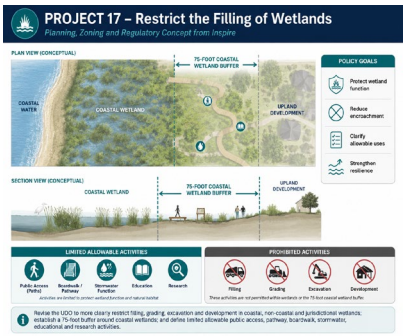
CAROLINA BEACH RCCP

Planning-Level Project Portfolio

Physical, Nature-Based, Programmatic, Feasibility and Policy Concepts







Town of Carolina Beach, North Carolina

Prepared through the North Carolina Resilient Coastal Communities Program

September 2026

PORTFOLIO OVERVIEW

This portfolio presents the physical, nature-based, programmatic, feasibility-level and policy concepts retained after the vulnerability assessment, review of prior plans and studies, Community Action Team and public input, and detailed Town review. It is designed as an implementation roadmap: concise enough to use in funding and scoping discussions, while retaining the information needed to advance individual concepts.

How to Use This Portfolio

- Use the portfolio roadmap and summary tables to compare concepts across implementation pathways.
- Use each two-page project spread to understand the need, proposed approach, next step, cost, partners and funding path.
- Treat all scopes, costs and schedules as planning-level information that must be refined through project-specific survey, engineering, permitting and coordination.
- Use the policy toolkit as a coordinated set of planning and funding actions rather than as capital construction projects.

RCCP Phase 3 and Phase 4 Funding Context

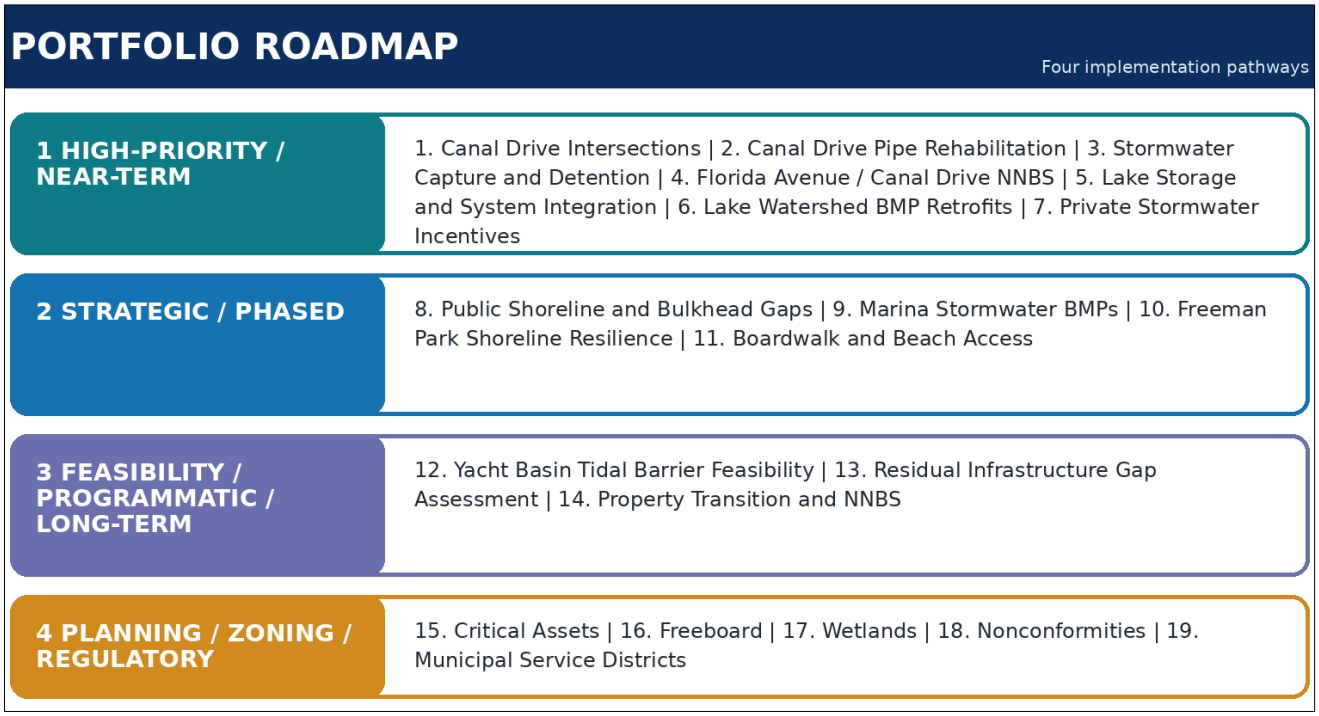
The upcoming RCCP Phase 3 and Phase 4 funding cycle is expected to place a strong emphasis on natural and nature-based solutions, including hybrid approaches that combine natural or green-infrastructure elements with traditional infrastructure. Specific eligibility requirements and evaluation criteria will be established through the Phase 3 and Phase 4 Request for Applications (RFA). Accordingly, the concepts in this portfolio are not characterized as eligible or ineligible for RCCP funding at this stage. Concepts better suited to other funding programs remain important parts of the Town's broader resilience strategy.

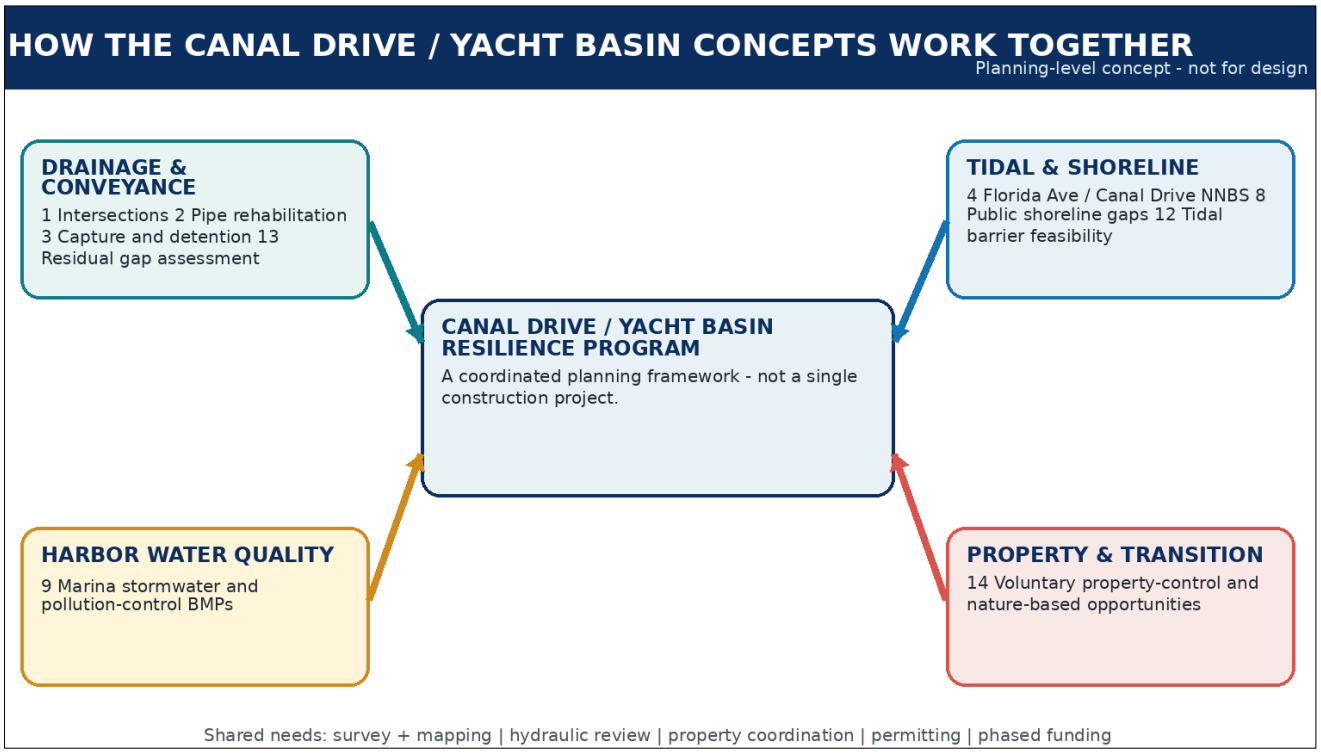
Relative Cost

$	Planning, study, program development or small implementation activity
$$	Moderate feasibility, design or targeted implementation cost
$$$	Substantial capital investment
$$$$	Major or highly variable capital investment

Potential funding sources are illustrative and subject to current program eligibility, matching requirements and application guidance.

PORTFOLIO ROADMAP





Several Canal Drive and Yacht Basin concepts are related but retain distinct purposes and implementation paths.

PROJECT SUMMARY

#	Concept	Pathway	Immediate Next Step
1	Critical Canal Drive Intersection Flood Mitigation Project	Near-Term	Complete targeted survey and drainage analysis, identify one or more pilot locations and prepare concept alternatives and planning-level costs.
2	Canal Drive Stormwater Pipe Relining / Replacement Project	Near-Term	Complete the Area F mapping and Town review, prioritize rehabilitation projects and early-action segments, and consider applying the same approach in other areas of Town where mapping or investigation identifies deteriorated stormwater infrastructure.
3	Canal Drive / Carolina Beach Avenue North Stormwater Capture and Detention Feasibility Concept	Near-Term	Complete topographic survey, hydrologic/hydraulic analysis, subsurface investigation, utility review and conceptual alternatives for a pilot location.
4	Florida Avenue / Canal Drive Nature-Based Tidal Flood Resilience Feasibility Concept	Near-Term	Complete targeted survey and hydrologic/hydraulic analysis, screen public and privately owned low-lying locations, and develop nature-based or hybrid concepts.
5	Carolina Beach Lake Storage and Stormwater System Integration Project	Near-Term	Obtain prior plans, update lake bathymetry and sediment data, and prepare an integrated lake-storage, pumping, force-main, and dredging plan.
6	Carolina Beach Lake Watershed BMP Retrofit Project	Near-Term	Prepare a watershed retrofit prioritization map and advance one or more demonstration projects.
7	Private Stormwater Improvement / Incentive Concept	Near-Term	Complete a program feasibility and rate-policy review, then develop a pilot incentive or rebate program.
8	Targeted Canal Drive / Harbor Public Shoreline and Bulkhead Resilience Project	Strategic	Inventory remaining public-shoreline gaps and prioritize unresolved Town-owned locations for survey and concept design.
9	Marina Stormwater / Pollution Control BMP Project	Strategic	Complete a harbor stormwater audit and identify priority BMP retrofits and operational practices.
10	Freeman Park / Sound-Side Shoreline Resilience Concept	Strategic	Coordinate with the Freeman Park planning effort and identify a viable location for a living shoreline, marsh enhancement, habitat restoration, or other natural stabilization.
11	Boardwalk / Public Beach Access Resilience Project	Strategic	Prepare an access vulnerability inventory and integrate priority retrofits into the Beach Management Plan and capital program.
12	Yacht Basin Tidal Barrier Feasibility / Concept Design Project	Feasibility	Conduct only a high-level fatal-flaw and economic screening before committing to a full feasibility study.
13	Yacht Basin / Canal Drive Residual Infrastructure Gap Assessment	Programmatic	Complete the Area F mapping and prepare a concise action list addressing remaining infrastructure and public-shoreline gaps.
14	Targeted Property Acquisition / Transition and Nature-Based Resilience Concept	Long-Term	Establish screening criteria, evaluate candidate parcels, and pursue owner engagement only after Town policy direction and a viable funding source are established.

