

PLANNING COMMISSION
May 10, 2023

The public may view the public meeting at:
www.youtube.com/user/cityofisleofpalms

Public Comment: Citizens may provide public comment here:
<https://www.iop.net/public-comment-form>

AGENDA

The Isle of Palms Planning Commission will hold its regular meeting on Wednesday, May 10, 2023, at 4:30 p.m. in Council Chambers of City Hall, 1207 Palm Boulevard.

- A. Call to order and acknowledgment that the press and the public were duly notified in accordance with state law
- B. Approval of minutes April 26, 2023
- C. New business Sea Level Rise Adaptation Plan RFP consideration
 - Seamon Whiteside interview
 - Weston and Sampson interview
 - discussion of next steps
- D. Old business Discussion of task from City Council regarding short term rentals

Comprehensive Plan review updated draft
- E. Miscellaneous business
- F. Adjourn



**Planning Commission Meeting
4:30pm, Wednesday, April 26, 2023
1207 Palm Boulevard, Isle of Palms, SC and
broadcasted live on YouTube: <https://www.youtube.com/user/cityofisleofpalms>**

MINUTES

1. Call to Order

Present: Sue Nagelski, Sandy Stone, Ron Denton, David Cohen, Jeffrey Rubin, Marty Brown

Staff present: Director Kerr, Zoning Administrator Simms

2. Approval of minutes

Mr. Cohen made a motion to approve the minutes of the March 8, 2023 regular meeting. Ms. Nagelski seconded the motion. The motion passed unanimously.

3. New Business

A. Discussion of task from City Council regarding short-term rentals

Director Kerr reviewed the list of considerations about short-term rentals that City Council would like for the Planning Commission to discuss and make recommendations back to Council. Those items include:

- Limit occupancy of newly constructed or substantially reconstructed homes
- Require minimum night stays – year-round or seasonally
- Amend parking requirements to incentive less vehicles and more carpooling
- Require STR listings to include STR license number
- Require new STR applicants to be considered for special exemption by BOZA

A lengthy discussion ensued around all the above considerations. The Commissioners agreed that amending parking requirements to incentives less vehicles and more carpooling and requiring new STR applicants to be considered for special exemptions by BOZA were not going to work and not worth further discussion or consideration. They believe the traffic concerns on the island are not as a result of the vehicles at larger short-term rentals.

They did agree to consider lowering occupancy limits on newly constructed homes (not including condominiums) to 8. They would also like to see occupancy limits restricted to 8 when an STR license lapses for more than a year.

They will also consider a three-night minimum for all rentals.

Director Kerr will check with the RentalScape software provider about including the STR license number in their search of rental advertisements and whether or not including the number in advertisements would help them in searching for non-compliant properties.

B. Review responses and discuss next steps for Sea Level Rise RFP

Director Kerr said two responses for the Sea Level Rise Adaptation Plan were received. The Planning Commission will review and score them at their May 10, 2023 meeting.

4. Old Business – Comprehensive Plan review updated draft

Director Kerr stated that all changes had been incorporated into the Comprehensive Plan draft and now only minor edits are seen in the draft. He and Zoning Administrator Simms are working on the grant funding lists needs in the Priority Investments element.

Mr. Stone said he will send his notes to Director Kerr about some of the redundancies he sees throughout the Plan. Director Kerr asked for all editorial suggestions be sent to him so he can incorporate them into the new draft, which will be discussed at the May 10 meeting.

5. Adjournment

The next meeting of the Planning Commission will be Wednesday, May 10, 2023 at 4:30pm.

Mr. Stone made a motion to adjourn, and Mr. Brown seconded the motion. The meeting was adjourned at approximately 6:08pm.

Respectfully submitted,

Nicole DeNeane
City Clerk

City of Isle of Palms, South Carolina
Request for Proposals 2023-01
Sea Level Adaptation Plan

In compliance with the City's Procurement Ordinance, the City of Isle of Palms, South Carolina is seeking proposals and probable costs for a Sea Level Rise Adaptation Plan (Plan) to steer policy and funding decisions for the foreseeable future. The Plan and project will include:

- development of localized sea level rise projections through the year 2100 based on the best available science;
- Model sea level rise scenarios in conjunction with other coastal flooding factors (utilize existing models such as NOAA Sea Level Rise Viewer, USGS Sea Level Change)
- an inventory of vulnerable public and private assets by time horizon;
- categorizing assets by their public importance, estimating the value of at-risk assets by time horizon;
- public engagement and meeting facilitation, and public hearing attendance;
- a range of potential adaptation measures with a focus on addressing critical infrastructure and other high priority assets, with a focus on practical nature-base solutions;
- estimated costs for implementation;
- a qualitative cost-benefit analysis of identified adaptation measures; and
- a list of potential funding sources.

The public engagement process will include outreach with affected property owners and other interested parties, including the Isle of Palms City Council, SCDNR, SCDHEC, USACE, SCDOT and Charleston County. This effort may include stakeholder interviews, focus groups, public workshops, and on-line questionnaires.

The request will be bid and awarded pursuant to the City's procurement ordinance. The City reserves the right to reject all proposals and to waive irregularities.

Proposals should be submitted to the following:

Douglas Kerr, Deputy City Administrator
1207 Palm Boulevard, Post Office Box 508
Isle of Palms, South Carolina 29451

Deadline for Questions: The deadline for questions is **5:00 p.m. Eastern Time, April 7th, 2023**. Proposers should send questions regarding this Request for Proposals to Douglas Kerr, Director of Building and Planning, in writing or email to dkerr@iop.net. Questions received before this deadline will be answered via addendum posted on the City's website at <http://www.iop.net/requests-for-bids-proposals>. Questions received after this deadline will not be answered. If an addendum is issued, Proposers must acknowledge receipt of the addendum with their proposal.

Deadline for Submissions: The deadline for submission is **2:00 p.m. Eastern Time, April 21st, 2023**. Submissions must be received at 1207 Palm Boulevard, Isle of Palms, South Carolina 29451 in a sealed envelope, where they will be opened and acknowledged. Sealed envelopes must be clearly marked "**RFP 2023-01; Sea Level Adaptation Plan**" and include one (1) hard copy and one (1) electronic copy saved to a USB flash drive. The City accepts no responsibility for electronic submissions, and it will be the responsibility of the Proposers to verify receipt by the City.

Proposals may be delivered by hand or by mail, but no proposal shall be considered which is not actually received by the City at the place, date and time appointed by the City and the City shall not be responsible for any failure, misdirection, delay or error resulting from the selection by any Proposer of any means of delivery of bids.

All proposals submitted shall include a current e-mail address. Once selection is complete, Notice of Award shall be posted on the City's website. Notice of Award and notices of non-award, shall be sent to all Proposers via e-mail.

Proprietary and/or Confidential Information: All submitted proposals will be public documents under the South Carolina Freedom of Information Act (FOIA), except as to information that may be treated as confidential as an exception to disclosure under the FOIA. If you cannot agree to this standard, please do not submit your proposal. All information that is to be treated as confidential and/or proprietary must be CLEARLY identified, and each page containing confidential and/or proprietary information, in whole or in part, must be stamped and/or denoted as CONFIDENTIAL, in bold, in a font of at least 12-point type, in the upper right-hand corner of the page. All information not so denoted and identified will be subject to disclosure by the City.

