeting was advertised through the Town's existing constant contact mailing list and official social media sites. A copy of the survey and other public engagement materials is included in **Appendix B**.

During the public engagement period, 96 responses to the survey were received, including 89 online responses and 7 responses at the public meeting. The major findings from the survey, and the input provided at the public meeting, include:

- Flooding is the most prevalent coastal hazard that concerns residents, with storm surge and heavy rainfall events named as the main sources.
- Roadways, utilities, the shoreline, wetlands, and streams were noted as the critical assets most affected by flooding.
- To address concerns to critical assets, the community indicated that upgrading the stormwater facilities (pipes, drainage ditches, culverts), strengthening the power grid, addressing shoreline erosion, and restoring wetlands and streams were areas for the Town to focus potential projects.
- While all of the projects listed in the survey received support, mapping and improving existing stormwater control devices received the most support by a small margin.

Survey participants were also given an opportunity to identify specific locations where improvements are needed and the solution that would best address the problem. Write-in suggestions included stricter zoning requirements to limit impervious surface area, reforestation to address trees lost due to storms, and extending the sewer system to all residents still using a septic system. Full details of the survey results can be found in the **Appendix B**.





IV. Review of Existing Local and Regional Plans

Swansboro has participated in several local and regional planning efforts that were aimed at increasing resiliency for North Carolina's coastal communities. Specifically, the 2019 CAMA Land Use Plan Update, along with the 2018 Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) effort identified Swansboro's critical assets and summarized a risk and vulnerability assessment. **Section V** of this report summarizes these two efforts, and **Table 2** lists previous efforts to identify Swansboro's critical assets and potential options to address coastal hazards.

TABLE 2: EXISTING LOCAL AND REGIONAL PLANS

YEAR	TITLE	DESCRIPTION
2006	Hawkins Creek Watershed Protection and Restoration Planning Study	Facilitate future planning for the Hawkins Creek Drainage Basin to restore the ecosystem.
2015	Hazard Mitigation Plan (Annex 5 to Onslow County Hazard Mitigation Plan)	Document includes hazard identification, vulnerability assessment, and mitigation strategies.
2017	Hurricane Matthew Resilient Redevelopment Plan – Onslow County	Identifies county-wide needs for recovery and redevelopment from Hurricane Matthew.
2017	Swansboro Watershed Restoration Plan	Framework for addressing water quality issues and restoring the watershed to its pre-development hydrology.
2017	Swansboro Watershed Restoration Plan	Plan addresses goals and methods to reduce overall stormwater runoff to improve water quality.
2018	Strategic Economic Development Plan	A 20-year vision to mitigate the effects of growth, while preserving the town's character.
2018	Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS)	Outlines potential vulnerabilities and outcomes that could be anticipated from climate related incidents.
2019	CAMA Land Use Plan Update	The document serves as a comprehensive land use plan for the Town and includes plans for preserving historic downtown, addressing traffic congestion, restoring wetlands, and managing growth. It recommends that sea level rise be considered during any new building and that updated building codes be followed.

V. Previous Risk and Vulnerability Assessment Efforts

Swansboro previously participated in the Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) process, an interactive planning process facilitated by the NC Sea Grant. This process aims to identify areas prone to flooding and storm damage.¹ Swansboro completed the VCAPS process between 2018 and 2019 in support of its 2019 CAMA Land Use Plan, which summarizes the Town's resource inventory, discusses resiliency and climate adaptation strategies, and defines planning goals and objectives. As part of the VCAPS process, Swansboro also identified critical assets and analyzed the impact to these assets from multiple hazards to support the plan update. VCAPS represented an important step for Swansboro to begin to assess its resilience; however, the RCCP CAT expressed concerns with the findings of the VCAPS and identified the need for a deeper dive into the Town's vulnerable and at-risk assets.

Through the VCAPS, Swansboro mapped identified assets and overlaid them with available flood datasets to identify the assets most exposed to flooding under specific events and those that may be exposed in the future due to sea level rise. These assets were categorized into built infrastructure (historic downtown, emergency and Town government facilities, utilities, pump stations and schools) and natural infrastructure (wetlands, streams, marshes, pocosins, and estuary habitat).² As expected, low-lying areas with wetlands and sensitive habitat, built infrastructure close to the waterfront, and the historic downtown are especially vulnerable to flooding hazards. One of the goals set by the CAMA Land Use Plan Update for Swansboro was to build community resilience in a changing environment.³



- 1 Stewart, Inc. (2019). CAMA Land Use Plan Update; Pg. 27
- 2 Stewart, Inc. (2019). CAMA Land Use Plan Update; Pg. 27
- 3 Stewart, Inc. (2019). CAMA Land Use Plan Update; Pg. 35



VI. Project Portfolio

Utilizing feedback from the public and input from the CAT, a list of projects to address specific coastal hazards and recommended locations was developed. The Project Portfolio, summarized in **Appendix C**, lists the following information on each project:

- Project title and description
- Anticipated cost and needs addressed
- Funding status
- Natural or Nature-Based Solution (NNBS) Opportunity
- Project timeline and priority

Factors considered in the development of the Project Portfolio include:

- Inclusion of natural or nature-based solutions (included in the RCCP criteria)
- The need(s) addressed and the scope of the project's benefit
- Project implementation timeline (i.e. an emphasis on shovel-ready projects)
- Other potential funding sources for the project
- Community input and support

Table 3 highlights the top three project priorities included in the Portfolio; the remaining projects are detailed in **Appendix C**.

TABLE 3: PROJECT SUMMARY	
PROJECT	DESCRIPTION
Stormwater Infrastructure Mapping	Map stormwater management and treatment facilities, analyze system needs, incorporating data on sea level rise and future floodplain locations.
Halls Creek Stream Restoration	Implement restoration projects to improve water quality and related ecosystem services along Halls Creek.
Hawkins Creek Stream Restoration	Implement restoration projects to improve water quality and related ecosystem services along Hawkins Creek.





VII. Conclusions and Future Opportunities

Phase 2 of the RCCP provided Swansboro with an opportunity to build upon previous planning efforts and establish a solid Project Portfolio to guide the Town in applying for project funding. Potential funding sources include Phases 3 and 4 of the RCCP, which funds the engineering and construction, respectively, for projects that meet specific identified needs in the community. As not all of the projects identified in this process will be eligible for funding under the RCCP, other potential funding opportunities at the federal, state, and local level have been identified to the extent possible.

Based on the feedback from the public and the CAT, Swansboro's leadership and staff recognize the impacts that coastal hazards, particularly storms, have on Town facilities and residents, and they understand that these impacts are expected to continue and even worsen in the future due to sea level rise and related climate changes. The projects included in the Project Portfolio, including infrastructure mapping, wetland and stream restoration, infrastructure improvements, and community outreach, represent opportunities to identify and address infrastructure needs to meet current and future flooding challenges and to improve ecosystem and water quality throughout the community.

In addition to infrastructure improvements, public education and community outreach was cited as a critical need. The CAT noted the importance of educating community residents and business owners on the challenges to be faced in the future from sea level rise and likely increases in storm-generated flooding. The Town can use the outreach process conducted under the RCCP to develop and implement a broader engagement and education program, focusing on the impacts of climate change and the role resilience planning plays in infrastructure development.

While it provided important background for the development of the Project Portfolio and the overall RCCP effort, Town staff and the CAT noted concerns with the findings of the 2018 VCAPS analysis. A new risk and vulnerability assessment, one that re-examines the potential impacts and vulnerabilities of key community assets, may be valuable in order to sharpen the focus of future resilience projects and identify more detailed infrastructure improvements that can address community needs.

Acknowledgments

We would like to thank the Town of Swansboro for its efforts associated with the development of this report and the Project Portfolio. In particular, we would like to thank Paula Webb, Alissa Fender, Jennifer Ansell, and the rest of the Community Action Team for their honest feedback on the community's needs and the challenges that have been faced historically in addressing these needs. We also thank Mackenzie Todd of the N.C. Division of Coastal Management for the guidance and insight she provided throughout this process.

APPENDIX A

COMMUNITY ACTION TEAM MEETINGS

MAY 2022



SWANSBORO CAT MEETING #1 DISCUSSION

DATE: November 17, 2021

TIME: 1:00 p.m.

LOCATION: Swansboro Town Hall

PURPOSE: Swansboro Community Action Team Meeting Discussion Notes

SUMMARY DATE: November 22, 2021

Discussion

1. Resilience Needs/ Projects to Address Needs:

Based on events to date, what do you see as the community's biggest needs? (What keeps you up at night?)

- Disaster recovery: Generator needed at Swansboro High School (local shelter), and concerns about several nursing homes located in community.
 - o May have funds allocated in the new state budget to construct EOC/police/fire department facility; however, construction could still be a few years out.
 - o Special concern for nursing homes within town. Many people were without power after the last storm and had to utilize the local shelter.
 - o Hazard mitigation funding available annually that may cover generator or other needs (have \$19 million annually for next two years). High school is primary shelter, Methodist Church is second shelter.
- Stormwater management: The Town currently charges residents a fee to fund stormwater improvements. The Town is currently reactive as it pertains to stormwater improvements; it needs a plan in place to get ahead of issues. All creeks in Town are impaired. A plan to move stormwater quickly may address local flooding, but doesn't address water quality. Look at creek heads and the stream restoration process. Handle in a way that coincides with the regional watershed management plan; it includes a figure of how much stormwater must be reduced.
 - o Issue with having no say with other permits being issued, or NCDOT projects.
 - o ONWASA has challenges with some of the pump stations, especially when the highway is damaged.
 - o Existing stormwater facilities need to be mapped in order to know what needs to be addressed; this should be a top priority.
- Climate change may not be a "need", as the community's focus is on addressing the consequences of climate change. It impacts everything else on the proposed needs list.
- Change "Hurricane Evacuation" need to "Hurricane Response" to account for those who remain in place, or stay in the area.
- The nearest NOAA tide gauge is at Beaufort Inlet, with data extrapolated. Going to have one at the harbor in town so that community has real-time tide data (local vs. extrapolated).

What projects do you think should be implemented to address the community's needs?

- Need a map of the entire stormwater system, including the underground drains. Don't know how old they are, where they start. This is a primary project need.
- Emerald Isle has an emergency management plan that allows for pumping once water is above 6" is on road; water quality drops out at that water level.