#	Concept	Pathway	Immediate Next Step
15	Restrict Critical Assets from Locating in Flood-Prone Areas	Policy / Regulatory	Complete planning and legal review, prepare draft UDO amendments, and conduct the required public process.
16	Higher Freeboard Requirement	Policy / Regulatory	Prepare ordinance alternatives and conduct stakeholder and public review in coordination with the flood-map reassessment.
17	Restrict the Filling of Wetlands	Policy / Regulatory	Complete legal and planning review, develop mapped and text alternatives, and conduct the required public process.
18	Review and Revise Nonconformities	Policy / Regulatory	Conduct legal review and prepare tiered ordinance options and administrative procedures.
19	Municipal Service Districts	Policy / Funding	Conduct a municipal finance and legal feasibility study and evaluate illustrative district scenarios.

Projects 1-7 are high priority / near-term concepts. Project 4 is intentionally placed before the two Carolina Beach Lake concepts to match the ordering used in the main RCCP report.

ONGOING, COMPLETED OR OTHERWISE ADDRESSED INITIATIVES

The following items were reviewed but are not carried forward as stand-alone portfolio projects because the Town has completed the work, funded or programmed it, or is addressing it through existing operations or regulatory requirements.

Initiative	Current Status
Canal Drive outfall backflow retrofits	Substantially completed.
Critical utility backup power	Completed.
Pump Station Hardening Bundle #1	Completed
Canal Drive sewer lift station hardening	Completed; lift stations have been upgraded for flood protection and include backup power.
Florida Avenue drainage / spot elevation	Roadway regrading, reprofiling and drainage improvements are complete.
Lake Park Boulevard Green Street retrofit	Removed following Town and CAT review.
Canal Drive / Florida Avenue monitoring and maintenance	Not retained as a stand-alone project.
Snow's Cut Bridge approach drainage	Removed as a current RCCP project.
Water and sewer treatment facility floodproofing	Completed / addressed through existing State-mandated protection protocols.
Hamlet Avenue emergency beach access restoration	Removed following Town and CAT review because no specific unresolved resilience need was identified.

PROJECT 1 | Critical Canal Drive Intersection Flood Mitigation Project

High-Priority / Near-Term Concept



Project Need and Proposed Approach	Address flooding, ponding and circulation disruption at the Canal Drive / Carolina Beach Avenue North, Carl Winner Drive and Harper Avenue intersections through targeted grading, inlet, curb, pipe and spot-elevation improvements. Where feasible, the concept may also include underground stormwater storage or detention in nearby Town-owned areas.
Location	Canal Drive intersections with Carolina Beach Avenue North, Carl Winner Drive and Harper Avenue.
Current Status	This concept was retained following Town and CAT review as a targeted intersection and drainage improvement strategy.

Source: RCCP vulnerability assessment; CAT input; Town staff review; CPE engineering review.

PATH TO IMPLEMENTATION

Recommended Next Step	Complete targeted survey and drainage analysis, identify one or more pilot locations and prepare concept alternatives and planning-level costs.
Timeline	1-2 years for feasibility and preliminary design; phased construction thereafter.
Relative Cost	$$ for feasibility/design; construction cost to be determined.
Lead and Partners	Town Stormwater Department with engineering support. Partners: Public Works, Planning, utility providers, affected property owners, NCDOT where applicable.

Key Feasibility Considerations - Confirm drainage areas, roadway elevations, inlet and pipe capacity, groundwater elevation, utility conflicts, available public land, storage volume and discharge constraints.

Funding Path - No dedicated project funding is identified in this planning-level portfolio. Potential sources, subject to eligibility: Golden LEAF Flood Mitigation Program, Clean Water State Revolving Fund, FEMA mitigation programs, NCDEQ stormwater funding, State infrastructure grants and local stormwater/capital funds.

Preliminary Hazard, Benefit, and Implementation Assessment

Hazards: Rainfall flooding, tidal influence on drainage, roadway ponding and compound flooding.

Benefits: Reduced ponding and roadway closure risk, improved evacuation and emergency access and improved drainage performance at high-consequence intersections.

PROJECT 2 | Canal Drive Stormwater Pipe Relining / Replacement Project

High-Priority / Near-Term Concept

Project Need and Proposed Approach	Rehabilitate or replace deteriorated stormwater pipes, inlets and related conveyance infrastructure where structural or hydraulic deficiencies contribute to persistent flooding and poor system performance. Although Canal Drive and Area F are the initial focus, the assessment and rehabilitation approach could be applied elsewhere in Town as additional stormwater infrastructure needs are identified.
Location	Canal Drive / North End stormwater network, including Area F of the Town's mapping program.
Current Status	The North End is located within the Town's Area F stormwater mapping area.



PATH TO IMPLEMENTATION

Recommended Next Step	Complete the Area F mapping effort and Town review of the findings, then develop a prioritized rehabilitation plan and identify early-action segments for future capital or grant-funded improvements.
Timeline	Area F mapping and Town review first; 1-2 years for prioritization and design after the findings are available.
Relative Cost	$$-$$$ depending on segment length and replacement method.
Lead and Partners	Town Stormwater Department and Public Works. Partners: Engineering consultant, utility providers, affected property owners, NCDEQ where applicable.

Key Feasibility Considerations

- Confirm completion of the Area F mapping effort and Town review of the findings
- Identify the types of abandoned, deficient, or otherwise problematic infrastructure present
- Determine where relining, replacement, disconnection or another repair is appropriate
- Account for the Town's limitations on public release of detailed infrastructure-location information.

Funding Path - Townwide stormwater mapping effort is ongoing. Potential sources, subject to eligibility: Local stormwater funds, Golden LEAF Flood Mitigation Program, Clean Water State Revolving Fund, FEMA mitigation funding and other State capital or infrastructure grants.

Preliminary Hazard, Benefit, and Implementation Assessment

Hazards: Rainfall flooding, tidal backflow interactions, reduced drainage capacity and infrastructure deterioration.

Benefits: Improved conveyance, reduced leakage and structural failure, better targeting of capital funds and improved performance of backflow controls.

PROJECT 3 | Canal Drive / Carolina Beach Avenue North Stormwater Capture and Detention Feasibility Concept

High-Priority / Near-Term Concept

Project Need and Proposed Approach	Evaluate whether runoff moving south along Carolina Beach Avenue North and down side streets toward Canal Drive can be intercepted using French drains or similar collection features and redirected into underground detention chambers beneath Town-owned beach-side street ends. The chambers would temporarily store runoff and release it at a controlled rate following rainfall events.
Location	Selected side streets and Town-owned beach-side street ends along Carolina Beach Avenue North adjacent to the most flood-prone portions of Canal Drive.
Current Status	This concept replaces the earlier low-point pumping and dune-infiltration idea, which raised concerns related to tidal-water pumping, elevation differences, cost, maintenance and feasibility.



PATH TO IMPLEMENTATION

Recommended Next Step	Complete topographic survey, hydrologic/hydraulic analysis, subsurface investigation, utility review and conceptual alternatives for a pilot location.
Timeline	1-2 years for feasibility and preliminary design.
Relative Cost	$ for feasibility; construction cost to be determined.
Lead and Partners	Town Stormwater Department with engineering support. Partners: Public Works, Planning, utility providers, NCDEQ, New Hanover County, affected property owners.

Key Feasibility Considerations - Confirm contributing drainage areas, runoff volumes, groundwater elevation, subsurface storage depth, utilities, pretreatment, sediment management, maintenance access, discharge rate, and suitable pilot locations.

Funding Path - No dedicated funding is currently identified for this feasibility concept. Potential sources, subject to eligibility: Golden LEAF Flood Mitigation Program, Clean Water State Revolving Fund, NCDEQ stormwater grants, FEMA mitigation programs and local stormwater funds.

Preliminary Hazard, Benefit, and Implementation Assessment

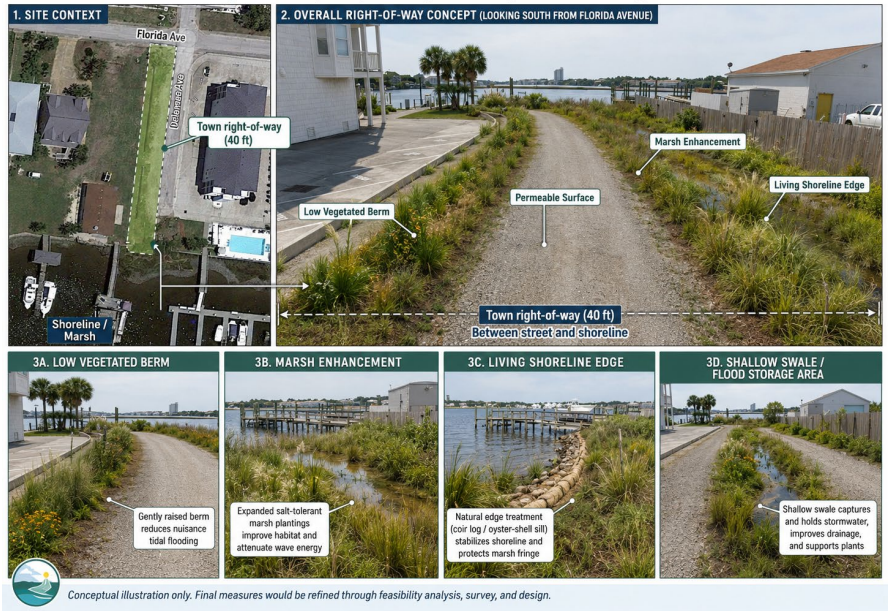
Hazards: Rainfall flooding, stormwater ponding and compound flooding along Canal Drive.

Benefits: Reduces runoff reaching Canal Drive, decreases ponding at vulnerable locations and creates a scalable phased approach.

Source: Town field review; CPE engineering discussion; RCCP vulnerability assessment.

PROJECT 4 | Florida Avenue / Canal Drive Nature-Based Tidal Flood Resilience Feasibility Concept

High-Priority / Near-Term Concept



Conceptual illustration only. Final measures would be refined through feasibility analysis, survey, and design.

Project Need and Proposed Approach	Evaluate nature-based and hybrid measures to reduce recurring tidal flooding in the Florida Avenue / Canal Drive area, where recent drainage improvements have addressed portions of the stormwater problem but tidal flooding remains unresolved. The feasibility effort would evaluate opportunities on Town-owned right-of-way and other public shoreline areas, as well as privately owned low-lying parcels where willing-owner participation, easement, acquisition, or other property control may be possible. Potential measures could include marsh preservation or enhancement, living shoreline treatments, low vegetated berms, and strategic use of public shoreline or right-of-way.
Location	Florida Avenue / Canal Drive low-lying corridor, including Town-owned right-of-way and other public shoreline areas as well as privately owned low-lying parcels, including the vicinity of 107 Florida Avenue and 1007 Canal Drive.
Current Status	Recent Florida Avenue roadway and drainage improvements are complete, but tidal flooding remains a concern.

Source: CAT follow-up concepts; Town staff discussion; Canal Drive Flooding and Vulnerability Study; RCCP VA; CPE engineering review.