Proposers acknowledge and agree that the City will not be liable for any costs, expenses, losses, damages (including damages for loss of anticipated profit) or liabilities incurred by the Proposer or any member of the Proposer's organization as a result of, or arising out of, submitting a proposal, negotiating changes to such proposal, or due to the City's acceptance or non-acceptance of the proposal or the rejection of any and all proposals. Proposers are responsible for submission of accurate, adequate and clear descriptions of the information requested. Neither issuance of the RFP, preparation and submission of a response, nor the subsequent receipt and evaluation of any response by the City of Isle of Palms will commit the City to award a contract to any Proposer even if all the requirements in the RFP have been met.

Proposers must have or be able to procure an Isle of Palms Business License.

Background

The Isle of Palms is a low-lying barrier island in Charleston County with an average grade elevation of only eight or nine feet above Mean Sea Level. The community is served by a drainage system that evolved over time and was primarily installed in the 1960's by the Beach Company or the South Carolina Department of Transportation (SCDOT) as roads and neighborhoods were developed on the island. The system functions marginally well but is expected to need changes to meet future needs and the City has engaged an engineering firm to develop a separate drainage masterplan that is expected to be complete in mid-2023.

Charleston County handles all aspects of the NPDES program for the City and has provided the City with an inventory of the existing stormwater infrastructure, which is attached as an exhibit to this request.

The City believes that because of its low elevation and aged infrastructure, the community is very vulnerable to the long-range effects of sea level rise. The City's Comprehensive Plan update draft includes a goal and strategy of developing a sea level rise adaptation strategy.

Objectives

The City is seeking proposals for consultant services to prepare a Sea Level Adaptation Plan that aligns with regional and statewide planning efforts, as well as the City's Comprehensive Plan and the Drainage Masterplan that is underway. The chosen consultant will be expected to produce a Plan that will include clear strategies to enable the City to identify, assess and plan for potential impacts of sea level rise within the Isle of Palms. The ideal proposal will emphasize protection and enhancement of existing assets while incorporating strategies to combat sea level rise.

Scope of Work

Task 1. Information gathering

1. Hold a series of internal meetings and interviews with the City staff, the Planning Commission, the Environmental Advisory Committee, utility providers, and other project staff to establish expectations, finalize timelines and to better understand what has already been done and what critical assets are viewed as vulnerable to sea level rise.
2. Develop a comprehensive and diverse contact list of potential participants for personal and small group interviews that includes public officials, representatives from special districts and regional agencies, local community groups, service organizations, businesses, neighborhood groups, developers, local colleges, and other interest groups.
3. Compile Sea Level Rise Data including Sea Level Rise Data with Groundwater Impacts and Flooding From Rainfall and Waves. The City has been collecting groundwater level data through its work on a drainage masterplan that will be made available.
4. The City staff will assist in coordinating a series of public outreach workshops. These workshops will introduce the project to the public, define project parameters, inform the community of project opportunities and constraints and solicit opinions from the community to shape the Plan. The Consultant is expected to incorporate feedback from these workshops into the plan development.

Deliverable 1. Background report with current sea level rise and groundwater data, and findings from stakeholder interviews.

Task 2. Draft Plan Development

1. Develop preliminary goals and vision for the Plan to address underlying vulnerabilities based on information gathered from Task 1.
2. Develop a draft illustrative Adaptation Map that geographically shows areas of vulnerabilities.
3. Develop draft adaptation strategies for the identified key issues.
4. Develop draft cost estimates of identified potential projects.
5. Develop a list of potential funding sources to fund potential projects.
6. Present draft findings to key interested and affected parties identified in Task 1 and seek their input.

Deliverable 2. Draft plan and presentations.

Task 3. Final Plan Development, Presentation and Adoption

1. Refine the draft plan and deliverables based on stakeholder feedback.
2. Present the final plan to smaller interested and affected parties groups.
3. Present the final plan to City Council with a goal of having Council adopt the plan.

Deliverable 3. Final Plan including inventory of existing conditions, projections, vulnerabilities, visions, goals, strategies, potential projects, maps, cost estimates, potential funding sources, and any other documentation necessary to meet the stated goals of this request.

Qualifications

The Proposer shall prepare a statement of qualifications which identifies:

- The size, stability, and capacity of Proposer's organization, including, at a minimum, an identification of Proposer's: (1) total number of years in operation, (2) total current number of employees, (3) number of office locations (including the location of each office), and (4) number of employees in the office location which is intended to provide services.
- The Proposer's experience performing services for projects of a similar size, scope, and complexity as the services required by this RFP, including an identification of: (1) the number of years Proposer has been performing similar services; and (2) the most recent projects for which the Proposer has performed similar services. The list of recent projects shall include the name, contact person, address, and phone number of each party for whom the service was provided, as well as a description of the service performed, the dollar amount of the contract, and the date of performance.
- A list of the Proposer's principals, employees, agents, and sub-consultants which the Proposer intends to assign to this Project. This list shall include a summary of the qualifications (including education, training, licenses, and experience) of each individual; the approximate number of hours each will devote to the Project; and the type of work to be performed by each individual. The City will retain under its agreement with the successful Proposer the right of approval of all persons performing under the agreement.

Proposal Format:

The proposal format requirements were developed to aid Proposers in their proposal development. These directions apply to all proposals submitted. The purpose of the proposal is to demonstrate the technical capabilities, professional proposals, past project experiences, and knowledge within this industry. Proposer's proposal must address all the points outlined herein as required, in the following order:

- A. Transmittal Letter: A transmittal letter must be submitted with a Proposer's proposal which shall include:
1. The RFP subject, RFP number, and Scope(s) of Work in which Proposer is submitting.
 2. Name of the firm responding, including mailing address, e-mail address, telephone number, and name of contact person.

3. The name of the person or persons authorized to make representations on behalf of the Proposer, binding the firm to a contract.
4. Prepare an executive summary stating the Proposer's understanding of the project, familiarity of the outfall sites, design approach and opinion why the Proposer's firm should be chosen. Include any general information the Proposer wishes the City to consider about the proposal.

B. Proposer's Work History and References:

Provide a brief description of any relevant large-scale drainage system redesign projects, or similar drainage projects of comparable size and complexity for which the Proposer provided services within the past five (5) years. Limit information to no more than five (5) projects. All such descriptions should include:

1. Project location
2. Redesign of existing system and/or design of new system
3. Description of original project budget versus actual cost.
4. Name and contact information for a reference with knowledge of the Proposer's work on the specified project.