- Referenced Dr. Hunt's presentation based on working with multiple DOT's- trying to come up with more realistic model of what facilities are most vulnerable.
- Power lines need to be relocated underground.
- NC 24, Hammocks Beach Road has washed out several times. NC 24, US 70, US 17 are the typical problem points, especially getting people back in after a storm.
- Last week's king tides had highest water on Cedar Point than previously seen.
- Town is split between Duke Energy Progress and Jones-Onslow power (split down NC 24). Duke services most of the commercial area.
- With final ruling, may be able to use ARP funds for stormwater projects.

Of these projects, which are the most important (or have the most impact) to the overall community?

- Mapping stormwater needs the main priority. (Referenced Hawkins Creek study- could be a project from this.)
- Schools, nursing homes.

Other feedback:

- Definition of resilience: resilience is ensuring that the Town is prepared to meet its future in terms of rising water levels and climate change, preventing storm damage, stormwater issues. No pushback during Land Use Plan development on climate change. However, many developers may not be concerned about climate change, even if they haven't said anything directly.
- Previous VCAPS assessment was an add-on to the Land Use Plan that was done rather quickly, meant to meet the LUP deadline. Not completely satisfied with final product.
- For next CAT meeting, can the stormwater system stakeholder join the group? NCDOT should be on the steering committee.

2. Community Engagement Strategy:

What techniques (in-person meetings, virtual options) have been the most effective at getting feedback?

- Recommend an online survey for those who aren't able to attend.
- The Board of Commissioners is returning to in-person meetings.
- There are almost 600 people on the Town's constant contact mailing list.
- Land Use Plan public engagement was very successful. Participants moved from table to table, and the meeting was held over an afternoon.
- Refine the list of projects based on public input, other community stakeholder input.
- Can we engage those who manage the stormwater system, even NCDOT? Invite NCDOT to participate.

If in-person, are drop-in events or formal presentations preferred?

- Drop in events preferred, allow for more social distancing.

What strategy do you recommend for this effort? Are there upcoming efforts/events that we can partner with on community outreach?

- Most likely, week after New Year's/second week of January will be the best time for a meeting; don't recommend holding events right before Christmas.

Other feedback:

Action Items

ACTION ITEM	ASSIGNED TO	DATE DUE	STATUS
Schedule Public Engagement event/prepare online survey #1	Dewberry	12/3/21	
Provide feedback on Meeting #1 discussion	CAT	12/3/21	

Attendees

Name	✓	Organization	Email
Beth Smyre	✓	Dewberry	esmyre@dewberry.com
Mackenzie Todd	✓	NC Division of Coastal Management	Mackenzie.Todd@ncdenr.gov
Alissa Fender	✓	Town Clerk, Town of Swansboro	afender@ci.swansboro.nc.us
Jennifer Ansell	✓	Planner, Town of Swansboro	jansell@ci.swansboro.nc.us
Paula Webb	✓	Town Manager, Town of Swansboro	pwebb@ci.swansboro.nc.us
Frank Tursi	✓	Mayor Pro Tem, Board of Commissioners	ftursi@ci.swansboro.nc.us
Scott Chadwick	✓	Planning Board Chairperson	mayorsea@gmail.com
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Sarah Spiegler	✓	NC Sea Grant	sespiegl@ncsu.edu



Resilient Coastal Communities Program

Swansboro- Community Action Team Meeting #1

November 17, 2021

1

Agenda

- Welcome and Introductions
- Resilient Coastal Communities Program Overview
- Discussion
- Wrap-up: Action Items, Next Steps

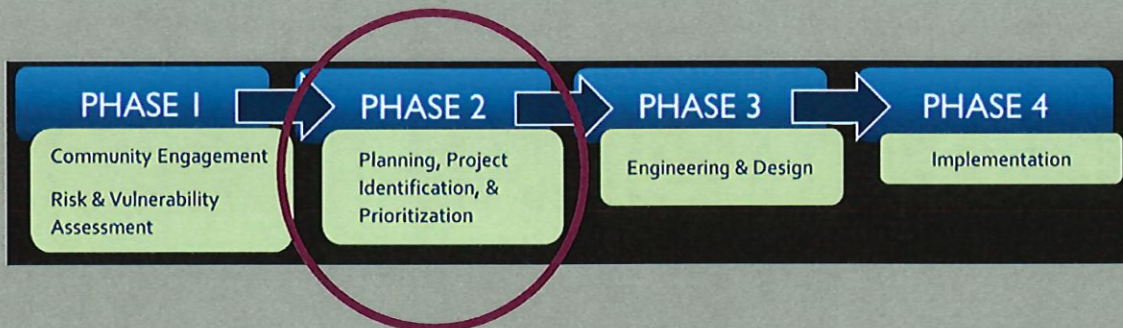
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Program Objectives

- Address barriers to coastal resilience in North Carolina at the local level, such as limited capacity, economic constraints, and social inequities;
- Assist communities with risk and vulnerability assessments and developing a portfolio of planned and prioritized projects;
- Advance coastal resilience projects to **shovel-readiness**, or ready for implementation; and
- Link communities to funding streams for project implementation

3

Program Overview




4

Deliverables

- Project Portfolio

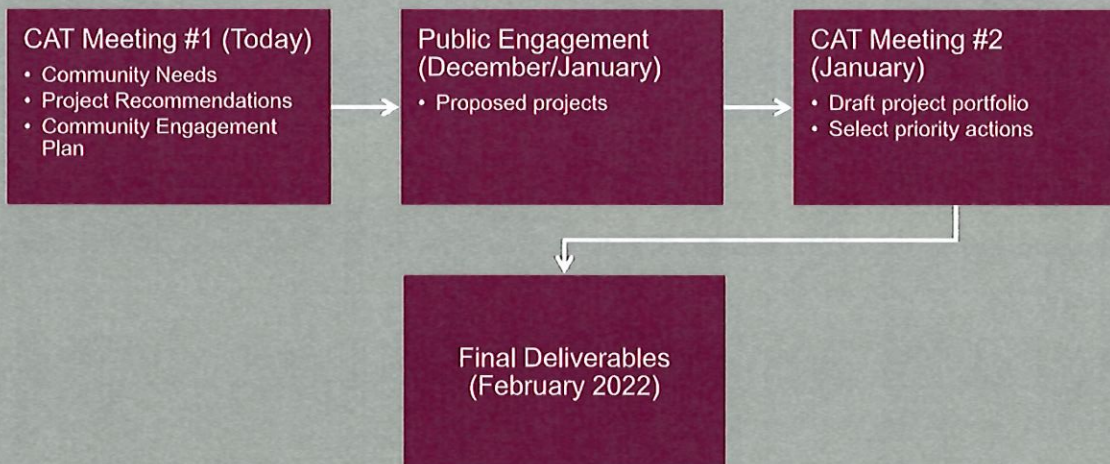
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Swansboro CAT Meeting #1 November 17, 2021

 Dewberry


5

Schedule



6

Swansboro CAT Meeting #1 November 17, 2021

 Dewberry

6

Discussion

- Community Resilience Needs
- Projects to Address Community Resilience
- Community Engagement Strategy

7

Community Needs

- Stormwater Management/Flooding
- Disaster Recovery
- Infrastructure Deficiency/Capacity
- Hurricane Evacuation
- Climate Change

8

Next Steps

- Action Items
 - Dewberry/Swansboro: Schedule Public Engagement event/survey
 - CAT: Provide feedback on today's discussion/proposed projects

Thank you!

Beth Smyre, PE 919-424-3771
esmyre@dewberry.com



SWANSBORO CAT MEETING #2 DISCUSSION

Date: March 21, 2022

Time: 2:30 p.m. – 4:00 p.m.

Location: Swansboro Town Hall

Purpose: Swansboro Community Action Team Meeting – Discuss Project Portfolio for the Resilient Coastal Communities Program

Discussion Topics

1. Public Engagement Summary - Feedback and Conclusions from February 23 Public Meeting, Online Survey

- The online survey was available on the town's website from February 8 – March 21, 2022. Received 89 online responses and 6 written responses from in-person, public involvement meeting.
- The main concern expressed was flooding hazards with areas of concern centered on the waterfront downtown. (Water Street, Front Street, Main Street, NC 24 as examples)
- The most popular solutions for addressing flooding were nature-based solutions such as restoring wetlands and streams, and infrastructure solutions, such as upgrading the NC 24 culvert and developing greens streets.
- Each project on the survey list received some level of support, with stormwater mapping and resizing the NC 24 culvert getting the strongest support.
- Write-in project suggestions included restoring Hawkins Creek, limiting impervious cover, warning system notifications, and providing sewer system access for residents still on private septic systems that get flooded.

2. Draft Project Portfolio Review

- The CAT discussed and refined the project portfolio list for inclusion in the final report and to guide Phase 3 of the program. Beth reminded the CAT the list of projects could be used to apply for other funding opportunities beyond the RCCP. The discussion centered around the following initiatives:

Stormwater Mapping

- Stormwater mapping would be one of the better projects due to ease of implementation and relatively inexpensive costs.
- Hawkins Creek had been studied previously but could not recall the date. Based on previous experience, the yards in this area flood but not the houses. Some work to improve the drainage was recently completed, but do not believe it was enough to alleviate the issues. This is an example of why stormwater mapping is needed.
- Halls Creek was also mentioned as a trouble area for flooding.
- Could different sea level rise scenarios be mapped to show future flooding for Swansboro? The State Floodplain Mapping Program has completed mapping for future scenarios. However, the suggestion was made to produce more precise local mapping to study flooding on a micro scale instead of a macro scale. This effort would require more detailed surveying of the Town to be completed for use in modeling.

SWANSBORO CAT MEETING #2 DISCUSSION

Culvert Upgrades

- The culverts under Bonita Lane and Oyster Bay Road need to be improved as well as the culvert under NC 24. The drainage system in that area is undersized.
- The CAT noted several areas where culverts and drainage systems were undersized.
- The Town would have to partner with NCDOT to replace the NC 24 culvert.