PATH TO IMPLEMENTATION

Recommended Next Step	Complete targeted survey and hydrologic/hydraulic feasibility analysis, evaluate Town-owned/public locations and privately owned low-lying parcels, screen nature-based and hybrid alternatives and develop one or more planning-level concepts with property-control, cost and permitting considerations.
Timeline	1-2 years for feasibility, survey and concept design; implementation timing would depend on property control, permitting and funding.
Relative Cost	$-$$ for feasibility; implementation cost to be determined.
Lead and Partners	Town Stormwater Department and Planning with coastal / civil engineering support. Partners: NCDCM, NCDEQ, NC Coastal Federation, property owners, New Hanover County, conservation partners and utility/public works staff.

Key Feasibility Considerations - Confirm tidal-flow pathways, ground and roadway elevations, marsh and wetland limits, property ownership, bulkhead elevations and gaps, hydrologic/hydraulic effects, permitting constraints, and whether a berm, marsh enhancement, living shoreline, acquisition, or combined approach would reduce flooding without redirecting water to adjacent properties. Evaluate both public and private opportunities before selecting a preferred location or treatment.

Funding Path - No dedicated funding is currently identified for this feasibility concept. Potential sources, subject to eligibility: RCCP Phase 3/4 for eligible nature-based feasibility/design/implementation; NFWF, NOAA, NCDEQ/DCM resilience grants, local funds and separate acquisition/conservation funding where property control is required.

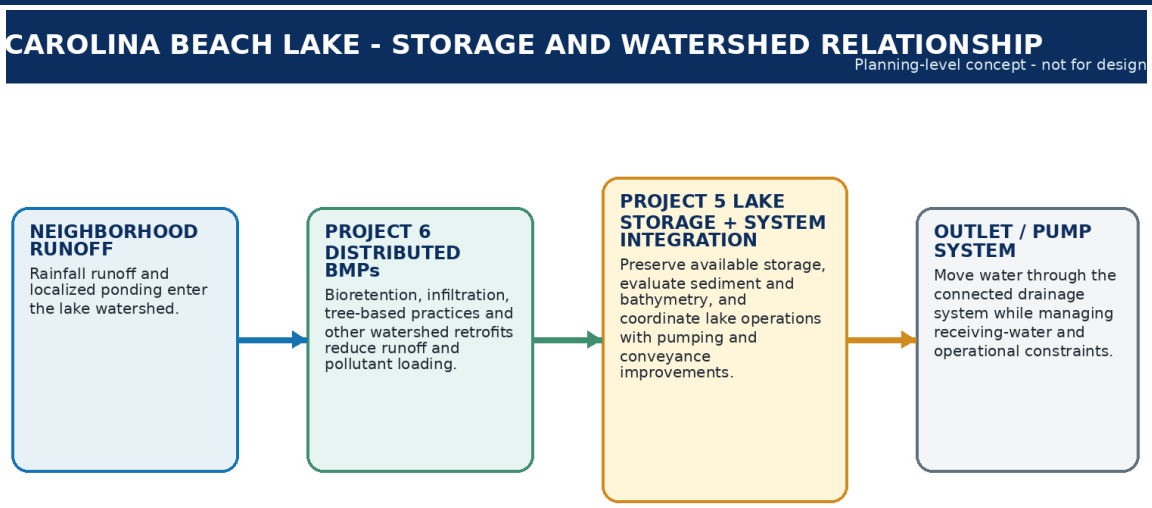
Preliminary Hazard, Benefit, and Implementation Assessment

Hazards: Tidal flooding, sea-level rise, roadway flooding, shoreline vulnerability and compound flood conditions.

Benefits: Potential reduction in recurring tidal flooding, protection or enhancement of existing marsh, improved roadway access, habitat and water-quality co-benefits and a nature-based adaptation opportunity in a high-priority area.

PROJECT 5 | Carolina Beach Lake Storage and Stormwater System Integration Project

High-Priority / Near-Term Concept



Conceptual planning graphic; site-specific conditions and design require further study.

Project Need and Proposed Approach	Maintain and improve the stormwater function of Carolina Beach Lake through continued storage preservation, dredging as needed, improved hydraulic connection with surrounding drainage infrastructure and targeted system modifications.
Location	Carolina Beach Lake and connected drainage and pumping infrastructure, including conveyance toward Henniker's Ditch.
Current Status	The Town has completed prior dredging and shoreline stabilization and is advancing additional stormwater-system improvements.

Source: Prior lake dredging and shoreline work; RCCP assessment; Town staff review; CPE engineering review.

PATH TO IMPLEMENTATION

Recommended Next Step	Obtain prior dredging plans and reports, complete updated bathymetry and sediment evaluation, document the relationship between lake storage, pumping and the funded force-main improvements and prepare a dredging and system-integration plan.
Timeline	1-3 years for investigation, design, permitting and phased implementation.
Relative Cost	$$$-$$$$ depending on dredging volume and disposal requirements.
Lead and Partners	Town Stormwater Department and Public Works. Partners: Engineering consultant, NCDEQ, USACE if applicable, New Hanover County, disposal-site owners.

Key Feasibility Considerations - Confirm the previous dredge-design elevation, remaining storage capacity, sediment quantity and quality, spoil-placement options, lake-to-system connections, and how the funded Carolina Beach Lake Pump Force Main project should be incorporated into future lake operations and system planning.

Funding Path - The Carolina Beach Lake Pump Force main project is funded, designed and bid. Potential sources, subject to eligibility: Local stormwater funds, Clean Water State Revolving Fund, Golden LEAF, FEMA mitigation programs, NCDEQ grants, State capital funds.

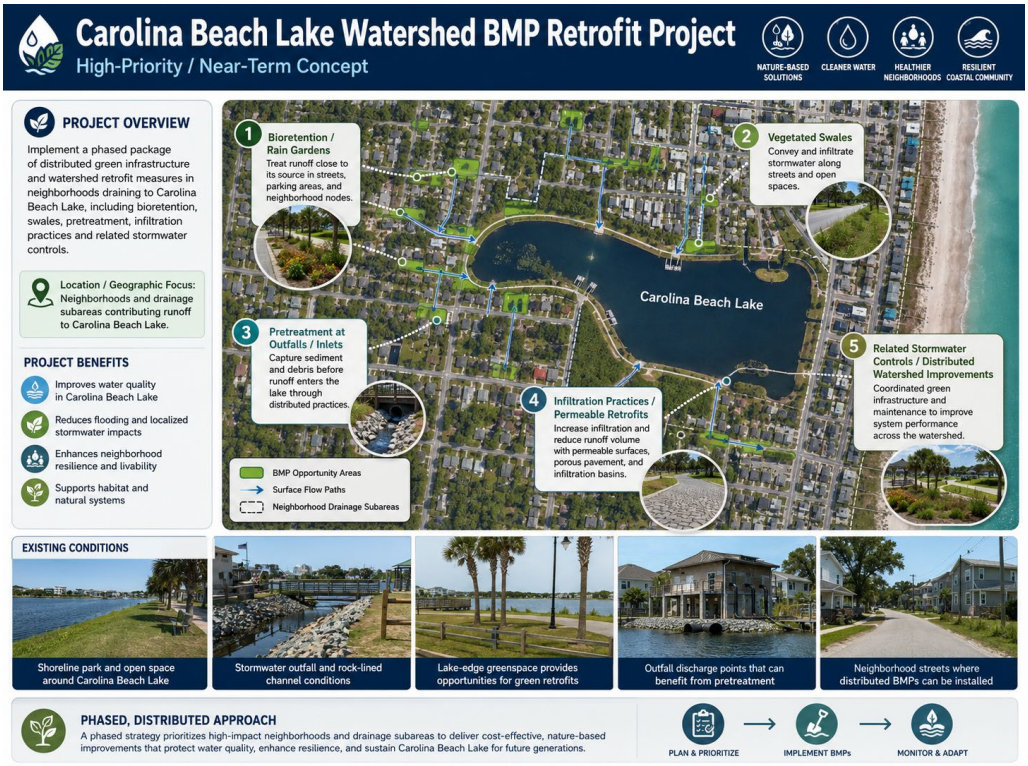
Preliminary Hazard, Benefit, and Implementation Assessment

Hazards: Rainfall flooding, stormwater surcharge, elevated groundwater and lake capacity limitations.

Benefits: Restored flood-storage capacity, improved pumping and conveyance, reduced rainfall flooding and improved long-term lake performance.

PROJECT 6 | Carolina Beach Lake Watershed BMP Retrofit Project

High-Priority / Near-Term Concept



Project Need and Proposed Approach	Implement a phased package of distributed green infrastructure and watershed retrofit measures in neighborhoods draining to Carolina Beach Lake, including bioretention, swales, pretreatment, infiltration practices and related stormwater controls.
Location	Neighborhoods and drainage subareas contributing runoff to Carolina Beach Lake.
Current Status	The Town has already implemented stormwater education and maintenance programs and has completed substantial lake improvements. Potential conservation of freshwater wetland properties surrounding and south of the lake is addressed separately under Project 14, where acquisition or conservation could preserve natural flood-storage and resilience functions.

Source: Nine Elements Watershed Plan; RCCP vulnerability assessment; Town staff review; CAT and project team input.

PATH TO IMPLEMENTATION

Recommended Next Step	Prepare a watershed retrofit prioritization map and advance one or more demonstration projects.
Timeline	1-3 years for prioritization and pilot implementation; ongoing phased program thereafter.
Relative Cost	$-$$ per small project; cumulative program cost varies by number and scale of retrofits.
Lead and Partners	Town Stormwater Department and Planning. Partners: NCDEQ, Cape Fear River Watch or watershed partners, New Hanover County, property owners, schools or civic organizations.

Key Feasibility Considerations - Identify priority sub catchments, available public right-of-way, groundwater constraints, maintenance responsibilities, pollutant hotspots and opportunities to coordinate with planned street or utility work.

Funding Path - No dedicated funding is currently identified for the remaining watershed retrofit program. Potential sources, subject to eligibility: RCCP Phase 3/4 for eligible nature-based planning/design/implementation, EPA 319, Clean Water State Revolving Fund, NCDEQ stormwater grants, NFWF/NOAA resilience programs and local stormwater funds.

Preliminary Hazard, Benefit, and Implementation Assessment

Hazards: Rainfall flooding, ponding, pollutant loading, bacterial impairment and watershed contribution to lake flooding.

Benefits: Reduced runoff and pollutant loading, improved lake performance, visible neighborhood benefits and scalable implementation.

PROJECT 7 | Private Stormwater Improvement / Incentive Concept

High-Priority / Near-Term Concept



Project Need and Proposed Approach	Create a voluntary program that encourages property owners to install Town-approved measures that reduce runoff entering the public stormwater system. Eligible practices could include permeable surfaces, cisterns, gutters, small-scale storage, rain gardens, swales, or other approved improvements.
Location	Town-wide with focus on flood-prone drainage areas contributing runoff to constrained public systems.
Current Status	The Town already requires stormwater and drainage review for development and redevelopment and conducts stormwater education as a Phase II community.

Source: Nine Elements Watershed Restoration Plan; Town stormwater program; CPE recommendation; RCCP process.

PATH TO IMPLEMENTATION

Recommended Next Step	Complete a program feasibility and rate-policy review; develop a pilot incentive or rebate program.
Timeline	1-2 years for program design and pilot launch.
Relative Cost	Staff time plus pilot incentives; annual program cost to be determined.
Lead and Partners	Town Stormwater Department, Finance and Planning. Partners: Property owners, local contractors, NC Cooperative Extension, NCDEQ, community organizations.

Key Feasibility Considerations - Define eligible practices, design standards, inspection requirements, credit value, administrative process, legal authority, funding source and methods to verify performance over time.