C. Project Team:

1. The proposal should clearly outline the background and experience of the Project Team. The Project Team will include any of the Proposer's staff who will be assigned to the project. If possible, include a one-page summary CV of each member. Understand that once the City issues a contract, no change in personnel assigned to the project will be permitted without prior written approval from the designated City representative.
2. Provide the following information for each proposed team member where applicable:
 - i. Name
 - ii. Job title for this project
 - iii. Professional Discipline
 - iv. South Carolina license number
 - v. Specific duties assigned on this project
 - vi. Recent experience with related drainage projects

D. Sub-Consultants/Contractors:

Provide the Proposer(s) and if possible, the names and proposals of all subconsultants that will be part of the Proposer's Team and identify the specific work the sub-consultant will perform. Once the City issues a contract, no change in sub-consultants assigned to the project will be permitted without prior written approval from the City.

E. Price Quote for Each Scope of Work:

Prior to entering into an agreement, but after the proposals are evaluated, the chosen Proposer will be requested to provide a price for each itemized project in the Scope of Work section of this request.

Proposal Evaluation Criteria:

The City will evaluate proposals based on the factors outlined within this RFP and the City's procurement ordinance, which shall be applied to all eligible, responsive proposals in selecting the successful Proposer. The City reserves the right to disqualify any proposal from a Proposer it deems as non-responsive and/or non-responsible. The City reserves the right to make such investigations of the proposals of the Proposer as it deems appropriate.

Award of any contract may be made without discussion with Proposers after proposals are received. The City reserves the right to cease contract negotiations if it is determined that the Proposer cannot perform the services specified in their response.

Recommendation of award for contract will be made based not only on price, which is an important factor, but also on quality of proposal, qualifications, experience, technical expertise, references and ability to execute the work. After careful evaluation, and a series of interviews, the Planning Commission will make a recommendation to City Council for award of a contract.

STATE OF SOUTH CAROLINA)
AGREEMENT TO DEVELOP A SEA LEVEL RISE)
ADAPTATION PLAN)
FOR THE CITY OF ISLE OF PALMS)

THIS AGREEMENT is made and entered into this _____ day of 2023, by
and between the City of Isle of Palms, S.C. ("City") and _____
("Consultant").

WHEREAS, City desires to engage the services of the Consultant to develop a
Sea Level Adaptation Plan (the "Project"); and

WHEREAS, Consultant agrees to perform the services pursuant to the terms and
conditions hereinafter set forth.

THEREFORE, in consideration of the mutual covenants and promises set forth
herein, City and Consultant agree as follows:

1. Scope of Work

A. Consultant agrees to provide all labor, equipment, materials, supplies, and
incidentals which are required to perform all services for the Project pursuant to
the Scope of Work described in the bid document and the proposal submitted by
Consultant to City dated _____, 2023 (the "Proposal"), a copy of
which is attached hereto as "Exhibit I" and made a part of this Agreement by
reference thereto. In the event of a conflict between any provision contained in
the Bid and any provision contained in this Agreement, the terms of this
Agreement shall control.

B. In providing services under this Agreement, the Consultant shall perform
in a manner consistent with that degree of care and skill ordinarily exercised by
members of the same profession currently practicing under similar circumstances
at the same time and in the same or similar locality. Upon notice to the
Consultant and by mutual agreement between the parties, the Consultant will,
without additional compensation, correct those services not meeting such a
standard. Consultant agrees to comply with all applicable federal, state and local
laws, rules and regulations regarding all services performed by Consultant
pursuant to this Agreement.

2. Contract Price. For all services to be performed by Consultant on the Project,
City agrees to pay to Consultant upon completion Work detailed in Exhibit I, which
includes labor fees and anticipated expenses.

3. Time of Performance. Consultant understands the time sensitivity of the Project

and agrees to complete the services on the Project in a timely manner. Provided, however, that if performance by the Consultant is delayed for reasons or causes beyond the control of Consultant (including but not limited to, acts of God, weather conditions, site conditions, labor or material shortages, delays caused by City, and casualty losses) the Project completion date shall be extended accordingly.

4. Change Orders. The City has the right to require alterations or changes ("Change Orders") to the Project and in such case Consultant agrees to make such alterations or changes; provided, however, that the details and additional cost or credit of such Change Order must be agreed to by the City and Consultant in writing prior to the commencement of the Change Order.

5. Indemnification and Insurance.

- A. Consultant agrees to hold harmless and indemnify City and its officers, agents and employees from and against any loss or damage, including all reasonable attorney's fees and expenses, incurred as a result of any and all claims, demands, causes of action, suits, judgments, fines or penalties (including but not limited to all fees and expenses incurred as a result of death or injury to persons or for loss of or damage to property) caused by Consultant's performance of the services under this Agreement. In the event of any such claims made or suits filed, City agrees to give Consultant written notice thereof, and Consultant shall have the right to defend or settle the same to the extent of its interests hereunder.
- B. Consultant shall procure, and maintain in effect during the term of this Agreement, Comprehensive general liability insurance in an amount not less than \$1,000,000.00 per person, \$2,000,000.00 per claim, and \$250,000.00 per claim for property damage;
- C. Professional Liability: Professional liability insurance for damages incurred by reason of any negligent act, error or omission committed or alleged to have been committed by Contract in the amount of \$1,000,000.00 per claim and in the aggregate; and
- D. Workers' Compensation: Consultant agrees to maintain workers' compensation coverage on its employees as required by the State of South Carolina workers' compensation laws.

All insurance coverage required hereunder shall be with companies approved in advance by City, who shall be named as an additional insured on all such policies. Proof of such insurance shall be provided to City prior to commencement of any work by Consultant. Each policy shall contain a requirement that, in the event of change or cancellation, 30 days' prior written notice must be given to City.

6. Consultant agrees that any subcontracts for this Project shall be approved in advance in writing by City; shall provide that City is an intended third-party beneficiary of the subcontract; shall require that all Consultant work be performed in accordance with the requirements of this Agreement, including all indemnification and insurance requirements set forth in this Section 6; and shall provide that City is named as an additional insured on all such insurance policies. Proof of Consultant's insurance shall be provided to City prior to commencement of any work by Consultant.

7. Breach. In the event that either party breaches any provision of this Agreement, and the same continues for a period of seven (7) days after receipt of written notice thereof, then the non-breaching party may exercise any and all remedies at law or in equity regarding the breach of this Agreement. Without prejudice to any other rights or remedies available for the said breach, the non-breaching party may terminate this Agreement and cease further performance under this Agreement.

8. Notices. All notices, consents, and approvals required by any provision of this Agreement shall be in writing and shall be deemed to be properly given and received when personally delivered to the representatives of each party or when deposited in the United States mail, registered or certified, with return receipt requested, postage prepaid, and addressed to:

City of Isle of Palms:

Representative: Desirée Fragoso, City Administrator
Address: PO Box 508, Isle of Palms, SC 29451

Consultant: _____

Representative: _____
Address: _____

9. Mediation. Any claim, dispute, or controversy arising under or in connection with this Agreement shall be subject to mediation as a condition precedent to litigation. A request for mediation shall be made in writing, delivered to the other party to the Agreement, and filed with the proposed mediator. Mediation shall be conducted in Charleston County, South Carolina. The mediator shall be a member of the South Carolina Bar and shall be selected by mutual consent and agreement of the parties. If a party fails to object to the mediator proposed by the party requesting mediation within 30 days of the initial request for mediation, the mediator shall be deemed selected as proposed. If the parties fail to agree upon a mutually acceptable mediator within 60 days of the initial request for mediation, the mediator shall be selected from the official roster of active certified mediators in Charleston County, as provided by the South Carolina Supreme Court's Commission on Alternative Dispute Resolution and Board of Arbitrator and Mediator Certification, by choosing in alphabetical order the first available circuit court mediator from the roster. The parties shall equally divide the mediator's fee and

any filing fees. Agreements reached in mediation shall be enforceable as settlement agreements in any court of competent jurisdiction. Nothing contained herein shall preclude either party from seeking enforcement of the terms of mediation pursuant to this Paragraph through a court of competent jurisdiction, and the prevailing party shall also be entitled to reimbursement by the losing party for all reasonable fees and costs, including attorney's fees, incurred in the proceedings seeking enforcement.