Wetland and Stream Restoration

- The CAT felt wetland and stream restoration projects were very important but questioned if there was enough information available to determine what areas were most suitable for wetland creation or restoration.
- Currently, the Town does not have a policy or procedure for wetland and stream restoration.
- Wetland and stream restoration could occur on town or county owned land with leadership coordination. Restoration on private property would require purchasing easements or asking for donations of land from property owners. The Town has a policy to preserve wetlands but does not have a mechanism for implementing preservation.
- The CAT requested to add creating a Wetland Restoration Plan to the project list. The plan would guide implementation for wetland and stream restoration and preservation. The plan could include tax incentives for property owners.

Public Education

- The mayor feels that the main goal of this RCCP effort is to educate the public. He was disappointed with the lack of participation at the public involvement meeting and in the online survey. The survey responses submitted represent about a ten percent response rate. Suggested the CAT continue to look for opportunities to engage and educate the public. Previous studies have indicated that this area could experience a one foot sea level rise by the end of the century.
- Based on the above, the CAT added a public education campaign to the projects list.

Shelters

- The locations of emergency shelters are controlled by Onslow County and the evacuation routes are defined by NCDOT. Therefore, Projects #2 (emergency generators for shelters) and #3 (re-evaluate sheltering and evacuation plans, coordinate extra care for nursing homes) are less desirable to move forward. It was also noted that nursing homes are required to provide their own backup generators.
- Onslow County has received \$19 million to upgrade shelters with better generators. Is Swansboro being adequately represented in the decisions on which shelters to upgrade?
- The CAT also discussed the location of the Town's secondary shelter. Currently, the Methodist Church is designated as the secondary shelter. However, the CAT felt that the middle school annex would make a better shelter and that the shelters should be further apart to better serve the Town. Sheltering concerns need to be explored further.

Stream Gauges

- A tidal gauge has recently been installed on public property by a private company. Although the company is gathering information and providing it for a fee, Swansboro has free access to the data. It was noted that the information composed of multiple graphs and is not user friendly.
- Since there is a gauge in place, would adding additional gauges provide additional benefit?

SWANSBORO CAT MEETING #2 DISCUSSION

Warning System Notifications

- Eliminated pursuing warning system notifications since there are several notification systems readily available to all residents.

Other Projects Mentioned

- The CAT eliminated Project #8, construction of a new emergency operations center to house police and fire departments, as it would be expensive. Also eliminated Project #9, establish an Emergency Management Plan to include a system of pumps to remove water once a specified water level above the roads was reached. Given that Swansboro is surrounded on three sides by water, there is no feasible place to pump water and the system would require permanent generators with a reliable power source.

Draft Refined Projects List

1. Stormwater mapping with fine-tuned floodplain mapping
 - a. Halls Creek
 - b. Hawkins Creek
2. Wetland restoration plan
3. Public Engagement Plan
4. NC 24 Culvert – will need to be in coordination with NCDOT.

3. Wrap Up

Final Deliverable Outline

- The overall report will highlight Swansboro's vision and goals, based on CAT meeting discussions, and stakeholder engagement, and the Project Portfolio. It will summarize previous plan efforts and recommendations as needed.
- The CAT was encouraged to continue to review the final list of projects and provide additional input to Beth.
- The goal is for the report to be completed by mid to late April.
- Phase 3 will begin in late March and will accept applications until late May.

Action Items and Next Steps

- Reorder project list and send back for final comment.
- Finalize the report.

Attendees

Name	✓	Organization	Email
Beth Smyre	✓	Dewberry	esmyre@dewberry.com
Mackenzie Todd		NC Division of Coastal Management	Mackenzie.Todd@ncdenr.gov
Alissa Fender	✓	Town Clerk, Town of Swansboro	afender@ci.swansboro.nc.us
Jennifer Ansell	✓	Planner, Town of Swansboro	jansell@ci.swansboro.nc.us



SWANSBORO CAT MEETING #2 DISCUSSION

Paula Webb		Town Manager, Town of Swansboro	pwebb@ci.swansboro.nc.us
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John Freshwater	✓	Engineer, Flood Management Appeals Board Chair	johnfh2o@gmail.com

Resilient Coastal Communities Program

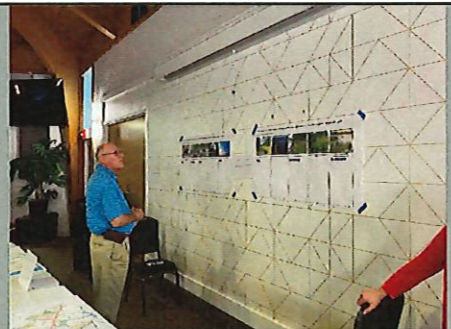
Swansboro- Community Action Team Meeting #2

March 21, 2022

1

Agenda

- Welcome and Meeting Objectives
- Public Engagement Summary
- Draft Project Portfolio
- Wrap-up: Final Deliverable Outline, Action Items, Next Steps



2

Public Engagement Summary

- 89 online survey responses (6 hard copy surveys)
- Flooding listed as main concern



Public Engagement Summary

- Project preferences: (all projects received support)
 - stormwater mapping, NC 24 culvert re-sizing
- Write-in project suggestions:
 - Hawkins Creek restoration
 - stream/creek/drainage clean-up (volunteers)
 - limiting impervious cover
 - warning system notifications
 - wetland preservation/restoration
 - sewer system access

Project Portfolio

- Projects listed that should be removed?
- Projects that should be added?
- Project priorities? Candidate for RCCP Phase 3?
- Details on project scope, estimated cost, completion timeline?

5

Final Deliverable Outline

- Vision and Goals
- Community Action Team
- Stakeholder Engagement Strategy/Summary
- Existing Local/Regional Plans
- Risk and Vulnerability Assessment
- Project Portfolio
- Conclusions/Lessons Learned

6

Next Steps

- Action Items

- CAT: Provide feedback on today's discussion/proposed projects
- Dewberry: Develop final project portfolio and report for CAT review

RCCP Phase 2

- Final Deliverables: April 2022



RCCP Phase 3 (Engineering)

- Application Window: March 2022 – May 2022



RCCP Phase 4 (Construction)

- Application Window: TBD

Thank you!

Beth Smyre, PE

919-424-3771

esmyre@dewberry.com

APPENDIX B

PUBLIC ENGAGEMENT MATERIALS AND SUMMARY RESULTS

MAY 2022



SWANSBORO PUBLIC MEETING DISCUSSION

DATE: February 23, 2022

TIME: 4:00 p.m.-6:00 p.m.

LOCATION: Swansboro Town Hall

PURPOSE: Swansboro Public Meeting Summary

SUMMARY DATE: March 22, 2022

A Public Meeting for the Resilient Coastal Communities Program (RCCP) was held on February 23, 2022. The purpose of the meeting was to get the community's feedback on the Town's perceived vulnerabilities and the proposed projects to address these concerns.

The meeting had five stations. The first was a sign-in station with a welcome poster that described the purpose of the meeting. The second station used two posters: the first listed project recommendations from previous planning efforts to address coastal hazards, and the second asked for opinions on those recommendations or for additional recommendations.

The third station had a map of the Town and instructions for respondents to use stickers to indicate areas where they have witnessed or knew of flooding or other coastal hazards (wind damage, erosion, etc.). The fourth station had three elements: two posters with eight images (four typical nature-based solutions and four built infrastructure solutions) of potential mitigation measures along with a map of Swansboro. The two posters asked respondents to indicate with a sticker their top four solution preferences for addressing flooding and other coastal hazards. On the map, respondents would use sticky notes to indicate recommended locations for future projects, the need the project would address, and the preferred type of project (nature-based or built infrastructure). Finally, the fifth station had surveys for the respondents to complete or a QR Code they could scan to take the survey online.

Attendance

A total of six people signed into the in-person public meeting and seven hard copy responses were received.

A total of 89 completed online surveys were received. In all, there were 96 responses to the survey.

Interactive Station Results

Locations of concern:

- Flooding at Water and Front Streets
- Flooding at Bicentennial Park
- Flooding at the end of Drudy Lane
- Sewer pump station off Front Street
- Sewer pump station off Shore Drive
- West Shore Drive off Spring Street
- Flooding at Bonita Lane
- Flooding due to runoff at the stream crossing under NC 24 near Hokum Lane
- Stormwater flooding at the corner of the Main Street Extension and Mt Pleasant Road
- Stormwater flooding on Dr. Corbett Road in multiple places
- Flooding on Old Hammocks Road near NC 24
- Flooding at multiple points on Main Street Extension, especially in the neighborhood with Ryan Glenn Drive
- Flooding on Main Street Extension between Swansboro Loop Road and Mt Pleasant Road

- Flooding on Swansboro Loop Road at the intersection with Moss Lane
- Wetland complex to protect near the corner of Hamrick Road and Main Street Extension
- Stormwater flooding at the end of Patriot's Point Lane
- Flooding at the end of Low County Lane
- Flooding from runoff at the end of Fort Sumner Way
- Flooding on Spoonbill Court
- Flooding at the end of Little Egret Lane
- Flooding from Queen's Creek in the area between Pine Bluff Road and Bluff View Lane
- Flooding near the intersection of Old Hammocks Road and Westwood Court
- Flooding on Hammock's Beach Road near Sand Grove Drive

Preferred Project Types:

Emergency Sheltering Improvements	I
Installation of Green Street Designs	IIII
Resizing of Culverts to prevent roadway flooding	III
Raising or Acquiring Homes	
Upgrade to the Power Grid	II
Stream Restoration	II
Shellfish Reefs/Oyster Restoration	
Living Shoreline	IIII
Forest Restoration, Enhancement or Creation	
Wetland Restoration, Enhancement, or Creation	IIII

Locations and ideas for projects:

- Road/stream improvements where NC 24 goes over the creek near Lisk Drive
- Living shoreline along causeway
- Green Street Designs in the downtown area near the water
- Larger culvert under Hammocks Beach Road near Sand Grove Drive
- Protect what is left of the wetlands off of Main Street Extension, behind the neighborhood on Ryan Glenn Drive
- Limit land disturbance in the ETJ area between Swansboro Loop Road and Mt. Pleasant Road
- General incorporation of LID into land development ordinances to reduce stormwater volume

Write-in project ideas:

- Maintain retention ponds
- Stricter zoning requirements
- Clean-out and maintenance of ditches
- Stormwater mapping
- Mapping of flooding under different sea level rise conditions
- Upgrade facilities
- Restore streams and wetlands

Survey Results

1. Coastal hazards of concern

What type of coastal or climate hazards concern you the most in your community?