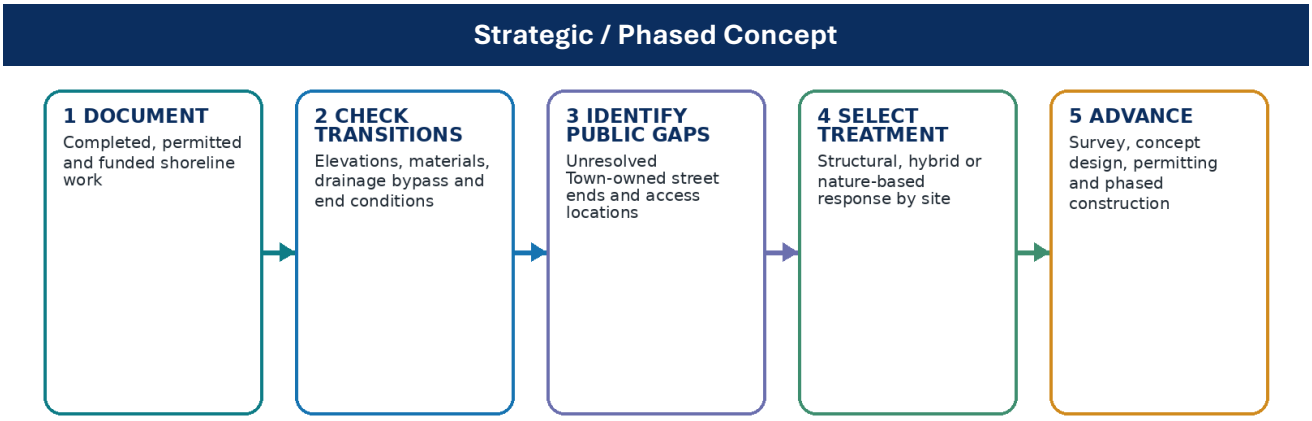
Funding Path - No dedicated funding is identified for a private-property incentive program. Potential sources, subject to eligibility: Local stormwater utility revenue, NCDEQ outreach grants, EPA 319, Clean Water State Revolving Fund, foundation grants.

Preliminary Hazard, Benefit, and Implementation Assessment

Hazards: Rainfall flooding, private runoff contributions, stormwater system loading and water-quality impacts.

Benefits: Reduces runoff at its source, expands community participation, lessens strain on public infrastructure and supports water quality.

PROJECT 8 | Targeted Canal Drive / Harbor Public Shoreline and Bulkhead Resilience Project



Conceptual planning graphic; site-specific conditions and design require further study.

Project Need and Proposed Approach	Address remaining shoreline, bulkhead and transition issues at Town-owned street ends and other public shoreline locations along Canal Drive / Florida Avenue and in the harbor / marina district where tidal overtopping, erosion, shoreline instability, drainage bypass, or access issues affect public infrastructure.
Location	Remaining unresolved Town-owned shoreline segments, public street ends and public access areas along Canal Drive / Florida Avenue and the harbor / marina district.
Current Status	The Town has completed public bulkhead improvements at Sandpiper, Starfish, Scotch Bonnet, Sailfish, Seagull, Scallop and Dolphin. This concept is limited to unresolved Town-owned shoreline gaps and transition points; it is not a corridor-wide bulkhead program and does not propose improvements on private property

Source: Canal Drive Flooding and Vulnerability Study; Town staff review; CAT and CPE engineering input.

PATH TO IMPLEMENTATION

Recommended Next Step	Complete a public-shoreline residual gap inventory using the confirmed completed and fall-2026 bulkhead locations and prioritize a small number of unresolved Town-owned locations for survey and concept design.
Timeline	1-3 years for gap assessment and design; phased construction thereafter.
Relative Cost	$$-$$$$ depending on location and structure type.
Lead and Partners	Town Stormwater/Public Works with Planning and engineering support. Partners: NCDCM/DCM, USACE, utility providers, engineering consultant and adjacent property owners where coordination is needed.

Key Feasibility Considerations

- Use the confirmed inventory of completed and permitted Town bulkhead locations to identify remaining public gaps and transition elevations
- Confirm design elevations, utilities, habitat impacts, maintenance responsibilities, and whether nature-based or hybrid treatments are feasible at remaining public shoreline locations. Evaluate Delaware Avenue separately as a potential integrated public shoreline, access, and stormwater opportunity.

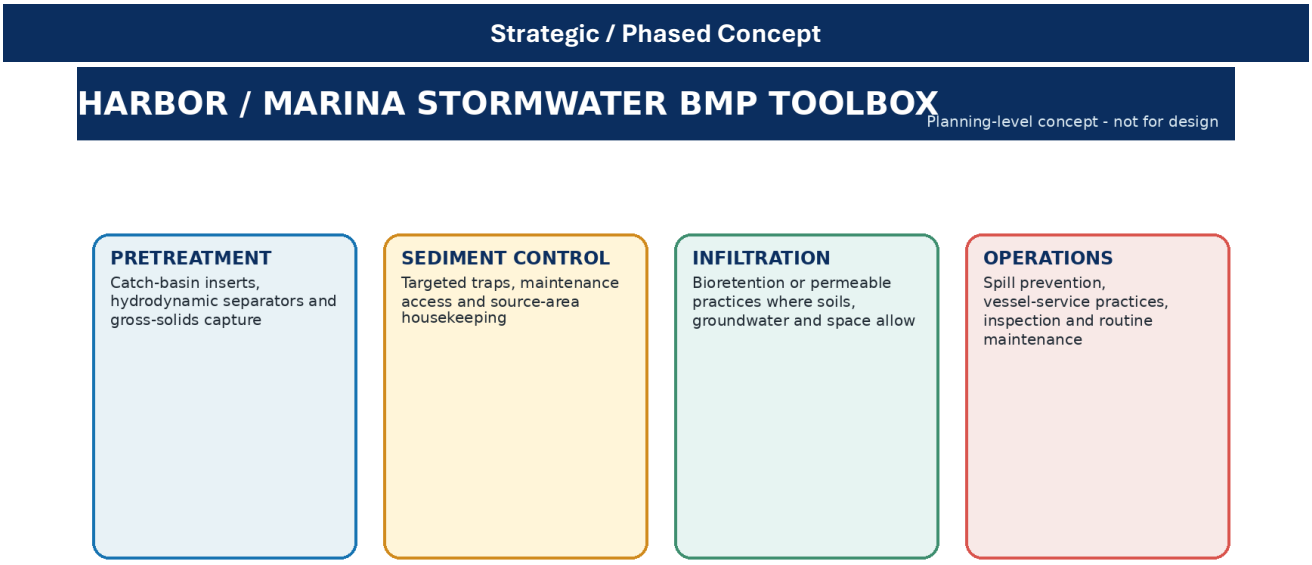
Funding Path - The Town has completed seven public bulkhead improvements and permitted improvements at Oystershell, Seahorse and Clamshell are expected to begin in fall 2026. Potential sources, subject to eligibility: Local capital/stormwater funds, FEMA mitigation programs, State shoreline/resilience grants and nature-based grant programs where an eligible hybrid or natural shoreline component is incorporated.

Preliminary Hazard, Benefit and Implementation Assessment

Hazards: Tidal flooding, shoreline erosion, overtopping, drainage bypass and sea-level-rise exposure.

Benefits: Reduced overtopping and erosion, improved continuity between shoreline structures, protection of public access and infrastructure and better drainage performance.

PROJECT 9 | Marina Stormwater / Pollution Control BMP Project



Conceptual planning graphic; site-specific conditions and design require further study.

Project Need and Proposed Approach	Build on existing harbor and marina stormwater controls through additional pretreatment, sediment capture, infiltration, spill prevention and operational best management practices.
Location	Harbor / marina district, waterfront parking areas, street drainage and discharge points entering the Yacht Basin or Myrtle Grove Sound.
Current Status	The Town has incorporated infiltration into a newly paved parking lot and is installing additional sediment traps.

Source: Water Use and Harbor Management Plan; Nine Elements Watershed Restoration Plan; Town staff review; RCCP process.

PATH TO IMPLEMENTATION

Recommended Next Step	Complete a harbor stormwater audit and identify priority BMP retrofits and operational practices.
Timeline	1-3 years for audit and phased improvements.
Relative Cost	$-$$$ depending on number and scale of BMPs.
Lead and Partners	Town Stormwater Department, Harbor/Marina management and Public Works. Partners: NCDEQ, marina operators, commercial users, NC Coastal Federation, watershed organizations.

Key Feasibility Considerations - Identify pollutant sources, drainage pathways, maintenance needs, vessel-operation concerns, available public space and opportunities to coordinate with planned waterfront improvements.

Funding Path - The Town has already completed or is advancing some marina stormwater improvements. Potential sources, subject to eligibility: EPA 319, Clean Water State Revolving Fund, NCDEQ grants, local stormwater funds, NOAA/NFWF coastal grants and RCCP only for eligible nature-based or hybrid BMP components.

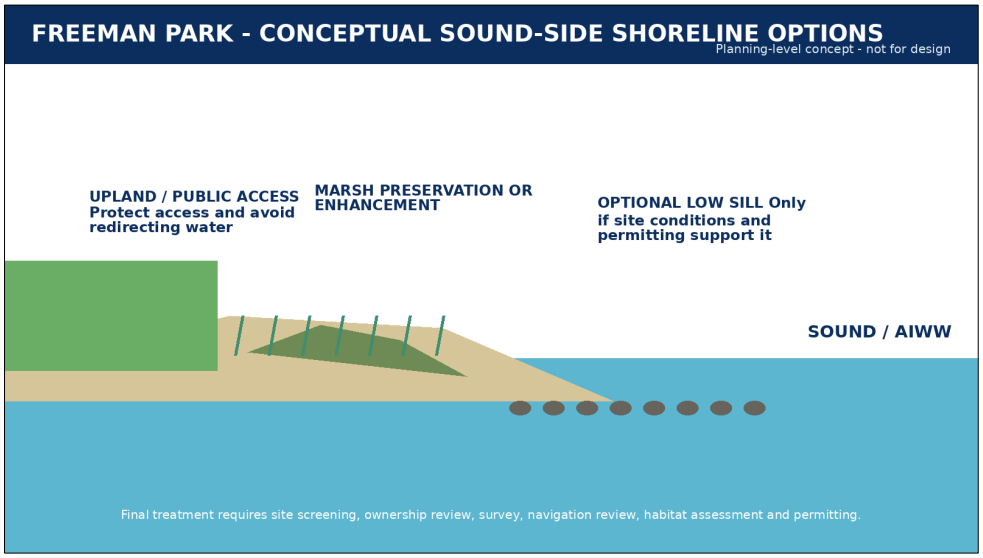
Preliminary Hazard, Benefit, and Implementation Assessment

Hazards: Stormwater runoff, sediment transport, bacterial and pollutant loading and tidal interaction with drainage.

Benefits: Reduced sediment and pollutant discharge, improved water quality, support for recreation and shellfish waters and enhanced public waterfront conditions.

PROJECT 10 | Freeman Park / Sound-Side Shoreline Resilience Concept

Strategic / Phased Concept



Conceptual planning graphic; site-specific conditions and design require further study.