10. Entire Agreement; Amendments. This Agreement constitutes the entire Agreement between the parties and supersedes and nullifies all prior or contemporaneous agreements or representations by either party which are not expressly stated in this agreement. Neither party is relying upon any representation not expressly contained herein.
This Agreement may be amended only by a written agreement signed by each party.

11. Effect of Waiver or Consent. A waiver or consent, express or implied, to or of any breach or default by a party in the performance of its obligations under this Agreement is not a consent or waiver to or of any other breach or default in the performance by that party of the same or any other obligations of that party with respect to this Agreement. Failure on the part of a party to complain of any act of the other party or to declare a party in default with respect to this Agreement, irrespective of how long that failure continues, does not constitute a waiver by that party of its rights with respect to that default until the applicable statute-of- limitation period has run.

12. Governing Law; Severability. This Agreement is governed by and shall be Construed and interpreted in accordance with the laws of the State of South Carolina, excluding any conflict- of-laws rule or principle that might refer the governance or the construction of this Agreement to the law of another jurisdiction. If any provision of this Agreement is held invalid or unenforceable to any extent by a court of competent jurisdiction, the remainder of this Agreement is not affected thereby, and that provision shall be enforced to the greatest extent permitted by law.

13. Binding Agreement. This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and permitted assigns.

14. Subcontracting and Assignment. Consultant agrees not to enter into any subcontracts, leases, agreements, or assignments pertaining to this Agreement or any interest or right herein, either voluntarily or by operation of law, without prior written approval of City.

15. Section Headings. The headings of Sections or paragraphs used in this Agreement have been inserted for convenience only and are not to be used in determining the contents contained herein.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals,
by and through the undersigned officers, as of the date stated above.

WITNESS:

The City of Isle of Palms, S.C.

By: _____

Title: _____

(as to City)

By: _____

Title: _____

(as to Consultant)

EXHIBIT I

(Attach Consultants Proposal, dated_____)

EXHIBIT II

(Attach original RFP 2023-01)



©City of Isle of Palms



**CITY OF ISLE OF PALMS
RFP 2023-01
SEA LEVEL ADAPTATION PLAN**

APRIL 21, 2023

seamonwhiteside.com

501 Wando Park Blvd, Suite 200, Mount Pleasant SC 29464 | 843-884-1667

MOUNT PLEASANT | GREENVILLE | SUMMERVILLE | SPARTANBURG | CHARLOTTE

Elevating the site design experience.

TABLE OF CONTENTS

Table of Contents.....	pg 2
Firm Overview.....	pg 3
Transmittal Letter.....	pg 5
Proposer’s Work History and References.....	pg 10
Project Team.....	pg 16
Certificates of Authorization.....	pg 22





SEAMONWHITESIDE MISSION

To ***elevate the site design experience*** through full commitment to our people, our clients, our plans, and communities, and to be the most exceptional site design firm in every community we serve.

Commitment to our People: We focus on care, respect, integrity, collaboration, mentorship, training, resources, events, and fun. This is our culture.

Commitment to our Clients: We work as a team by understanding the vision, providing realistic schedules, designing creative solutions, engineering functional plans, producing quality work, and embracing high level of collaboration and care throughout the process.

Commitment to our Communities: We are proud of the places we design and the communities we help build and enjoy. Seeing our designs come to life is a rewarding experience in itself. We also give back to our communities through service positions, charitable gifts, sponsorships, and numerous organized volunteer efforts each year.

Commitment to our Plans: We focus on the quality of our design and deliverables by creating a solid set of plans for our clients. We strive to approach each job with a high level of care, utilizing quality control processes, strong coordination practices, and cutting edge design tools to deliver a set of plans we are proud to stand behind.

Commitment to Sustainability: SW+ is a leader in environmentally conscious, low-impact engineering and site design and is committed to keeping up with the evolving technologies of sustainability. We approach each design with a balance of natural systems, long term economic values, and working diversity to create holistic environments for people and communities.



CITY OF ISLE OF PALMS RFP 2023 - OI SEA LEVEL ADAPTATION PLAN



ESTABLISHED

1985

FOUNDERS

Kenny Seamon & Stuart Whiteside

PRINCIPALS

David “Russ” Seamon, President
Joe Bryant, Executive Vice President
Gary Collins, Vice President
Jason Munday, Vice President
William O’Neal, Vice President

EMPLOYEES

157+

DESCRIPTION

SeamonWhiteside (SW+) is a full-service land design firm providing master planning, landscape architecture, civil engineering, urban design, and permit coordination services to public and private clients throughout the Southeast. SW+ provides comprehensive services tailored to the needs of each project for the purposes of facilitating the planning, design and construction.

CLIENT TYPES

Commercial, Retail, Office Buildings, Business Parks, Industrial and Commerce Parks, Higher Education and Corporate Campus, Single and Multi-Family Residential, Parks and Recreation, Mixed Use, Urban Design, Municipal Improvements, Streetscapes, Roadway Design

SERVICES

Land Planning, Civil Engineering, Landscape Architecture, Urban Design, Industrial, Permitting Coordination, Flood Studies, Charrette | Public Engagement

WEBSITE

www.seamonwhiteside.com

TWITTER

@SeamonWhiteside

FACEBOOK

facebook.com/SeamonWhiteside

INSTAGRAM

@seamonwhiteside

MOUNT PLEASANT OFFICE

501 Wando Park Boulevard, Suite 200
Mount Pleasant, SC 29464
Tel (843) 884-1667

GREENVILLE OFFICE

Judson Mills Building 6000, Suite 6060
701 Easley Bridge Road
Greenville, South Carolina 29611
Tel: (864) 298-0534

SUMMERVILLE OFFICE

712 N Cedar Street
Summerville, SC 29483
Tel: (843) 972-0710

SPARTANBURG OFFICE

104 N Daniel Morgan Avenue, Suite 300
Spartanburg, SC 29301
Tel: (864) 272-1272

CHARLOTTE OFFICE

230 E Peterson Drive, Suite B
Charlotte, NC 28217
Tel: (980) 312-5450





April 21, 2023

Douglas Kerr, Deputy City Administrator
1207 Palm Boulevard
Post Office Box 508
Isle of Palms, SC 29451

RFP 2023-01; Sea Level Adaptation Plan

Scope of Work: Seamon, Whiteside & Associates, Inc. is responding to all of the scope of work items detailed in the RFP