- Flooding, shoreline/beach erosion, extreme heat, hurricanes and tropical storms, wildfires, and severe weather were all noted as concerns.

- Of the hazards listed, hurricanes and tropical storms and flooding are the largest concerns, with 84% and 72% of responses, respectively.
- Responses also included write-in answers such as unchecked development, sunny day flooding, and water pollution from septic tank effluent.

What kind of flooding concerns you most?

- Of the flooding types listed on the survey, respondents were mostly concerned about flooding from storm surge (48%) and stormwater/rainfall (32%).
- All types of flooding were chosen, which indicates that all types of flooding are a concern to the respondents.

2. Property damage

Have you ever witnessed property or infrastructure damage due to coastal or climate hazards in your community?

- Over 90% of respondents answered yes.

What type of damage did you witness?

- The respondents who answered this question indicated that they had seen property damage, utility disruption, injury and/or concern for personal health, damage to transportation systems, and limited access to services.
- The most common responses were property damage (90%), utility disruption (77%), and damage to transportation systems (60%).
- One write-in response indicated that they have witnessed damage to water quality from runoff.

3. Resilience projects to be implemented

Where do you think the Town of Swansboro should implement resilience projects?

- Respondents indicated a desire for stricter guidelines on development within the Town
- Reengineering of Front and Water Streets.
- Town wide electric grid.
- Ditches on Deer Run.
- Two projects for Hawkins Creek were mentioned, one for stream restoration and another to address Highway 24 at the origin of the Creek where erosion of the roadway has polluted it.
- The back of Kelly Circle near the reservoir pond has stormwater drainage issues.
- Erosion in the ditch at the intersection of Hammocks Beach Road and Schooner Drive.
- Larger culvert under Hammocks Beach Road.
- Sinkholes on private property.
- More natural barriers around the Town of Swansboro shoreline
- Restoration of Ward Shore Park
- Halls Creek improvement to not affect property owner rights for those adjacent to the creek.

What are the top five project types that would make your community more resilient to storms?

- Only 15 of the 96 respondents answered this question.
- All of the options listed received the same level of support from the people who responded to the question.
- 14 of 15 respondents indicated that nature-based solutions would make the community more resilient to storms.

The Town of Swansboro is considering several projects to increase resilience. Please rank the top three projects that would generate the greatest benefit to the community.

- All of the listed projects received some level of support.
- Power line upgrades (78%), stormwater mapping (60%), and resizing the culvert under NC 24 (57%) were the most popular projects. A number of write in responses indicated a support for restoration of Hawkins Creek.
- Other write in responses mentioned:
 - o Stream, creek, and drainage cleanups by volunteers.
 - o Limited impervious cover in the Town's watersheds.
 - o Use of early warning system notifications to ensure that the public is aware of upcoming possibly dangerous events.
 - o Plant palm trees.
 - o Wetland preservation and restoration.
 - o Provide sewer to all homes in the Town boundaries to limit septic system overflow during flood events.
 - o Historic preservation
 - o Clean out clogged storm drains
 - o Move powerlines underground

What options would you support for paying for these projects?

- All options were indicated by respondents.
- Nearly 95% of respondents preferred state or federal funding.

The Town of Swansboro is gathering public feedback on proposed options to improve the Town's resilience to coastal hazards. Swansboro received a grant under North Carolina's [Resilient Coastal Communities Program](#) to develop a list of projects to address critical Town infrastructure needs, and public input is a key part of the process to determine what improvements are most important to the community.

Thank you for your feedback!

1. What type of coastal or climate hazards concern you the most in your community? (Select all that apply.)

<input type="checkbox"/>	Flooding	<input type="checkbox"/>	Severe Weather (Thunderstorm Winds, Lightning, & Hail)
<input type="checkbox"/>	Shoreline/Beach Erosion	<input type="checkbox"/>	Wildfires
<input type="checkbox"/>	Extreme Heat	<input type="checkbox"/>	Other:
<input type="checkbox"/>	Hurricanes and Tropical Storms	<input type="checkbox"/>	

2. If you selected flooding, what kind of flooding concerns you the most? Rank these options from **least (1)** to **most (4)** concerning.

<input type="checkbox"/>	Tidal (from king tides, nor'easters, etc.)	<input type="checkbox"/>	Stormwater/Rainfall
<input type="checkbox"/>	Storm surge (from hurricanes, tropical storms, etc.)	<input type="checkbox"/>	Riverine (rising river water levels, etc.)

3. Have you ever witnessed property or infrastructure damage due to coastal or climate hazards in your community? (Circle one: **YES/NO**) If **Yes**, what type of damage did you witness?

<input type="checkbox"/>	Property damage, including homes, businesses, or personal possessions (including vehicles)	<input type="checkbox"/>	Damage or disruption to transportation systems (e.g., flooded roadways, transportation delays)
<input type="checkbox"/>	Utility disruption, including power loss or lack of access to clean drinking water	<input type="checkbox"/>	Limited access to services, such as healthcare, education, or government offices
<input type="checkbox"/>	Injury, illness, and/or concerns for personal health and safety	<input type="checkbox"/>	Other:

4. Where do you think the Town of Swansboro should implement resilience projects to minimize future damage from storms, floods, and other coastal hazards? What type of projects should the Town consider?

Please send your comments to:

Beth Smyre, Dewberry, 2610 Wycliff Road, Suite 410, Raleigh NC 27607
or esmyre@dewberry.com

5. Please select the **top five project types** that you think would make your community more resilient to storms, floods, and other coastal hazards. (Check up to 5 options.)

	Nature-based solutions, such as living shorelines or habitat restoration		Elevations of homes, businesses, and public infrastructure, including roads
	Acquisition and conservation of flood-prone land		Utility upgrades for community facilities, such as increased generator capacity for hospitals
	Increased stormwater drainage capacity		Resilience planning, policies, and development standards
	Structural protection, such as floodwalls or tide gates		Public education and outreach
	Other:		

6. The Town of Swansboro is considering several projects to increase its resilience to coastal and climate hazards. Based on this list, please rank the three projects you think would generate the greatest benefit to the community (1 = greatest benefit).

	Stormwater Mapping: Map all Town stormwater drainage and treatment facilities to determine system improvement needs.		Power Line Upgrades: Work with electric providers to reinforce or upgrade electric lines to mitigate potential damage during storms or other hazard events.
	Emergency Facility Generators: Work with Onslow County to provide additional generators at shelters and emergency facilities.		Halls Creek Stream Restoration: Implement restoration projects to improve water quality and related ecosystem services along Halls Creek.
	Sheltering Needs: Re-evaluate sheltering and evacuation plans to improve hurricane response, and coordinate extra care for nursing homes.		Resize NC 24 Culvert: Work with NCDOT to increase the capacity of the culvert underneath NC 24 and improve roadway drainage facilities.
	NOAA Tidal Gauge: Install a tidal gauge at the local harbor to provide the community with real-time water level data.		

7. What options would you support for paying for these projects? (Select all that apply.)

	Local taxes or levies		Loans
	State or federal funding (grant funds, budget allocations, etc.)		Public-private partnerships
	Local bonds		Other:

Please send your comments to:

Beth Smyre, Dewberry, 2610 Wycliff Road, Suite 410, Raleigh NC 27607
or esmyre@dewberry.com

ONLINE PUBLIC ENGAGEMENT SURVEY SCREENSHOTS



SWANSBORO
FRIENDLY CITY BY THE SEA *North Carolina*

The Town of Swansboro is gathering public feedback on proposed options to improve the Town's resilience to coastal hazards.

Swansboro received a grant under North Carolina's [Resilient Coastal Communities Program](#) to develop a list of projects to address critical Town infrastructure needs. Public input is a key part of the process to determine what improvements are most important to the community.

This survey should take roughly 10 minutes to complete. Thank you for your feedback!

Next

Page 1 of 4

ONLINE PUBLIC ENGAGEMENT SURVEY SCREENSHOTS

Hazard Perceptions and Experiences

The following section includes questions about which hazards you believe most affect your community and your experiences with hazards in the past.

What type of coastal or climate hazards concern you the most in your community?²

Select all that apply.

☐ Flooding

☐ Shoreline or Beach Erosion

☐ Extreme Heat

☐ Hurricanes and Tropical Storms

☐ Severe Weather (including thunderstorm winds, lightning, & hail)

☐ Wildfires

☐ Other

What kind of flooding concerns you the most?²

Please rank these options from least (1) to most (4) concerning by dragging the boxes in order.

Tidal (from king tides, nor'easters, etc.)

Riverine

Storm Surge (from hurricanes, tropical storms, etc.)

Stormwater or Rainfall

Reset

Have you ever witnessed property or infrastructure damage due to coastal or climate hazards in your community?²

☐ Yes

☐ No

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ONLINE PUBLIC ENGAGEMENT SURVEY SCREENSHOTS

Resilience Project Identification

The following section aims to understand which types of projects you believe would benefit the Town of Swansboro the most.

Optional: Identify a location where you believe the Town of Swansboro should implement a resilience project to minimize future damage from storms, floods, and other coastal hazards.

Place a point on the map by zooming and clicking on the map, or entering an address into the search bar.



Optional: What hazard affects this location?

<input type="radio"/> Flooding	<input type="radio"/> Shoreline or Beach Erosion	<input type="radio"/> Extreme Heat
<input type="radio"/> Hurricanes and Tropical Storms	<input type="radio"/> Severe Weather (including thunderstorms, winds, lightning & hail)	<input type="radio"/> Wildfires
<input type="radio"/> Other		

Optional: Please provide a description of the project you think this location would benefit from.

ONLINE PUBLIC ENGAGEMENT SURVEY SCREENSHOTS

The Town of Swansboro is considering several projects to increase its resilience to coastal and climate hazards. Based on this list, please select the three projects you think would generate the greatest benefits to the community.⁴

☐ Stormwater Mapping: Map all Town stormwater drainage and treatment facilities to determine system improvement needs.

☐ Emergency Facility Generators: Work with Onslow County to provide additional generators at shelters and emergency facilities.

☐ Sheltering Needs: Re-evaluate sheltering and evacuation plans to improve hurricane response, and coordinate extra care for nursing homes.