Project Need and Proposed Approach	Evaluate whether targeted stabilization, restoration, living shoreline, or other nature-based or hybrid shoreline measures are feasible along the Intracoastal Waterway side of Freeman Park or other less-constrained sound-side locations.
Location	AIWW / sound-side shoreline near Freeman Park and other candidate public shoreline reaches.
Current Status	Town staff and the project team identified the AIWW side of Freeman Park as one of the Town's stronger opportunities for a nature-based shoreline project because the property is publicly controlled, relatively undeveloped and subject to shoreline erosion, tidal conditions and vessel-wake impacts.

Source: Town staff review; CPE coastal review; examples from NC Coastal Federation projects; RCCP process.

PATH TO IMPLEMENTATION

Recommended Next Step	Coordinate with the Freeman Park planning effort and complete shoreline-condition and site-feasibility screening to identify a viable location for living shoreline, marsh enhancement, habitat restoration, or other natural stabilization measures.
Timeline	1-3 years for site screening and concept design.
Relative Cost	$ for feasibility; $$-$$$ for pilot construction depending on scale.
Lead and Partners	Town Planning/Parks with coastal engineering support. Partners: NC Coastal Federation, NCDCM, USACE, NCDEQ, local conservation partners.

Key Feasibility Considerations - Screen shoreline condition, fetch and wave energy, bathymetry, wetland and habitat constraints, navigation, public access, ownership, permitting and compatibility with land-management plans.

Funding Path - Freeman Park land-management planning is underway. Potential sources, subject to eligibility: RCCP Phase 3/4 for eligible nature-based feasibility/design/implementation, NFWF, NOAA, NCDEQ/DCM, NC Coastal Federation partnerships, USACE programs and local funds.

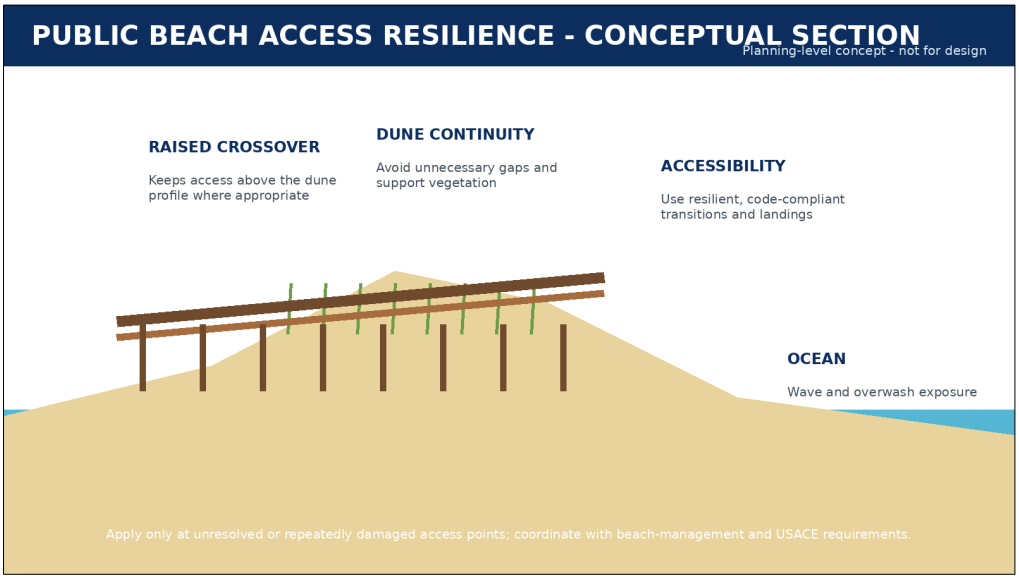
Preliminary Hazard, Benefit, and Implementation Assessment

Hazards: Shoreline erosion, habitat loss, wave exposure, sea-level rise and localized access vulnerability.

Benefits: Erosion reduction, habitat enhancement, demonstration value, public education and adaptation experience transferable to other sound-side areas.

PROJECT 11 | Boardwalk / Public Beach Access Resilience Project

Strategic / Phased Concept



Conceptual planning graphic; site-specific conditions and design require further study.

Project Need and Proposed Approach	Improve the resilience of public beach access structures, dune crossovers and related facilities in areas subject to storm surge, erosion, overwash and repeated maintenance needs.
Location	Boardwalk area and selected public oceanfront beach access points.
Current Status	The Town continues to coordinate with USACE and is replacing traditional wooden dune crossovers with Mobi-Mats where appropriate. Future work under this concept should focus only on unresolved needs beyond improvements already underway

Source: RCCP assessment; Town staff review; Beach Management Plan and USACE coordination.

PATH TO IMPLEMENTATION

Recommended Next Step	Prepare an access vulnerability inventory and integrate priority retrofits into the Beach Management Plan and capital program.
Timeline	1-5 years depending on location and coordination.
Relative Cost	$-$$ per access location; larger boardwalk work may be $$$.
Lead and Partners	Town Public Works, Parks/Recreation and Planning. Partners: USACE, NCDCM, accessibility partners, tourism organizations.

Key Feasibility Considerations - Identify unresolved high-maintenance or high-risk access points, confirm dune impacts, ADA needs, design standards, utilities, permitting and consistency with federal/state beach projects.

Funding Path - Beach-management and access planning are ongoing Town activities. Potential sources, subject to eligibility: DCM Public Beach and Coastal Waterfront Access grants, FEMA mitigation funding, USACE coordination, local occupancy tax or capital funds.

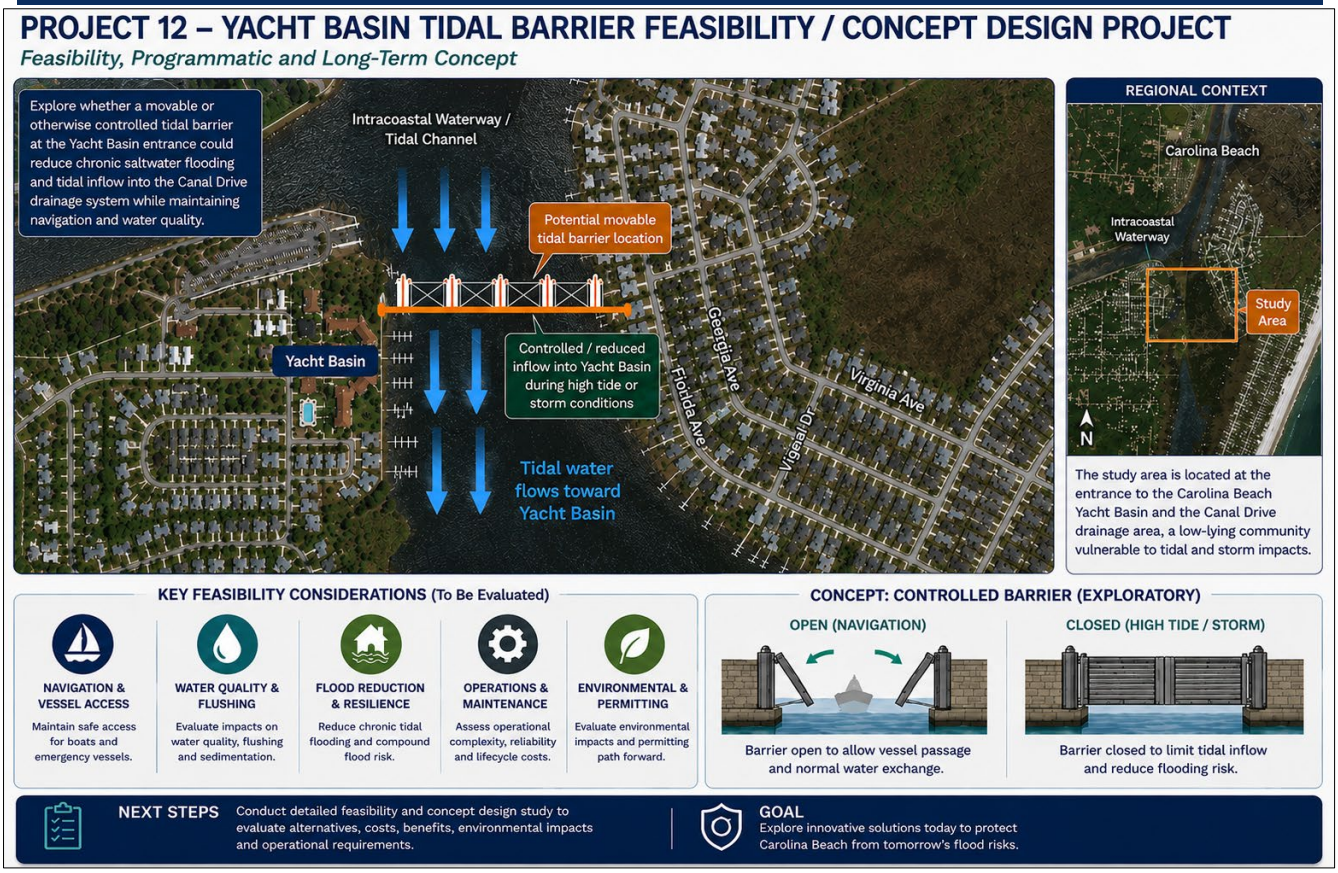
Preliminary Hazard, Benefit, and Implementation Assessment

Hazards: Storm surge, overwash, erosion, sea-level rise, wave impacts and wind exposure.

Benefits: Maintains safe public access, reduces storm preparation and repair needs, supports dune continuity and improves accessibility.

PROJECT 12 | Yacht Basin Tidal Barrier Feasibility / Concept Design Project

Feasibility, Programmatic and Long-Term Concept



Project Need and Proposed Approach	Explore whether a movable or otherwise controlled tidal barrier at the Yacht Basin entrance could reduce chronic saltwater flooding and tidal inflow into the Canal Drive drainage system while maintaining navigation and water quality.
Location	Entrance to the Carolina Beach Yacht Basin and connected Canal Drive drainage area.
Current Status	Town and engineering review indicated that this concept may be costly, operationally complex, environmentally sensitive and unlikely to be a near-term priority.

Source: Prior flood-resilience study concepts; RCCP screening; Town and CPE engineering review.

PATH TO IMPLEMENTATION

Recommended Next Step	Conduct only a high-level fatal-flaw and economic screening before committing to a full feasibility study.
Timeline	2-5 years for initial screening and feasibility; longer for design, permitting and implementation if advanced.
Relative Cost	$$ for initial screening; $$$$ for detailed study/design and potential implementation.
Lead and Partners	Town Manager/Planning with coastal engineering support. Partners: USACE, NCDCM, NCDEQ, Coast Guard, marina users, property owners.

Key Feasibility Considerations - Evaluate preliminary economic viability, navigation, flushing and water quality, environmental impacts, ownership, operations, failure modes, storm surge, sedimentation, permitting and alternative strategies.