Firm Responding: Seamon, Whiteside & Associates, Inc. (SeamonWhiteside)

Number of Employees: 170 Company-wide; 81 in the Mount Pleasant office

Mailing Address: 501 Wando Park Boulevard, Suite 200, Mount Pleasant, SC 29464

Email: rphillips@seamonwhiteside.com

Phone Number: (843) 884-1667 ext. 212

Name of Contact Person: Ryne C. Phillips, PE

Person Authorized to Make Representation on Behalf of the Proposer: Jason Munday, PE, Managing Principal

Dear Mr. Kerr and Selection Committee:

Isle of Palms is a focal point for the Charleston area, is home to thousands of residents, and serves as a vacationing playground for millions around the globe. Life on the Isle of Palms depends on a pristine landscape and flowing coastal waterways. However, sea level rise may cause those recreational waterways to become the city's greatest threat if ignored over the next 50 to 75 years. Based on the premonition of future flooding from sea level rise, the city has made an instrumental decision to begin planning for the future. Accordingly, **SeamonWhiteside** has assembled a team of individuals to support the Isle of Palms goals of developing a sea level adaption plan which will support long term coastal community resiliency for Isle of Palms' residents and visitors for years to come.

Project Understanding, Familiarity, and Design Approach

Flooding due to intense rainfall and King Tides have been a nuisance for Isle of Palms' residents, business owners, and visitors. In an effort to mitigate these flood risks, the city has been working on drainage master plans for specific areas on the island: Phase 1, 2, 3, and 4. These drainage master plans, developed on a phase-by-phase approach, have been completed to identify and conceptually design improvements aimed towards eliminating and preventing flood conditions due to intense rainfall (e.g., 6th/7th Avenue) and elevated tides (e.g., Waterway Boulevard). As funding is available, the city has started implementing several key drainage improvements that have been identified (e.g., Phase 3 outfall improvements).

Previously recommended improvements may address minor coastal flooding. Such recommendations include earthen berms and check valves. However, such recommendations may only provide flood relief during today's King Tides or minor storm surges. With the threat of significant sea level rise on the horizon, it is imperative the city have a holistic, city-wide, plan that provides a comprehensive outlook on what the potential impacts from sea level rise may be (e.g., structure and/or road flooding) and how the city can position itself to combat those potential impacts. As a result, the city has opted to complete a sea level adaptation plan to support the city's goal of providing a long-term coastal community resiliency.

The final deliverable of the scope of work identified by the city and outlined herein will indeed be a sea level adaptation plan. At its core, the plan will outline potential risk of sea level rise from accredited existing sources, provide strategies for adapting to sea level rise both environmentally ethically and cost effectively, outline potential projects that will mitigate against sea level rise, and identify potential funding sources the city can leverage to implement adaption strategies and improvement projects.

501 Wando Park Boulevard, Suite 200, Mount Pleasant, SC 29464 | (843) 884-1667

SeamonWhiteside.com

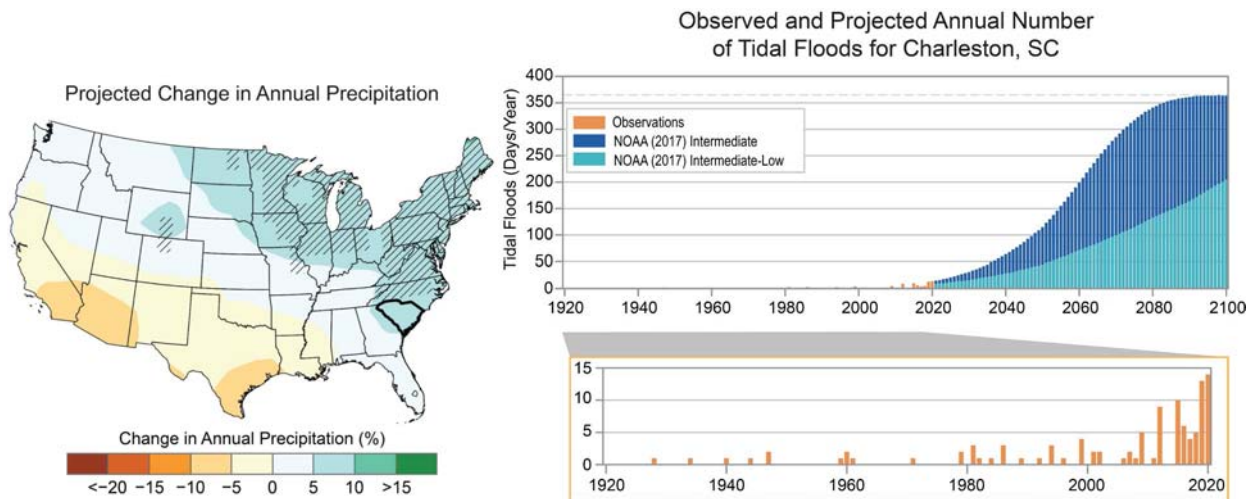
Mount Pleasant | Greenville | Summerville | Spartanburg | Charlotte

Elevating the site design experience.

Task 1 – Information Gathering

Sea Level Rise, Flooding, and Infrastructure Data Compilation

Numerous sources are available that outline potential sea level rise. Our team will gather, evaluate, and present those data to city staff to form a recommendation of a target sea level rise prediction over time (e.g., 2030 through 2100). In addition to sea level rise data, our team will compile existing rainfall driven flood vulnerabilities from previously developed drainage master plans, future rainfall projections, and infrastructure assets (e.g., buildings, roads, sewer pump stations, etc.). Additional information to be collected and considered in the project include but may not be limited to historical groundwater records, FEMA flood claims, soils data, land cover data, and historical tidal data from recent hurricane events.



South Carolina climate summary for (a) projected changes in total precipitation and (b) number of observed tidal flood days in Charleston, SC (orange) with NOAA projections (blue). Source: Runkle, J., K.E. Kunkel, L.E. Stevens, R. Frankson, B.C. Stewart, W. Sweet, and S. Rayne, 2022: South Carolina State Climate Summary 2022. NOAA Technical Report NESDIS 150-SC. NOAA/NESDIS, Silver Spring, MD, 5 pp.

During the information gathering phase, our team will meet with city staff, utility providers, and other critical stakeholders (e.g., SCDOT, SCDHEC, IOP Water and Sewer Commission) to better understand the current state of on-going and future infrastructure projects, as well as define what assets/infrastructure are considered critical. This information will be paramount in determining priorities of proposed projects, adaptation plan goals, and recommendations for adaptation measures.

Public Engagement

Public feedback and engagement are often untapped and valuable resources when investigating and addressing concerns regarding sea level rise and coastal flooding. Information such as photographic evidence and eyewitness testimony are critical in understanding concerns and developing solutions to address flooding. Accordingly, our team will employ several public engagement strategies to promote and encourage public involvement during plan development. In addition to more traditional strategies such as public meetings (stakeholder meetings and workshops), our team will develop and deploy a web-based public information tool to efficiently capture public feedback such as photos of coastal flooding, locations of flooding, and opinions of adaption measures. Information collected from stakeholder meetings, workshops, and web reporting will be used and incorporated into the final plan deliverable.