☐ NOAA Tidal Gauge: Install a tidal gauge at the local harbor to provide the community with real-time water level data.

☐ Power Line Upgrades: Work with electric providers to reinforce or upgrade electric lines to mitigate potential damage during storms or other hazard events.

☐ Halls Creek Stream Restoration: Implement restoration projects to improve water quality and related ecosystem services along Halls Creek.

☐ NC 24 Culvert: Work with NCDOT to increase the capacity of culverts underneath NC 24 and improve roadway drainage facilities.

Optional: Do you have concerns with any of the projects previously listed, or other resilience strategies that may be implemented?

Optional: Besides the projects previously listed, are there other resilience strategies the Town of Swansboro should consider?

ONLINE PUBLIC ENGAGEMENT SURVEY SCREENSHOTS

What options would you support for paying for these projects?⁴
Select all that apply.

☐ Local taxes or fees


☐ State or federal funding (grant funds, budget allocations, etc.)

☐ Local bonds

☐ Loans

☐ Public-private partnerships

☐ Other

[Back](#) [Next](#)  Page 3 of 4

ONLINE PUBLIC ENGAGEMENT SURVEY SCREENSHOTS

Residency & Demographics

The following section includes questions about your relationship to the Town of Swansboro, as well as optional demographic questions.

Which best describes you?*

☐ Full-time resident

☐ Part-time resident

☐ Work or own business in the Town of Swansboro

☐ Represent a jurisdiction, agency, or organization with vested interest in the Town of Swansboro

☐ Other

What is your zip code?*

Optional: Select your race or ethnicity.

Select all that apply.

☐ American Indian or Alaska Native

☐ Asian

☐ Black or African American

☐ Native Hawaiian or Pacific Islander

☐ White

☐ Hispanic/Latino

☐ Other

Optional: Select your age bracket.

☐ Under 18

☐ 18 to 39

☐ 40 to 65

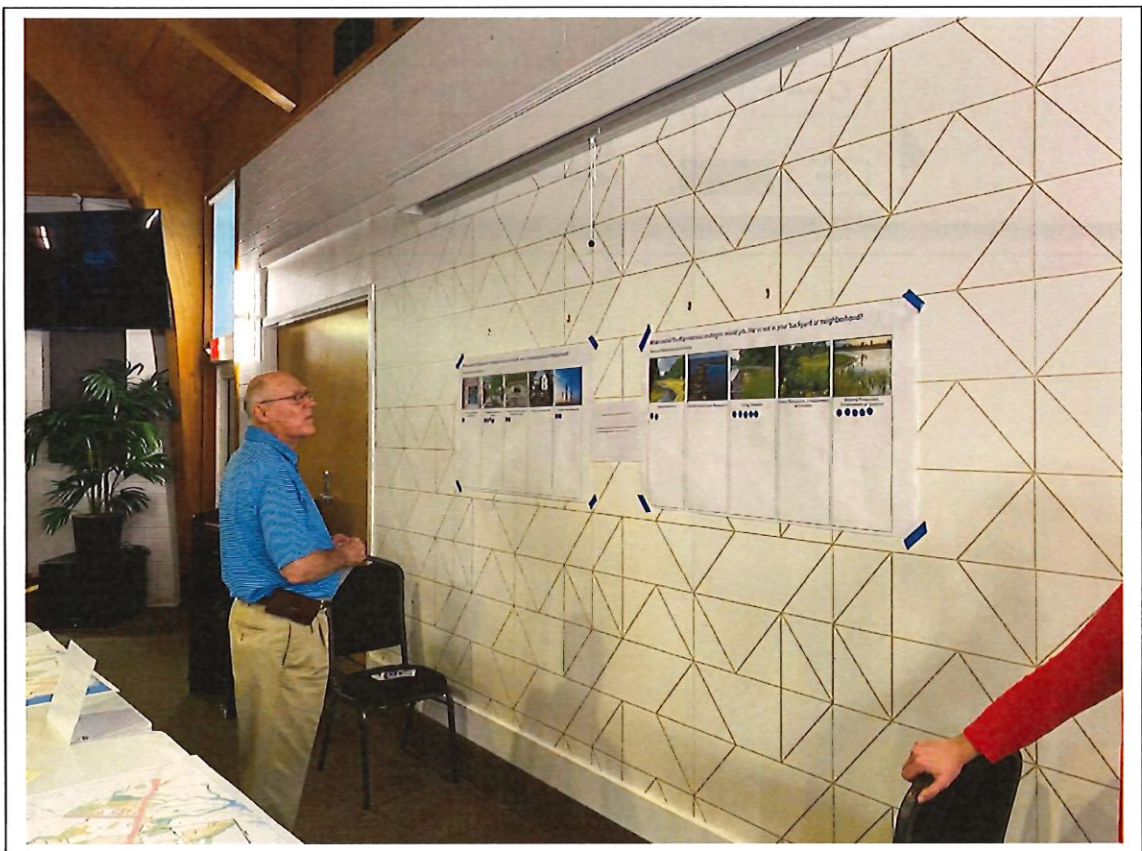
☐ Over 65

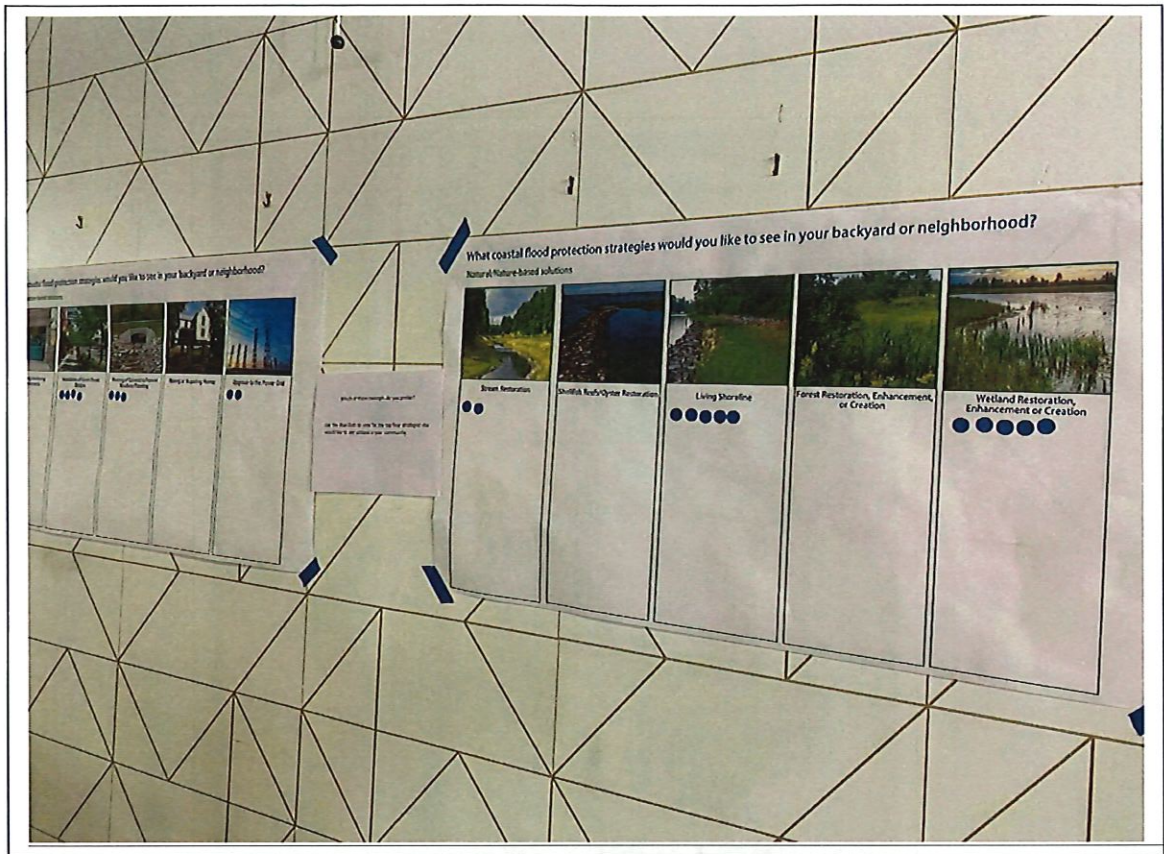
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Submit

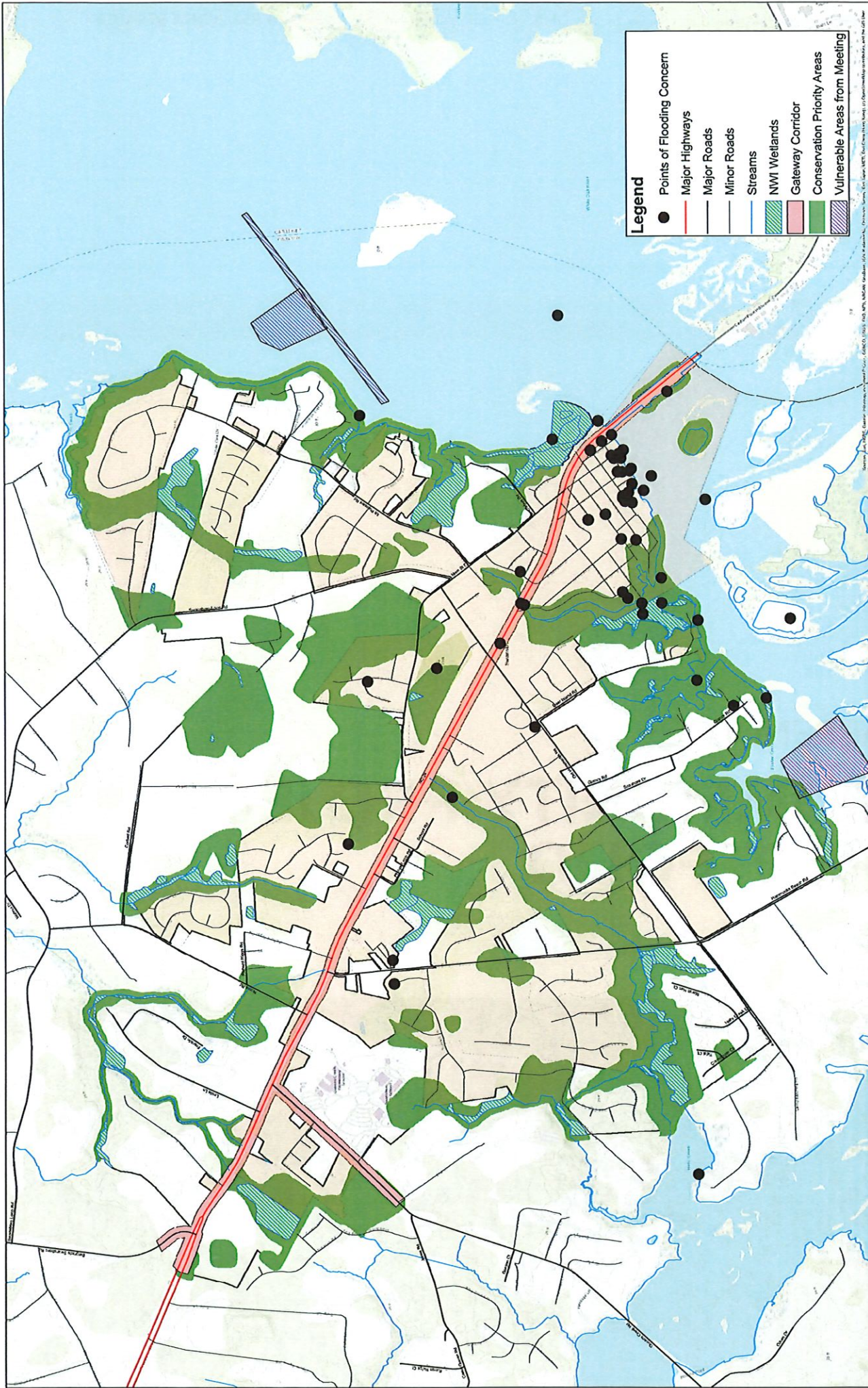
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FEBRUARY 2022 COMMUNITY ENGAGEMENT PHOTOS