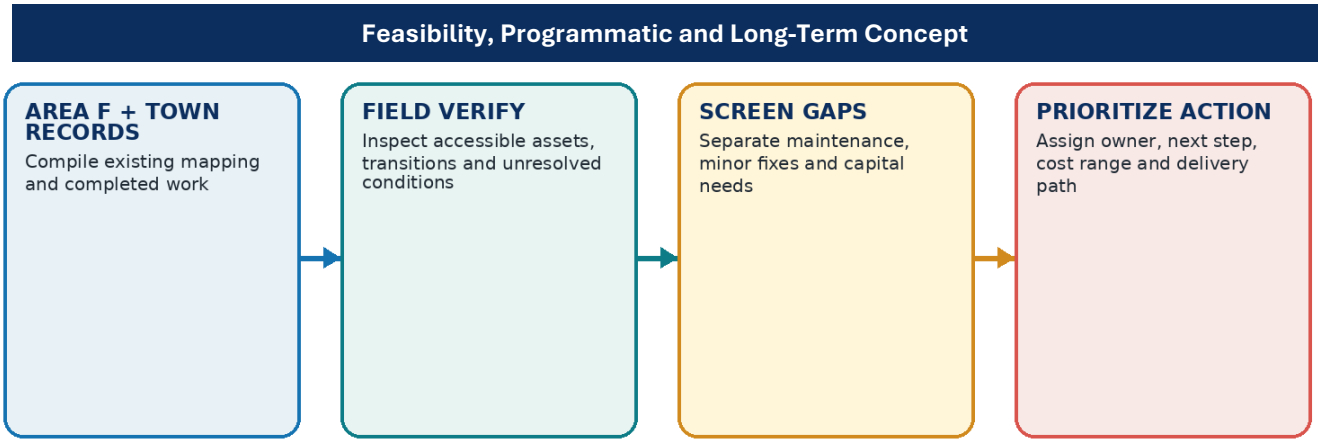
Funding Path - No dedicated funding is currently identified for tidal-barrier feasibility or concept design. Potential sources, subject to eligibility: USACE planning assistance, FEMA mitigation/planning programs, NOAA/NFWF where applicable, State planning funds and local funds.

Benefits and Preliminary Assessment

Hazards: Chronic tidal flooding, sea-level rise, saltwater inflow and compound flooding.

Benefits: Potential reduction in tidal inflow and chronic flooding if technically, environmentally and economically feasible.

PROJECT 13 | Yacht Basin / Canal Drive Residual Infrastructure Gap Assessment



Conceptual planning graphic; site-specific conditions and design require further study.

Project Need and Proposed Approach	Identify unresolved infrastructure gaps remaining after ongoing Town bulkhead, outfall, backflow and drainage improvements. The assessment would focus on abandoned outfalls, remaining pipe deficiencies, bulkhead transitions and other localized pathways that may continue to permit flooding, leakage, erosion, or drainage bypass.
Location	Yacht Basin shoreline, Canal Drive / Florida Avenue, street ends and connected drainage infrastructure.
Current Status	Much of the originally proposed bulkhead and outfall work has been completed or programmed.

Source: Canal Drive Flooding and Vulnerability Study; Town field review; CPE engineering observations.

PATH TO IMPLEMENTATION

Recommended Next Step	Combine the assessment with completion and Town review of the Area F stormwater mapping and prepare a concise residual-gap action list based on generalized findings and remaining public shoreline needs.
Timeline	1-2 years.
Relative Cost	$-$$ depending on survey, inspection and subsurface investigation needs.
Lead and Partners	Town Stormwater Department/Public Works. Partners: Engineering consultant, property owners, utility providers, NCDEQ/DCM.

Key Feasibility Considerations - Confirm whether older pipes remain connected, inspect abandoned outfalls, document bulkhead transition elevations, integrate stormwater mapping and identify residual maintenance or capital needs.

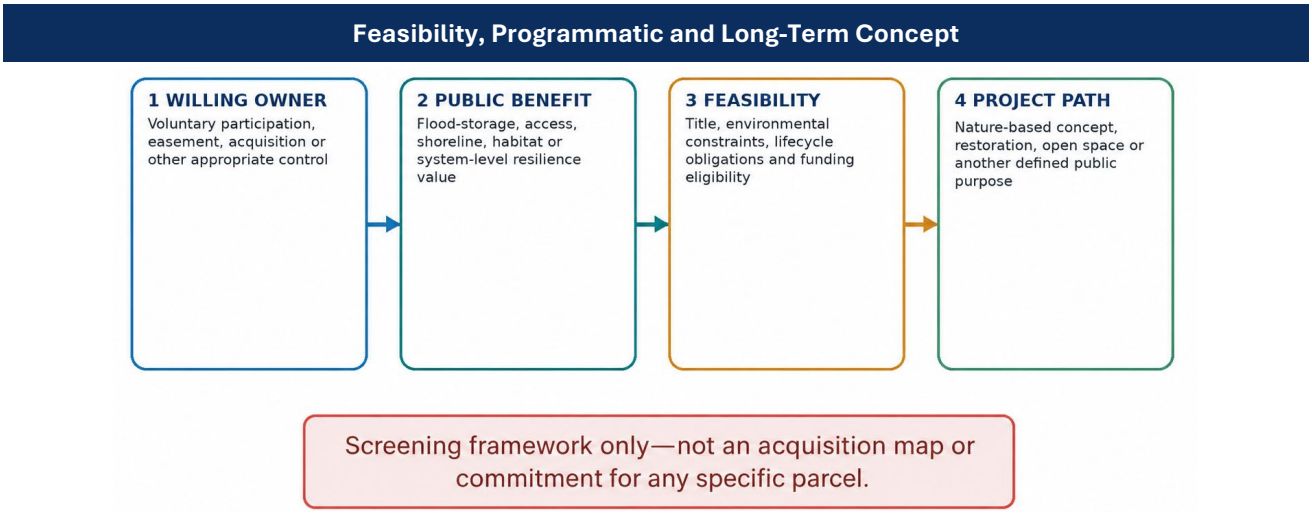
Funding Path - Area F stormwater mapping is ongoing. Potential sources, subject to eligibility: Local stormwater funds, Golden LEAF Flood Mitigation Program, Clean Water State Revolving Fund and other State infrastructure or asset-management grants.

Benefits and Preliminary Assessment

Hazards: Residual tidal flooding, drainage-system leakage, shoreline overtopping and infrastructure deterioration.

Benefits: Closes remaining flood pathways, improves confidence in completed investments and supports efficient maintenance and capital planning.

PROJECT 14 | Targeted Property Acquisition / Transition and Nature-Based Resilience Concept



Conceptual planning graphic; site-specific conditions and design require further study.

Project Need and Proposed Approach	Evaluate voluntary acquisition, conservation easement, or property-transition opportunities in selected low-lying or repeatedly flood-prone areas where public control could support a defined resilience purpose. Potential post-acquisition uses could include protection or enhancement of marsh and wetlands, stormwater or tidal-flood storage, living shoreline or shoreline restoration, public open space, drainage access, or other nature-based flood-management functions.
Location	Potential screening areas include the privately owned low-lying marsh parcels at 107 Florida Avenue and 1007 Canal Drive and selected freshwater wetland properties surrounding and south of Carolina Beach Lake, where conservation could preserve natural flood-storage and resilience functions.
Current Status	No formal buy-out or acquisition program has been established through this effort.

Source: CAT discussion and follow-up; Town staff discussion; RCCP VA; CPE review; Inspire property-transition discussion.

PATH TO IMPLEMENTATION

Recommended Next Step	Establish screening criteria and evaluate a small number of candidate parcels for resilience benefit and acquisition feasibility. Pursuing owner engagement only after Town policy direction and a viable acquisition funding source are identified.
Timeline	2-5 yrs depending on property-owner interest, funding cycles and associated nature-based project.
Relative Cost	$$-$$$$ for acquisition depending on parcel value; separate nature-based project costs would vary.
Lead and Partners	Town Manager, Planning, Finance and Stormwater/Public Works, with legal and technical support. Partners: Property owners, NCDCM, NC Emergency Management/FEMA where eligible, New Hanover County, land trusts/conservation partners, NC Coastal Federation and grant agencies.

Key Feasibility Considerations - Confirm willing ownership, parcel value, acquisition or easement eligibility, environmental conditions, intended public resilience use, long-term maintenance, funding sources, legal restrictions, equity implications, and whether acquisition would materially advance a defined flood-resilience project.

Funding Path - No formal acquisition program or dedicated acquisition funding has been established through this effort. Potential sources, subject to eligibility: Property acquisition would require non-RCCP sources such as FEMA/State acquisition programs where eligible, conservation funding, CAMA/local acquisition funds, or local funds. RCCP Phase 3/4 may be considered separately for eligible nature-based planning/design/implementation public control is established.

Benefits and Preliminary Assessment

Hazards: Chronic tidal and/or rainfall flooding, sea-level rise, wetland vulnerability, shoreline exposure and long-term land-use risk.

Benefits: Permanent reduction of future exposure, preservation or enhancement of natural flood-storage functions, creation of space for nature-based resilience improvements and avoidance of development that could worsen flooding.

PLANNING AND POLICY TOOLKIT

Projects 15-19 are planning, zoning, regulatory and funding tools developed to complement the physical resilience portfolio. They do not require the same multi-page engineering format as the capital and feasibility concepts. The following one-page action cards focus on the policy decision, implementation path and principal considerations.

FIVE COORDINATED POLICY TOOLS

15	**PROTECT CRITICAL ASSETS**	Keep essential facilities out of future flood-risk areas.
16	**REQUIRE HIGHER FREEBOARD**	Increase elevation standards to reduce future flood damage and disruption.
17	**PROTECT WETLANDS**	Limit fill and preserve flood-storage, water-quality, and habitat functions.
18	**ADDRESS NONCONFORMITIES**	Support resilient repair, adaptation, and redevelopment.
19	**FUND LOCAL RESILIENCE**	Use municipal service districts to fund localized resilience improvements.