Task 2 – Draft Plan Development

Vulnerability Assessment

A vulnerability assessment will be completed based on data gathered during Task 1. The vulnerability assessment will identify both private and public infrastructure (e.g., buildings, road, and property) that could be at risk of flooding sometime in the future. Vulnerability will be assessed over time to better develop goals for addressing future flood conditions and what adaptation measures should be considered.



Resilience and adaptation planning iterative process as outlined by NOAA (source: Anna Eshelman, NOAA)



Preliminary flood vulnerability due to intermediate sea level rise projections (3.89 feet) for year 2100.

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Elevating the site design experience.



Preliminary structure vulnerability due to intermediate sea level rise projections (3.89 feet) for year 2100.

Plan Goals

Actionable and attainable goals will be developed after obtaining feedback from city officials and stakeholder groups. Such goals will be developed to address potential vulnerabilities. An example of an easily attainable goal to prevent from minor sea level rise may be development and implementation of a check valve program – install check valves on existing drainage systems that connect tidal waters to low lying upland areas (e.g., Carolina and Palm Boulevard outfall). Regardless of what goals are drafted, it will be beneficial to separate goals into short-term and long-term goals. Short-term goals might be immediate and easily implementable projects or strategies to prevent minor flooding with relatively low initial costs (e.g., 25th Avenue outfall improvements completed by SCDOT). Alternatively, long-term goals would be projects that have high initial capital costs and may take years to successfully implement (e.g., perimeter protection in the form of earthen berms along the Intracoastal Waterway).

Recommendations

Recommendations to mitigate and/or adapt to potential future flood conditions will be developed based on developed plan goals. Recommendations may take the form of infrastructure improvement projects such as installation of check valves and construction of earthen berms. Such recommendations may be a combination of newly developed projects based on future flood risk or from previous drainage master plans (e.g., Phase 3 and Phase 4). Such recommendations will include a cost an order of magnitude cost estimate.

In addition to physical infrastructure recommendations, regulatory adaptation strategies may be identified that could reduce future flood risk. An example of such a strategy may be to review and revise development regulations that focus on preservation of low-lying coastal areas but might also allow homeowners flexibility in protecting their flood vulnerable assets.

Task 3 – Final Plan Development, Presentation, and Adoption

A final plan, mapping, cost estimates and other supporting data will be developed based on feedback obtained during the public engagement process and presentations to city officials. This plan will be instrumental in guiding the city's capital infrastructure program as well as overseeing community development and safety. Not only will the plan be developed to provide specific measures and projects to implement but it will also provide funding strategies to support successful and timely completion of those measures and projects.

Why SW+

Sea level rise and future flooding has been a debated topic. Projections are unknown which in turn make the future unknown. However, those unknowns and underlying uncertainties do not mean the city has to tackle a plan for the unknown by itself. Our team is uniquely located miles away and has been in the engineering and land planning coastal consulting industry for nearly 40 years. Our team prides itself on working closely with clients to develop sound plans for sustainable futures. Our blended team of landscape architects, engineers, and scientists will bring a well-rounded perspective to support the city in its goals to attaining a resilient future. If the city has a vision, our team will turn that vision into a reality.

Sincerely,

SEAMON, WHITESIDE & ASSOCIATES, INC.



Jason Munday, PE, VP, Managing Principal
843-884-1667 jmunday@seamonwhiteside.com
JM/ee



Storm surge flooding during Hurricane Joaquin (2015) (source: Mic Smith, AP).



TOWN OF LYMAN STORMWATER STUDY

The Town of Lyman decided to complete a comprehensive drainage study of one of the town's major watersheds after receiving numerous complaints of flooding. The intent of the study was to evaluate reported flooding at specific properties and complete a holistic assessment of the entire watershed to ensure all residents within the watershed are provided with long-term flood resiliency. The end result of the study will provide the town with recommendations for improvements, including conceptual design, implementation cost estimates, and funding recommendations.

Services provided to the Town of Lyman included data gathering, field investigations, survey, combined 1D/2D hydrologic and hydraulic modeling, stormwater system improvement investigations and alternatives analysis, conceptual design, and cost estimating.

Reference:

Town of Lyman
R. Noel Price Blackwell, ABL, Town Administrator
864-485-0240
nblackwell@lymansc.gov



Location

LYMAN, SC

Project Type

STORMWATER STUDY

Completion Date

ACTIVE





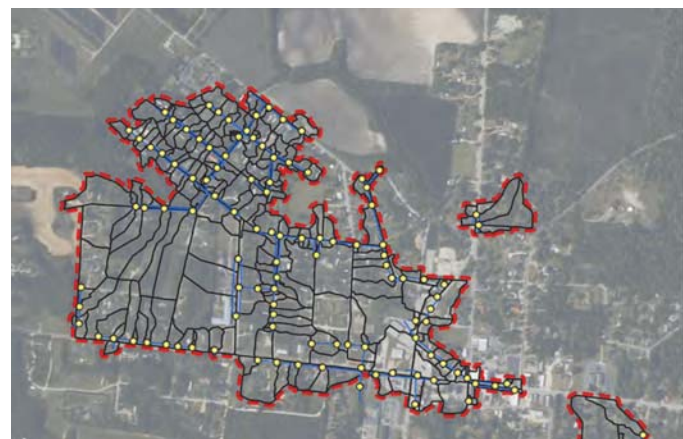
TOWN OF SUMMERTON HYDROLOGIC AND HYDRAULIC STUDY

Facilitated by the South Carolina Office of Resilience (SCOR), SeamonWhiteside (SW+) is currently performing a town-wide Hydrologic & Hydraulic Study to assess existing drainage conditions and identify improvements throughout the town, conduct an assessment of the existing drainage systems, develop, assess, and prioritize projects, and establish an implementation strategy for projects to improve the drainage system and mitigate against future flooding throughout the Town of Summerton.

SW+ is providing the following services to the Town of Summerton: project administration and meetings, data gathering, field survey, analysis, existing conditions report, alternative analysis, project recommendations, and a final report.

Reference:

South Carolina Office of Resilience (SCOR)
Phleisha Lewis
803-609-9100
phleisha.lewis@scor.sc.gov



Location

SUMMERTON, SC

Project Type

HYDROLOGIC & HYDRAULIC STUDY

Completion Date

ACTIVE



ASHLEY RIVER PARK

SW+ provided recreation planning, landscape architecture, and civil engineering services related to site program and master plan refinement for the 87-acre Ashley River Park property. Park elements include bike and pedestrian trails, covered shelter, restrooms, a pavilion, access roads, parking, a dog run, playgrounds, and interactive water feature, fishing pier, and kayak launch.

As the Prime firm, SeamonWhiteside provided extensive subconsultant coordination throughout the design development, permit coordination, and construction document preparation phases.