- Legend**
- Points of Flooding Concern
 - Major Highways
 - Major Roads
 - Minor Roads
 - Streams
 - ▨ NWI Wetlands
 - ▨ Gateway Corridor
 - ▨ Conservation Priority Areas
 - ▨ Vulnerable Areas from Meeting

Swansboro - Resilient Coastal Communities Program

Scale: 2022
 Date: 2022
 Author: [Name]
 Reviewer: [Name]
 Approved: [Name]
 0 0.25 0.5 1 Miles



Swansboro, NC
 Swansboro, NC
 Swansboro, NC

APPENDIX C

COMMUNITY PROJECT PORTFOLIO









MAY 2022



COMMUNITY PROJECT PORTFOLIO

A critical component of the Resilient Coastal Communities Program is the identification and prioritization of a series of projects that are intended to address community vulnerabilities to coastal hazards. The enclosed list of projects, which includes infrastructure improvements (structural, non-structural, natural or nature-based solutions, or hybrid options), policy and planning efforts, and asset management actions, has been synthesized from previous local and regional planning efforts, input from the Community Action Team, and feedback from the public.

Included in this Appendix is a summary list of the proposed projects, followed by an individual sheet for each project. Each project sheet summarizes the factors that were considered in the project identification and prioritization process, including:

	LOCATION	The geographic location and scope of the project.
	HAZARD(S) ADDRESSED	A summary of the community-specific coastal hazards that impact the project location. This can include flooding, storm surge, wind damage, or other coastal hazards.
	TYPE OF SOLUTION	<p>A description of whether the project represents infrastructure improvements, policy and planning effort, or an asset management/mapping program.</p> <p> A symbol is used to denote whether the project includes a natural or nature-based solution (NNBS) component.</p>
	PROJECT ESTIMATED COST	A qualitative analysis of the total project cost, including initial engineering and construction as well as future maintenance (as available). Project cost is shown symbolically.
	POTENTIAL FUNDING SOURCES	Recommendations on potential sources to construct or otherwise implement the project, including the Resilient Coastal Communities Program and other federal and state funding sources.
	ESTIMATED PROJECT TIMELINE	An estimated timeline to complete the project, including notes on any expected delays in the timeline.
	PRIORITY RATING	A qualitative ranking of the project's priority in the context of the entire Project Portfolio. Rankings of High , Medium , or Low are provided for each project.


Each project sheet includes a proposed map of the project area and photos of potential sites to be addressed, where available.

Proposed Project Summary

TOWN OF SWANSBORO			RESILIENT COASTAL COMMUNITIES PROGRAM PROJECT PORTFOLIO							UPDATED MAY 2022
Project (Priority #)	Project Title	Description	Location	Anticipated Cost	Funding Status	Needs Addressed	NMBS Opportunity	Source Document	Timeline	Notes/Project Status
1 (Priority 1)	Stormwater Mapping	Map all Town stormwater drainage and treatment facilities, including underground drains. Use this mapping to determine system improvement needs. Mapping effort should incorporate available data on sea level rise scenarios and floodplain locations.	Townwide	Expected to be low cost, depending upon level of survey effort.	Not currently funded	Stormwater Management, Flooding		Swansboro CAT; included in public survey	No proposed timeframe; may take between six months to a year to complete.	Identified as top priority in CAT Meetings. Received most votes in the online public survey.
2 (Priority 1A)	Halls Creek Stream Restoration	Implement restoration projects to improve water quality and related ecosystem services along Halls Creek.	Halls Creek	Dependent upon extent of stream restoration needed.	Not currently funded	Stormwater Management, Flooding	Yes	Swansboro CAT; Included in public survey	Dependent upon the extent and scope of restoration efforts.	Mapping developed in Project #1 needed for this project.
3 (Priority 1B)	Hawkins Creek Stream Restoration	Implement restoration projects to improve water quality and related ecosystem services along Hawkins Creek.	Hawkins Creek	Dependent upon extent of stream restoration needed.	Not currently funded	Stormwater Management, Flooding	Yes	Swansboro CAT; Public input	Dependent upon the extent and scope of restoration efforts.	Included as write-in response to online survey. Mapping developed in Project #1 needed for this project.
4	Water Street Rehabilitation	Repair and replace stormwater infrastructure prior to resurfacing Water Street in downtown Swansboro. Project includes use of permeable pavers to facilitate stormwater runoff.	Water Street from West Broad Street to Church Street	Estimated cost of \$215,000 (2018 estimate).	Planned, but not currently funded	Stormwater Management, flooding	Yes	Swansboro staff input	Intended for implementation as soon as funding available; estimated completion within 1 year.	Engineering plans have been prepared for the project.
5	Townwide Wetland Restoration Plan	Develop a town-wide wetland restoration plan, including the identification of critical wetland systems and recommendations on restoration and preservation actions to protect these systems. Include discussion about working with private property owners on wetland restoration projects.	Townwide	Expected to be low-medium cost, dependent upon level of detail to be provided in restoration plan.	Not currently funded	Stormwater Management, Flooding	Yes	Swansboro CAT	No proposed timeframe.	Build upon the 2006 Hawkins Creek Watershed Protection and Restoration Planning Study.
6	Public Engagement and Education Campaign	Engage and educate Town of Swansboro residents and business owners on the impacts of sea level rise and other climate hazards. This would be a continuous program to involve Town residents in the decision-making process for determining future resilience actions.	Townwide	Limited cost, primarily staff time and publication/ distribution of materials.	Not currently funded	Stormwater Management, Flooding, Infrastructure Deficiency or Capacity, Climate Change		Swansboro CAT	Intended as an ongoing program as funding is available.	
7	Resize NC 24 Culvert	Work with NCDOT to increase the capacity of the culvert underneath NC 24 and improve roadway drainage facilities.	NC 24	Higher cost expected, dependent upon culvert sizing and extent of roadway repair required.	Not currently funded	Stormwater Management, Flooding		Included in public survey	No proposed timeframe.	Over half of the respondents to online survey listed this option. Requires NCDOT (owner) participation.

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1	STORMWATER MAPPING
PROJECT DESCRIPTION	Map all Town stormwater drainage and treatment facilities, including underground drains. Use this mapping to determine system improvement needs. Mapping effort should incorporate available data on sea level rise scenarios and floodplain locations.
LOCATION	Townwide
HAZARD(S) ADDRESSED BY PROJECT	Stormwater Management/Flooding, Infrastructure Deficiency/Capacity. The project is intended to identify and address infrastructure deficiency issues and to enable the Town to recover as efficiently as possible from storms and other disasters.
TYPE OF SOLUTION 	Mapping effort that is intended to lead to future infrastructure improvements.
PROJECT ESTIMATED COST	Mapping effort is expected to be low cost, depending upon the level of survey effort. Cost Level: \$
POTENTIAL IMPLEMENTATION FUNDING SOURCES	This effort is not currently funded or listed on the Town CIP. Potential funding sources: Federal sources may include FEMA – BRIC, EDA - Investment for Public Works, National Wildlife Federation, and Economic Development Facilities. State sources may include the Rural Grant Programs, NCDEQ Clean Water State Revolving Fund, NCDEQ American Rescue Plan Act (ARPA), NCDEQ Asset Inventory and Assessment Grant Program, and Golden Leaf Foundation Flood Mitigation Program .
PROJECT ESTIMATED TIMELINE	There is currently no proposed timeframe for this plan, but it has been identified as the Town's top priority, as it will aid in the identification of future infrastructure improvements. This effort is anticipated to take between 3 and 9 months to complete upon receipt of project funding.
PRIORITY RATING	High. Project has been identified as the top priority under the Resilient Coastal Communities Program Phase 2.