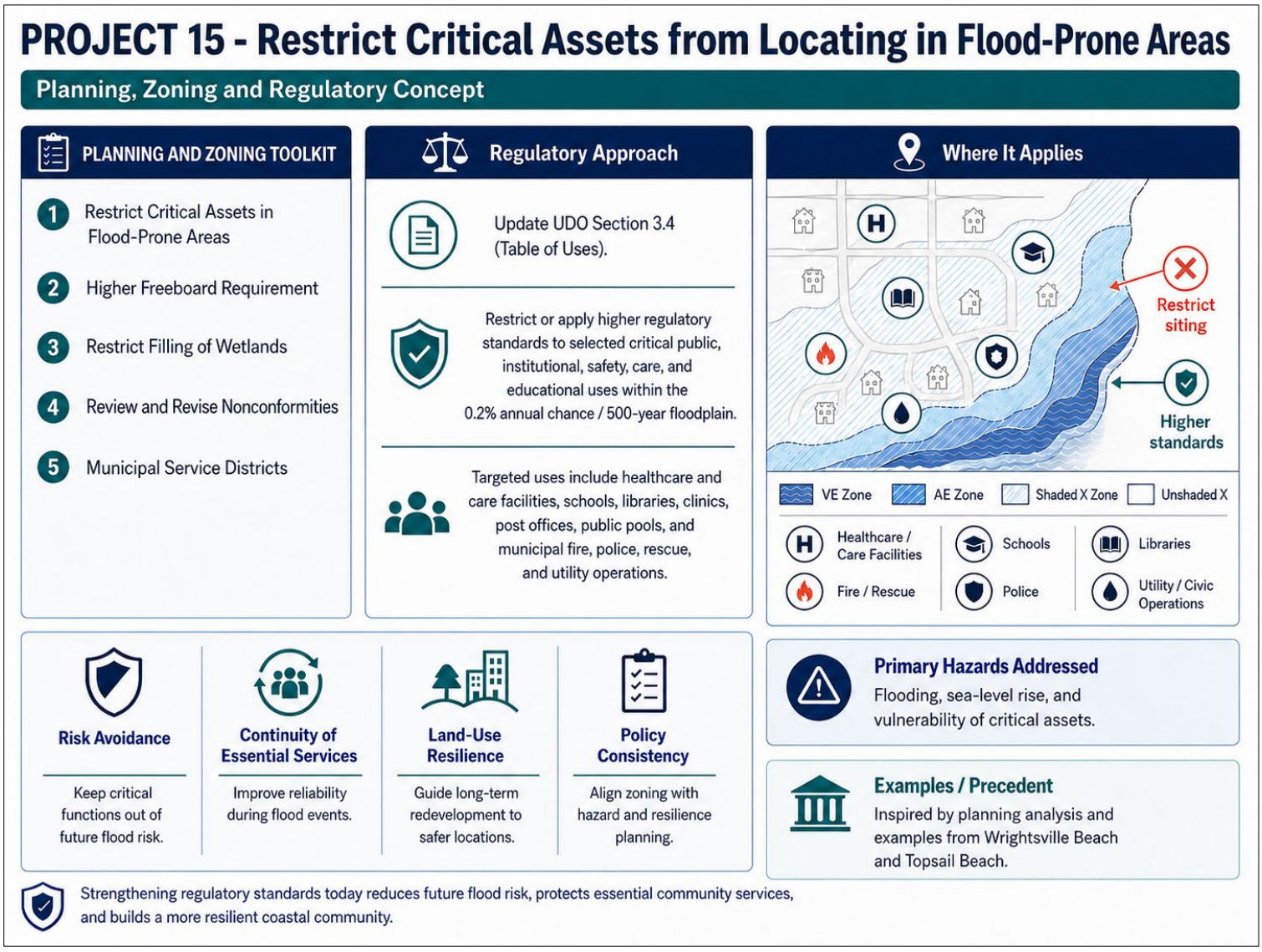
Common Implementation Sequence

1. Confirm Direction	Town staff and elected officials confirm the intended policy objective and scope.
2. Technical Review	Planning, legal, floodplain, finance and other specialists test feasibility and consistency.
3. Draft	Prepare ordinance language, administrative procedures, mapping or financial scenarios.
4. Engage	Conduct the required public, stakeholder, board and elected-official review.
5. Implement	Adopt, administer, monitor and periodically update the tool.

Policy language in this portfolio is conceptual and should not be interpreted as final ordinance text or legal advice.

PROJECT 15 | Restrict Critical Assets from Locating in Flood-Prone Areas

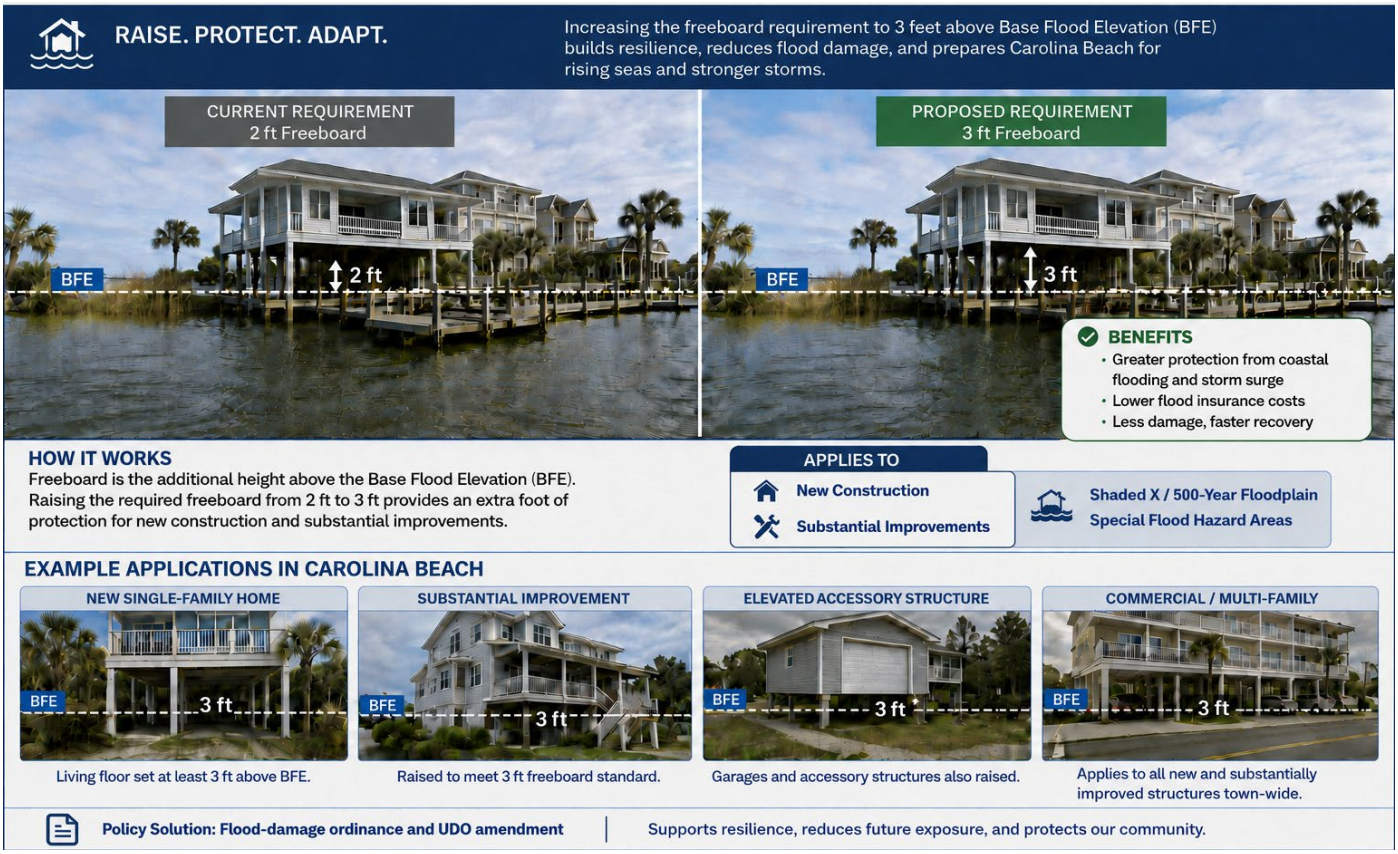
Planning, Zoning and Regulatory Concept



Policy Action	Update UDO Section 3.4 (Table of Uses) to restrict or apply higher regulatory standards to selected critical public, institutional, safety, care and educational uses within the 0.2% annual chance / 500-year floodplain. Targeted uses include healthcare facilities, childcare facilities, schools, libraries, medical clinics, post offices, municipal fire, police, and rescue operations.
Where It Applies	Town-wide regulatory application within the Shaded X / 500-year floodplain.
Recommended Next Step	Planning and legal review followed by draft UDO amendments and public process.
Lead / Timeline / Cost	Town Planning Department with legal counsel. Short term: approximately 1 year. Staff time.
Key Benefit	Avoids creation of new high-consequence vulnerabilities and improves long-term continuity of public services.

PROJECT 16 | Higher Freeboard Requirement

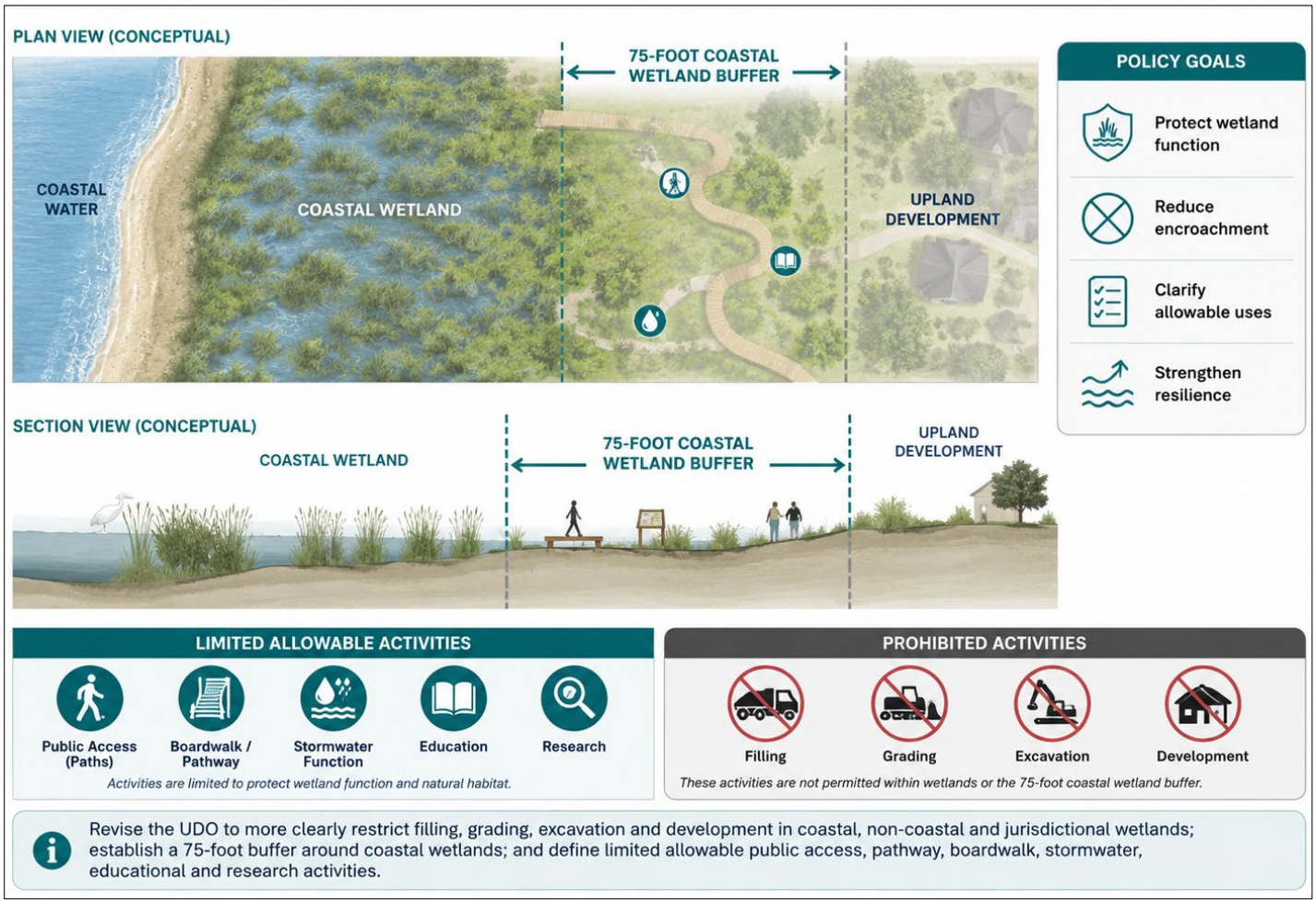
Planning, Zoning and Regulatory Concept



Policy Action	Increase the Town's freeboard requirement from 2 feet to 3 feet above Base Flood Elevation and amend UDO height exceptions to provide a corresponding structural-height allowance. Extend elevation standards into the Shaded X / 500-year floodplain for new construction and substantial improvements.
Where It Applies	Town-wide, with specific application in Special Flood Hazard Areas and the 500-year floodplain.
Recommended Next Step	Prepare ordinance alternatives and conduct stakeholder and public review.
Lead / Timeline / Cost	Town Planning, Inspections and Floodplain Administration. Short to moderate term, coordinated with flood-map reassessment. Staff time and limited consultant/legal support.
Key Benefit	Reduces future flood damage, supports adaptation to sea-level rise and avoids penalizing property owners for resilient elevation.