Reference:

Rebecca Dantzler, Capital Projects Manager
Dorchester County
201 Johnston Street
St. George, SC 29477
(843) 563-0142
rdantzler@dorchestercountysc.gov



Location

DORCHESTER COUNTY, SC

Project Type

PARKS & RECREATION

Project Size

87 ACRES

Completion Date(s)

MASTER PLAN: 2018
CONSTRUCTION DOCUMENTS: 2020
CONSTRUCTION: 2022





MORRISON YARD

Morrison Yard is a mixed-use office, retail, and residential development unique in downtown Charleston. The project consists of three buildings. Two of the buildings front Morrison Drive, a 386-unit, 10-story apartment building with space for retail and office use and a 12-story, 148,000 SF office tower that also offers retail, restaurant, and event space. The third facility is a parking garage located behind the office tower that will serve residents, employees, and the public.

Located on land previously owned by the SC State Ports Authority, the new mixed-use development embraces a contemporary architectural design aesthetic reflecting the area's shipping history. SW+ provided master planning, comprehensive civil engineering and landscape architecture services, permit coordination, and construction administration for both the apartment building and the office tower.

Reference:

Mike Schwarz, Partner
Woodfield Development, LLC
1306 Myrtle Avenue
Charlotte, NC 28203
(843) 290-3914
MSchwarz@woodfieldinvestments.com



Location

CHARLESTON, SC

Project Cost

\$128 MILLION (APARTMENTS)
\$71 MILLION (OFFICE TOWER)

Completion Date

2022 (APARTMENTS)
2023 (OFFICE TOWER)



ADDITIONAL WATER RESOURCES PROJECT EXPERIENCE

<p>Wilmington Corporate LOMR Wilmington, NC</p> <p>SW+ is providing project administration, a flood study, and FEMA LOMR submittal for proposed development within FEMA Special Flood Hazard Area (SFHA).</p>	<p>Mayberry Mixed Use Greenville, SC</p> <p>Stormwater analysis, floodplain permit coordination, DRB approval, schematic design / design development, civil site and landscape construction documents, site work permit coordination, and construction phase services.</p>
<p>Unity Park Floodplain Compensatory Storage Capacity Assessment Greenville, SC</p> <p>Water Resources Assessment Services to the City of Greenville to determine compensatory floodplain storage as part of the Unity Park Master Plan</p>	<p>Heathmoor Tract CLOMR Roebuck, SC</p> <p>Conceptual master planning, floodplain analysis, and Conditional Letter of Map Revision (CLOMR) related services.</p>
<p>Salisbury Tract – North Parcel Summerville, SC</p> <p>Flood study to establish the regulatory floodway and update base flood elevations, master planning, civil engineering, landscape architecture, permit coordination services and construction administration.</p>	<p>County Square Redevelopment Greenville, SC</p> <p>Near the Reedy River, County Square has had problems with flooding in the past. SW+ is providing comprehensive civil engineering services, grading, drainage, and stormwater management planning and design, landscape architecture, permit coordination services and construction administration.</p>
<p>Knightsville Tract Summerville, SC</p> <p>Flood study to establish the regulatory floodway and update base flood elevations, master planning, civil engineering, landscape architecture, permit coordination services and construction administration.</p>	<p>Garlington Industrial CLOMR Greenville, SC</p> <p>Design and construction of a 136,000 square foot industrial building with one permanent dry master storm water management pond, and approximately 2200 LF of storm line, and a flood study of Rocky Creek and its tributaries to conclude that the development would not increase the base flood elevation.</p>
<p>Magnolia Trail Townhomes Greenville, SC</p> <p>Master planning, civil engineering, landscape architecture design services site planning, stormwater analysis, schematic design / design development, civil site and landscape construction documents, site work permit coordination, and construction phase services.</p>	<p>Shot Pouch Greenway LOMR Sumter, SC</p> <p>Construction phase services, observe grading and path construction activities in the floodplain and regulatory floodway as it relates to compliance with the approved FEMA Conditional Letter of Map Revision.</p>



REFERENCES

Andy Benke, Administrator

Town of Sullivan's Island
Post Office Box 427
Sullivan's Island, SC 29482
(843) 883-5726
abenke@sullivanisland-sc.com

Eric Demoura, Town Administrator

Mount Pleasant, SC 29464
(843) 884-8517
edemoura@tompssc.com

Russ Cornette, Town Engineer

Summerville, SC 29483
(843) 871-6000
RCornette@SummervilleSC.gov

Rebecca Dantzler, Capital Projects Manager

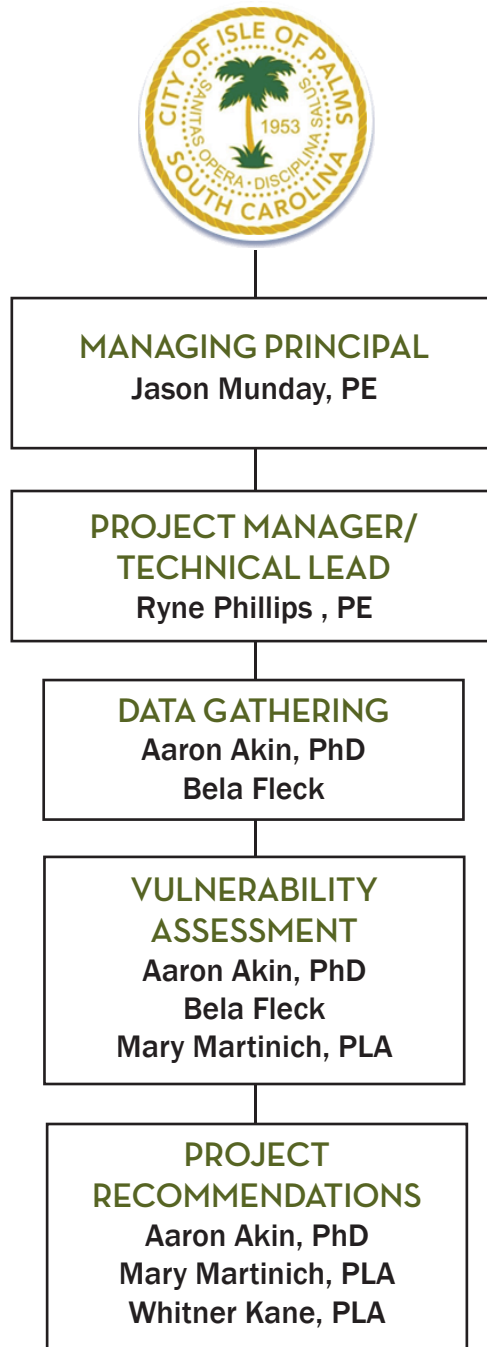
Dorchester County
201 Johnston Street
St. George, SC 29477
(843) 563-0142
rdantzler@dorchestercountysc.gov



Check valve and earthen berm installation at 25th Avenue by SCDOT in October 2022.

OUTSOURCING STATEMENT & ORGANIZATION CHART

Our talented team of civil engineering and landscape architecture professionals will be led by **Point-of-Contact and Project Manager/Technical Lead Ryne Phillips, PE, Water Resources Team Leader in our SW+ Mount Pleasant office.** Resumes for **key staff members** only are included on the following pages.