1

STORMWATER MAPPING



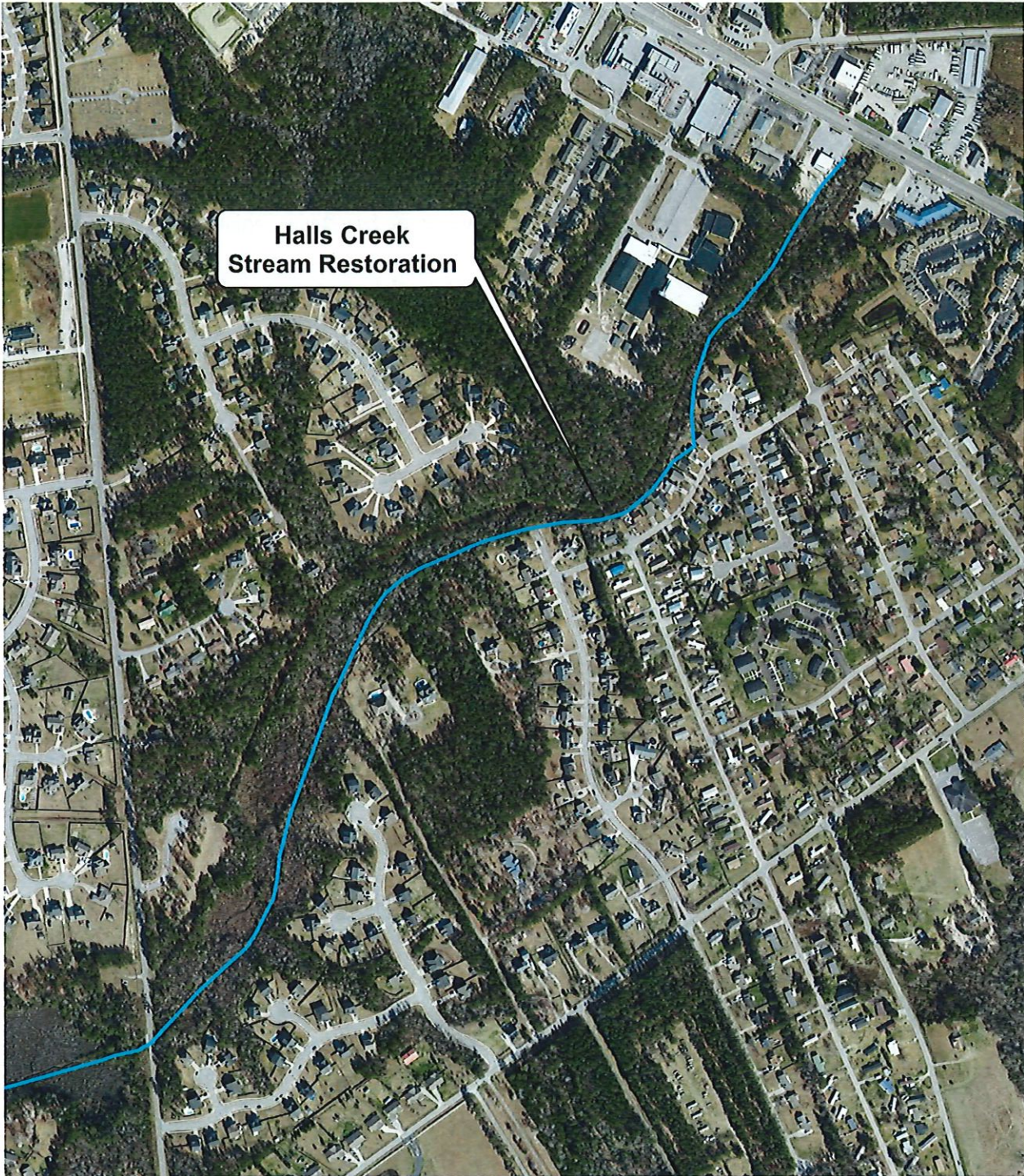
Swansboro, NC


Front Street

2	HALLS CREEK STREAM RESTORATION	
PROJECT DESCRIPTION	Implement restoration projects to improve water quality and related ecosystem services along Halls Creek.	
LOCATION	Halls Creek: the specific section of Halls Creek to be determined through further analysis.	
HAZARD(S) ADDRESSED BY PROJECT	Stormwater Management/ Flooding. The project is intended to address regional flooding impacts and water quality concerns by restoring sections of Halls Creek.	
TYPE OF SOLUTION	 Waters of the U.S. restoration project/ecosystem renewal.	
PROJECT ESTIMATED COST	Cost dependent upon the stream length to be restored and the scope of the restoration. Cost Level: \$\$	
POTENTIAL IMPLEMENTATION FUNDING SOURCES	The project is not currently funded or listed on the County CIP. Project is eligible for funding under Phases 3 and 4 of the Resilient Coastal Communities Program. Potential funding sources: Federal sources may include NOAA - National Coastal Resilience Fund (NCRF), USFWS – National Coastal Resilience Fund, National Wildlife Federation, and DOI National Coastal Wetlands Conservation. State sources may include NCDEQ Clean Water State Revolving Fund, NCDEQ Drinking Water State Revolving Fund, and NCDWR – Water Resources Development Project Grants.	
PROJECT ESTIMATED TIMELINE	Overall timeline dependent upon the stream length to be restored and the scope of effort. Design and construction timeline expected to vary between 6 months and 2 years upon receipt of project funding. Further engineering analysis and design is needed to identify the appropriate sections for restoration. Future monitoring may be required.	
PRIORITY RATING	High	

2

HALLS CREEK STREAM RESTORATION




3	HAWKINS CREEK STREAM RESTORATION
PROJECT DESCRIPTION	Implement restoration projects to improve water quality and related ecosystem services along Hawkins Creek.
LOCATION	Hawkins Creek; the specific section of Hawkins Creeks to be determined through further analysis.
HAZARD(S) ADDRESSED BY PROJECT	Stormwater Management/ Flooding. The project is intended to address regional flooding impacts and water quality concerns by restoring sections of Hawkins Creek.
TYPE OF SOLUTION 	Waters of the U.S. restoration project/ecosystem renewal.
PROJECT ESTIMATED COST	Cost dependent upon the stream length to be restored and the scope of the restoration. Cost Level: \$\$
POTENTIAL IMPLEMENTATION FUNDING SOURCES	The project is not currently funded or listed on the County CIP. Project is eligible for funding under Phases 3 and 4 of the Resilient Coastal Communities Program. Potential funding sources: Federal sources may include NOAA - National Coastal Resilience Fund (NCRF), USFWS – National Coastal Resilience Fund, National Wildlife Federation, and DOI National Coastal Wetlands Conservation. State sources may include NCDEQ Clean Water State Revolving Fund, NCDEQ Drinking Water State Revolving Fund, and NCDWR – Water Resources Development Project Grants.
PROJECT ESTIMATED TIMELINE	Overall timeline dependent upon the stream length to be restored and the scope of effort. Design and construction timeline expected to vary between 6 months and 2 years upon receipt of project funding. Further engineering analysis and design is needed to identify the appropriate sections for restoration. Future monitoring may be required.
PRIORITY RATING	High

3

HAWKINS CREEK STREAM RESTORATION



4	WATER STREET REHABILITATION	
PROJECT DESCRIPTION	Repair and replace stormwater infrastructure prior to resurfacing Water Street in downtown Swansboro. Project includes use of permeable pavers to facilitate stormwater runoff.	
LOCATION	Water Street from West Broad Street to Church Street	
HAZARD(S) ADDRESSED BY PROJECT	Stormwater Management/Flooding, Infrastructure Deficiency/ Capacity. Water Street is subject to frequent flooding from heavy rainfall and stormwater infrastructure deficiencies.	
TYPE OF SOLUTION 	Infrastructure Improvements – Construction/replacement of stormwater infrastructure along Water Street as part of the proposed removal/replacement of the asphalt paving. NNBS solutions, such as gravel parking, gravel driveway connections, and permeable pavers, will be used where feasible.	
PROJECT ESTIMATED COST	Construction plans have been completed. In 2018, final construction costs were estimated to be \$215,000. Cost Level: \$\$	
POTENTIAL IMPLEMENTATION FUNDING SOURCES	The project is eligible for funding under Phases 3 and 4 of the Resilient Coastal Communities Program. Potential funding sources: Federal sources may include EDA - Investment for Public Works and Economic Development Facilities, FEMA – BRIC, and the National Wildlife Federation. State sources may include the Rural Grant Programs, NCDEQ Clean Water State Revolving Fund, NCDEQ American Rescue Plan Act (ARPA) Funding, NCDEQ Asset and Inventory Assessment Grants, and Golden Leaf Foundation Flood Mitigation Program.	
PROJECT ESTIMATED TIMELINE	Construction timeline will be developed by the contractor but is expected to require no more than 1 year to complete.	
PRIORITY RATING	High	