PROJECT 17 | Restrict the Filling of Wetlands

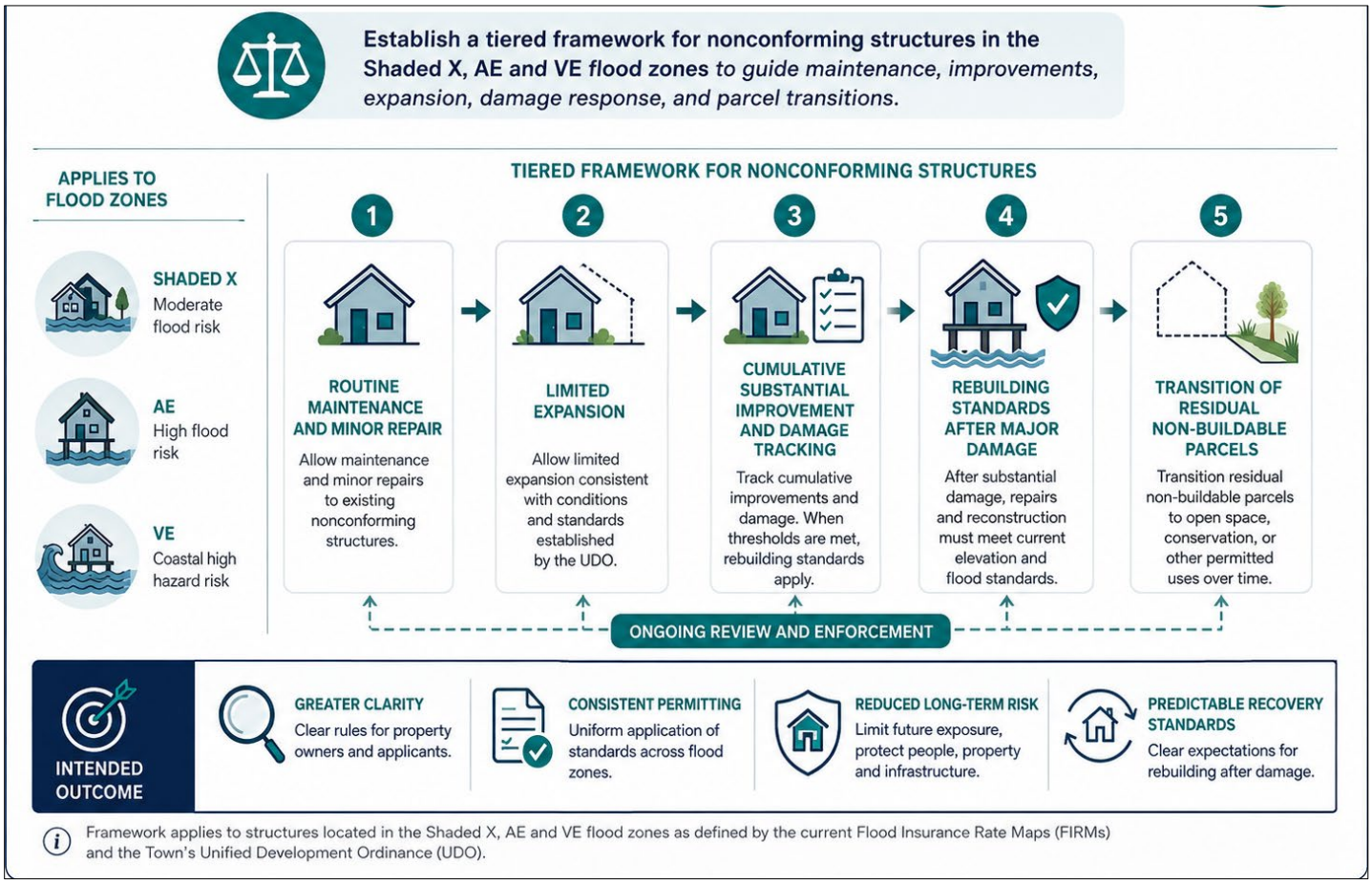
Planning, Zoning and Regulatory Concept



Policy Action	Revise the UDO to more clearly restrict filling, grading, excavation, and development in coastal, non-coastal, and jurisdictional wetlands; establish a 75-foot buffer around coastal wetlands; and define limited allowable activities such as public access points, pathways, boardwalks, and certain stormwater or educational uses.
Where It Applies	Town-wide wetlands and proposed coastal wetland buffers.
Recommended Next Step	Complete legal and planning review, develop mapped and text alternatives and conduct public process.
Lead / Timeline / Cost	Town Planning and Stormwater Departments. Short to moderate term. Staff time and legal/planning support.
Key Benefit	Preserves natural storage and ecological function, reduces fill-related flood displacement and protects water quality.

PROJECT 18 | Review and Revise Nonconformities

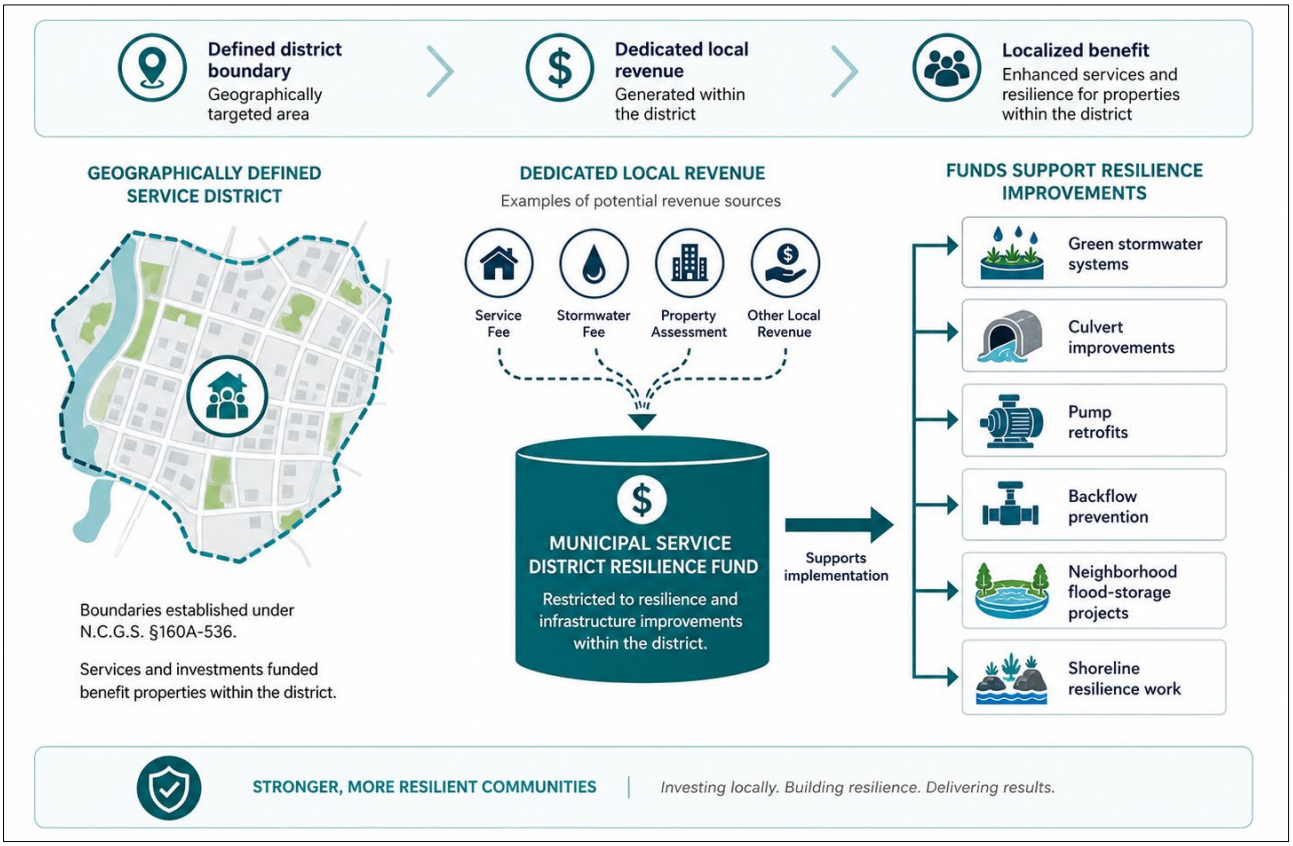
Planning, Zoning and Regulatory Concept



Policy Action	Update UDO Section 3.49 to establish a tiered framework for nonconforming structures in the Shaded X, AE and VE flood zones. The framework would address maintenance, cumulative substantial improvement and damage, limited expansion, rebuilding standards and transition of residual non-buildable parcels.
Where It Applies	Town-wide application to nonconforming structures in flood-prone areas.
Recommended Next Step	Conduct legal review and prepare tiered ordinance options with administrative procedures.
Lead / Timeline / Cost	Town Planning, Inspections, Floodplain Administration and legal counsel. Short to moderate term. Staff time plus legal and planning support.
Key Benefit	Gradually reduces the most vulnerable nonconforming conditions and improves the resilience of post-damage rebuilding.

PROJECT 19 | Municipal Service Districts

Planning, Zoning and Regulatory Concept



Policy Action	Explore geographically defined Municipal Service Districts under N.C.G.S. §160A-536 to generate dedicated local revenue for stormwater, drainage, flood protection and resilience improvements that provide enhanced services within the district. Revenue could support green stormwater systems, culvert improvements, pump retrofits, backflow prevention, neighborhood flood-storage projects, shoreline work, or other localized resilience investments.
Where It Applies	Potential hazard-based districts in the Town's most flood-prone areas; exact boundaries to be determined.
Recommended Next Step	Conduct a municipal finance and legal feasibility study and test illustrative district scenarios.
Lead / Timeline / Cost	Town Council, Town Manager, Finance and Planning. 2-3 years for evaluation and potential establishment. $ for study; staff time and legal/financial consulting.
Key Benefit	Could create a dedicated and transparent funding stream for localized resilience needs, provide predictable maintenance/capital funding and help supply local match for outside grants. A one-time special assessment could also be evaluated for a discrete project, but it would not provide the continuing revenue stream associated with an MSD

PORTFOLIO USE AND NEXT STEPS

This portfolio is intended to support annual capital planning, grant strategy, feasibility scoping, policy development and coordination with Town departments, residents, property owners and partner agencies. It should be updated as projects are completed, funded, refined or removed.

Recommended Near-Term Portfolio Actions

- Confirm the Town's preferred Phase 3 and Phase 4 application concept after the Request for Applications establishes eligibility and evaluation criteria.
- Complete or consolidate the Area F stormwater mapping and use the findings to define the relationship between Projects 2 and 13.
- Advance site-specific survey and hydrologic/hydraulic evaluation for the Florida Avenue / Canal Drive nature-based tidal-flood concept.
- Document how Carolina Beach Lake storage, pumping, force main improvements and watershed BMPs function as an integrated system.
- Maintain one current inventory of completed, permitted, funded and unresolved public shoreline improvements.
- Assign a responsible department and annual status to each portfolio concept.

Portfolio Maintenance

Update Frequency	Review at least annually and before major grant cycles.
Minimum Status Fields	Lead, next action, funding status, schedule, major decisions and completed work.
Retire or Reframe	Remove completed concepts; combine overlapping actions; reframe concepts when new information changes the implementation path.
Public Communication	Use generalized graphics where detailed infrastructure or private-property information is sensitive.

Stronger Community. Safer Shoreline. Better Future.