4

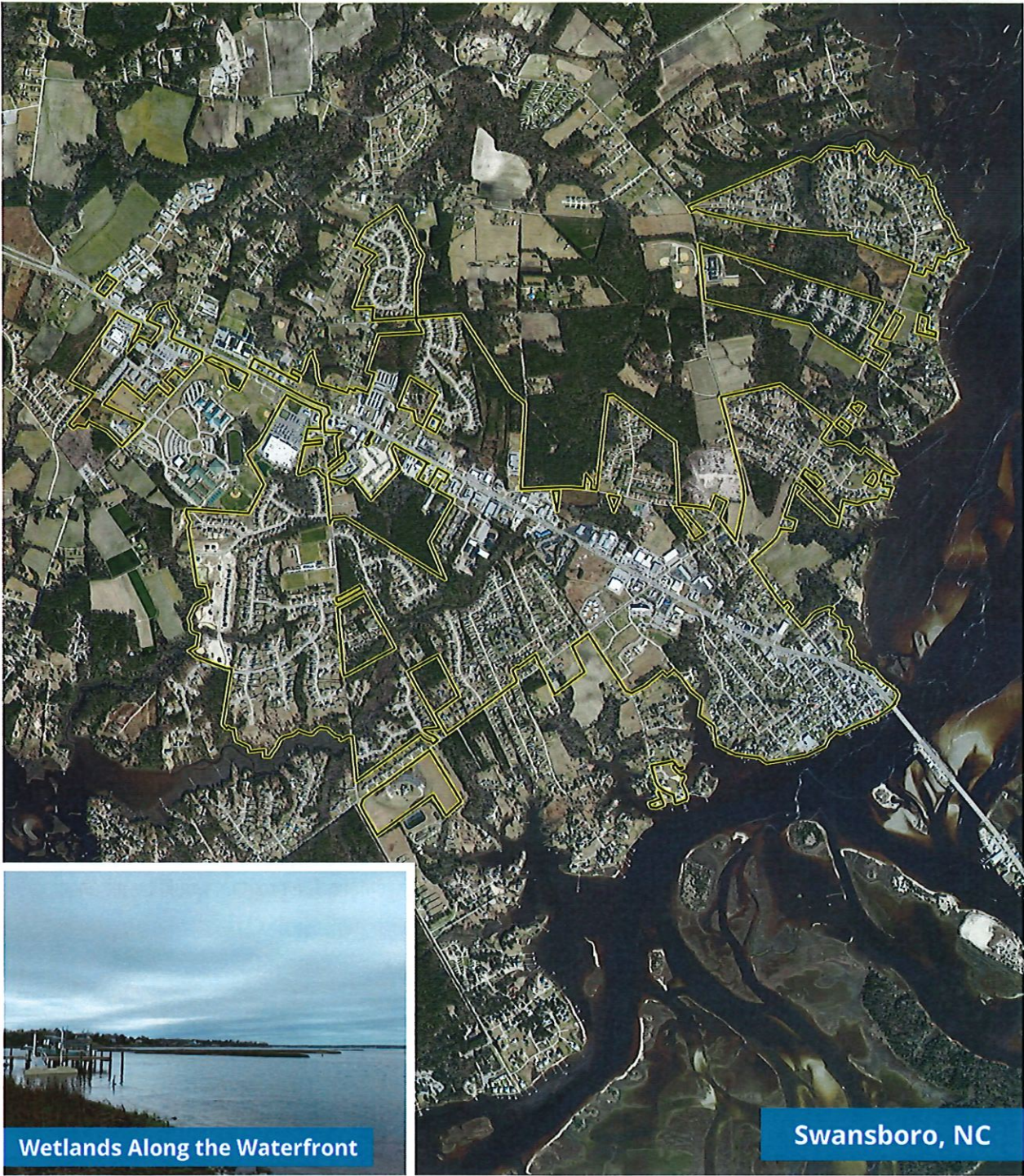
WATER STREET REHABILITATION



5	TOWNWIDE WETLAND RESTORATION PLAN
PROJECT DESCRIPTION	Develop a town-wide wetland restoration plan, including the identification of critical wetland systems and recommendations on restoration and preservation actions to protect these systems. Include discussion about working with private property owners on wetland restoration projects. This effort can build upon the 2006 Hawkins Creek Watershed Protection and Restoration Planning Study.
LOCATION	Townwide
HAZARD(S) ADDRESSED BY PROJECT	Stormwater Management/Flooding. The effort is intended to address regional flooding by identifying the appropriate ecosystem restoration projects that would facilitate more effective stormwater management.
TYPE OF SOLUTION 	Wetland, Waters of the U.S. restoration
PROJECT ESTIMATED COST	Expected to be low-medium cost, dependent upon level of detail to be provided in restoration plan. Cost Level: \$
POTENTIAL IMPLEMENTATION FUNDING SOURCES	The development of a Town-wide Wetland Restoration Plan is not currently funded or listed on the County CIP. Individual restoration efforts are eligible for funding under Phases 3 and 4 of the Resilient Coastal Communities Program; however, the initial comprehensive plan would require other funding sources. Potential funding sources: Federal sources may include NOAA - National Coastal Resilience Fund (NCRF), USFWS – National Coastal Resilience Fund, National Wildlife Federation, and DOI – National Coastal Wetlands Conservation. State sources may include NCDEQ American Rescue Plan Act (ARPA), NCDEQ Clean Water State Revolving Fund, NCDEQ – Water Resources Development Project Grants, and NC Division of Mitigation Services.
PROJECT ESTIMATED TIMELINE	There is currently no timeframe for this effort.
PRIORITY RATING	Medium

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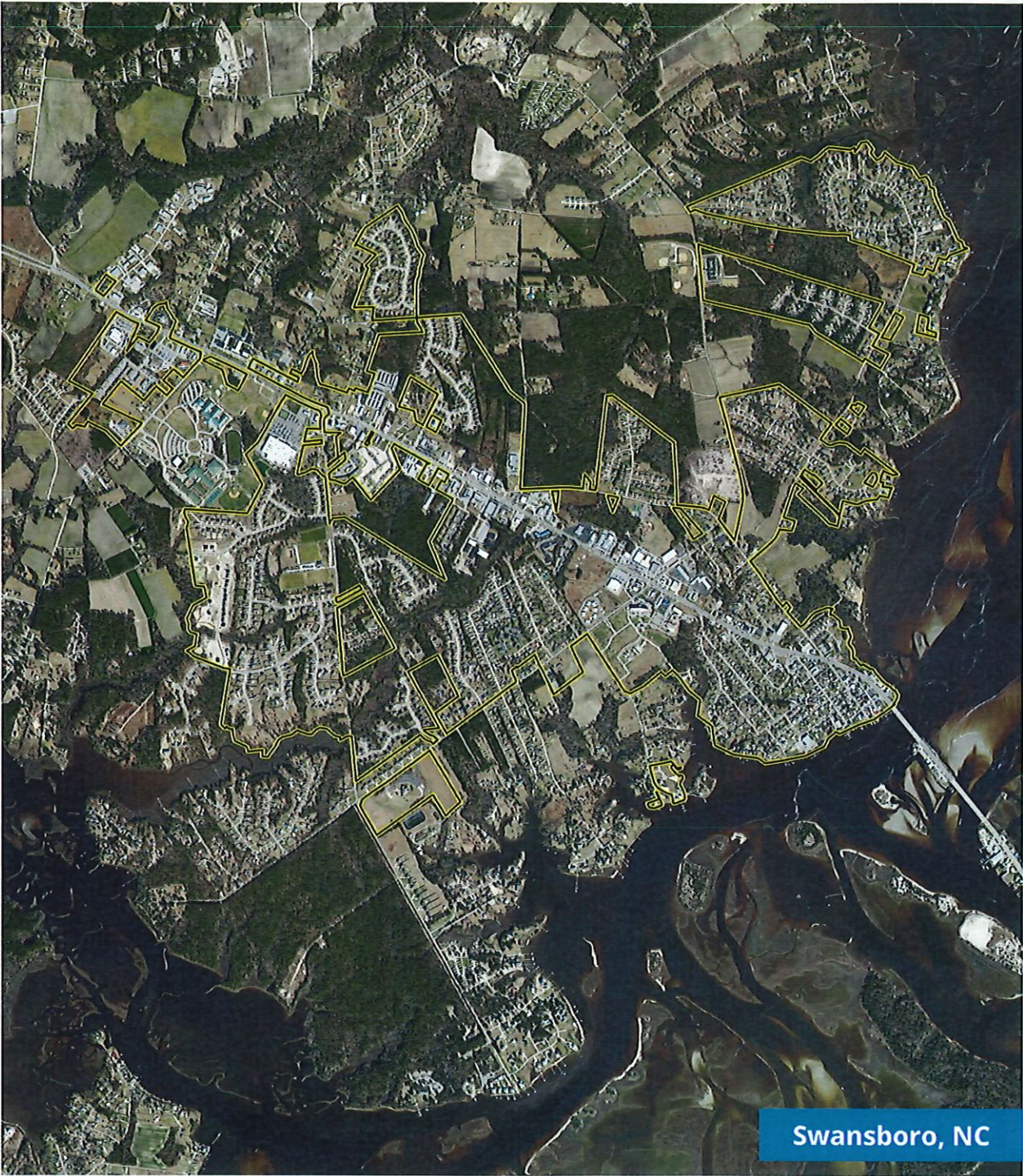
TOWNWIDE WETLAND RESTORATION PLAN



Wetlands Along the Waterfront

Swansboro, NC

6	PUBLIC ENGAGEMENT AND EDUCATION CAMPAIGN	
PROJECT DESCRIPTION	Engage and educate Town of Swansboro residents and business owners on the impacts of sea level rise and other climate hazards. This would be a continuous program to involve Town residents in the decision-making process for determining future resilience actions.	
LOCATION	Townwide	
HAZARD(S) ADDRESSED BY PROJECT	Stormwater Management/Flooding, Infrastructure Deficiency/Capacity, Climate Change. Project is to educate the community on the impacts of current and future anticipated flooding and the Town's stormwater management needs as well as the impacts of climate change on the community.	
TYPE OF SOLUTION	Non-regulatory program, specifically an ongoing public engagement and education program for community residents and business owners.	
PROJECT ESTIMATED COST	<p>Primary costs are expected to include staff time for public engagement and events and for the publication/distribution of online and printed education materials.</p> <p>Cost Level: \$</p>	
POTENTIAL IMPLEMENTATION FUNDING SOURCES	<p>This effort is not currently funded or listed on the County CIP.</p> <p>Potential funding sources: Partnerships with non-governmental organizations may provide opportunities to fund the public engagement and education effort. The N.C. Office of Environmental Education website provides information on potential education grants.</p>	
PROJECT ESTIMATED TIMELINE	There is currently no proposed timeframe for this effort but is recommended to begin in the next year to encourage continued engagement. The program would be an ongoing effort.	
PRIORITY RATING	Medium	



7	RESIZE NC 24 CULVERT	
PROJECT DESCRIPTION	Work with NCDOT to increase the capacity of the culvert underneath N.C. 24 and improve roadway drainage facilities.	
LOCATION	NC 24	
HAZARD(S) ADDRESSED BY PROJECT	Stormwater Management/Flooding. The project addresses flooding impacts to transportation infrastructure and surrounding properties during storm events.	
TYPE OF SOLUTION	Infrastructure improvements	
PROJECT ESTIMATED COST	<p>Project cost will be dependent on associated roadway design and implementation. No detailed project cost has been estimated.</p> <p>Cost Level: \$\$\$\$</p>	
POTENTIAL IMPLEMENTATION FUNDING SOURCES	<p>Infrastructure is under the jurisdiction of NCDOT. Potential funding will likely include funds assigned through the department's prioritization process.</p> <p>Potential funding sources: Federal sources may include FEMA – BRIC and the National Wildlife Federation. State sources may include the Rural Grant Programs, NCDEQ Clean Water State Revolving Fund, NCDEQ American Rescue Plan Act (ARPA) Funding, NCDEQ Asset and Inventory Assessment Grants, and Golden Leaf Foundation Flood Mitigation Program.</p>	
PROJECT ESTIMATED TIMELINE	Project improvements are expected to require an estimated 1-3 years following receipt of project funding.	
PRIORITY RATING	Low. This project was cited as a priority of over half of the respondents to the survey conducted under the Resilient Coastal Communities Program Phase 2.	

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RESIZE NC 24 CULVERT