RYNE PHILLIPS, PE
Water Resources Team Leader

Ryne Phillips, Water Resources Team Leader in SW+'s Mount Pleasant office, started his career with SeamonWhiteside in 2023. He has worked on a variety of projects including water resources, municipal, and publicly funded projects. Typical responsibilities include infrastructure design, regulatory approvals presentation and support, stormwater management plans, and subcontractor administration.

Ryne specializes in water resources engineering ranging from site specific watershed characterization to river basin scale analyses and pipeline transients. His practical and applied problem-solving skills are complemented with advanced numerical and computational knowledge of natural and man-made waterways, as well as distribution networks and turbomachinery. A key believer of adaptability and suitability, He interacts with clients, regulatory agencies, and changing environments to tailor solutions to specific project needs. Ryne's experience includes ecosystem restoration, flood hazard mapping and analysis, bridge and culvert hydraulics and scour analysis, flood frequency analysis, open/closed stormwater conveyance system design and analysis, water distribution network analysis and design, sewer system network analysis and design, pump station assessments and design, hydraulic transient studies, process engineering, GIS program and model development, and irrigation design and assessment.

*COMPLETED WITH PREVIOUS EMPLOYER

EDUCATION

**PhD Candidate, Civil & Environmental Engineering
(Stochastic Hydrology)**

UNIVERSITY OF SOUTH CAROLINA | COLUMBIA, SC

**Master of Science, Civil Engineering
(Water Resources Concentration)**

CLEMSON UNIVERSITY | CLEMSON, SC

**Bachelor of Science,
Agricultural Mechanization & Business**

CLEMSON UNIVERSITY | CLEMSON, SC

REGISTRATIONS AND AFFILIATIONS

Professional Engineer

SOUTH CAROLINA | #35434

GEORGIA | #048360

Southeast Stormwater Association (SESWA)

American Geophysical Union

Institute of Mathematical Statistics

International Association of Hydrological Sciences

American Public Works Association (APWA)

SIGNATURE PROJECTS

***The Point & Downtown**

Stormwater Drainage Study

BEAUFORT, SOUTH CAROLINA

***Island of Palms Ph 4 Island Wide Drainage Plan**

ISLE OF PALMS, SOUTH CAROLINA

***Lighthouse Pointe Drainage Study**

JAMES ISLAND, SOUTH CAROLINA

***Camp Rd & Riverland Dr Drainage Improvements**

CHARLESTON COUNTY, SOUTH CAROLINA

***Ehrhardt Street Drainage Improvements**

CHARLESTON, SOUTH CAROLINA

***US-17 Spring St & Fishburne St
Drainage Improvements**

CHARLESTON, SOUTH CAROLINA

***Barberry Woods Drainage Study**

CHARLESTON, SOUTH CAROLINA

***Johns Island Flood Risk Assessment**

CHARLESTON, SOUTH CAROLINA

***Calhoun West Drainage Improvement Project
& Sea Level Rise Mitigation Project**

CHARLESTON, SOUTH CAROLINA

***Fretwell Street Drainage Study**

NORTH CHARLESTON, SOUTH CAROLINA

***Arc & Billow Streets Drainage Improvements**

EDISTO ISLAND, SOUTH CAROLINA





AARON AKIN, PHD

Water Resources Project Coordinator

Aaron joined the Mount Pleasant office of SeamonWhiteside in 2023. As a Water Resources Project Coordinator in the Civil Engineering department, he supports senior staff by working on a variety of project types including water resources, municipal, and publicly funded projects. He provides water resources engineering design services for roadways, utilities infrastructure, stormwater, and site improvements.

Aaron specializes in helping communities make better, more informed decisions regarding watershed management and flood mitigation. By coupling emerging technologies with innovative engineering, he is able to develop solutions for a number of resiliency problems. Aaron's experience includes flood mitigation studies, stormwater master planning, stormwater network analysis, flood hazard mapping and analysis, instrumentation, real-time monitoring and control systems, GIS program and model development, and combined 1D/2D hydrologic and hydraulic model development and optimization.

EDUCATION

PhD, Water Resources Engineering
UNIVERSITY OF TENNESSEE | KNOXVILLE, TN

**Master of Science,
Biological & Agricultural Engineering**
KANSAS STATE UNIVERSITY | MANHATTAN, KS

**Bachelor of Science,
Biological Systems Engineering**
KANSAS STATE UNIVERSITY | MANHATTAN, KS

REGISTRATIONS AND AFFILIATIONS

Southeast Stormwater Association (SESWA)

South Carolina Beach Advocates

American Public Works Association (APWA)

American Ecological Engineering Society (AEES)

American Society of Civil Engineers (ASCE)

SIGNATURE PROJECTS

**Town of Summerton
Hydrologic and Hydraulic Study**
SUMMERTON, SOUTH CAROLINA

***Island of Palms
Phase 4 Island Wide Drainage Plan**
ISLE OF PALMS, SOUTH CAROLINA

***City of Conway Stormwater Master Plan**
CONWAY, SOUTH CAROLINA

***The Point & Downtown
Stormwater Drainage Study**
BEAUFORT, SOUTH CAROLINA

***SCDOT Bridge Scour Assessment Program**
STATEWIDE, SOUTH CAROLINA

*COMPLETED WITH PREVIOUS EMPLOYER





LIGIA 'BELA' FLECK
Civil Designer I

Bela joined the Greenville office of SeamonWhiteside in 2022. As a Civil Designer I, Bela supports senior staff by working on a variety of project types including industrial, municipal, mixed use, and residential. She provides civil engineering design services for roadways, utilities infrastructure, stormwater, and site improvements from conceptual design through construction documents.

Bela has a particular interest in water resources and assists the SW+ Water Resources Engineering team with flood studies, hydraulic and hydrologic studies, and stormwater management projects.

EDUCATION

Bachelor of Science, Civil Engineering

BOB JONES UNIVERSITY | GREENVILLE, SC

Graduate Certificate, Communication Studies

BOB JONES UNIVERSITY | GREENVILLE, SC

SIGNATURE PROJECTS

Town of Summerton

Hydrologic & Hydraulic Study

SUMMERTON, SOUTH CAROLINA

Wilmington Corporate LOMR

WILMINGTON, NORTH CAROLINA

Shot Pouch Greenway LOMR

SUMTER, SOUTH CAROLINA

Taylors Mill Redevelopment LOMR & CLOMR

GREENVILLE, SOUTH CAROLINA

Knightsville Tract Flood Study

SUMMERVILLE, SOUTH CAROLINA

Salisbury Tract – North Parcel Flood Study

SUMMERVILLE, SOUTH CAROLINA

Town of Lyman Stormwater Engineering Services

LYMAN, SOUTH CAROLINA

Mayberry Mixed Use Stormwater Analysis

GREENVILLE, SOUTH CAROLINA

Chesnee Hwy SF Residential 99 AC Tract

SPARTANBURG COUNTY, SOUTH CAROLINA

E Park Avenue Townhomes

GREENVILLE, SOUTH CAROLINA

Six Oaks Single Family Residential

Phase 1 - Tupper Tract

SUMMERVILLE, SOUTH CAROLINA

Greenville Parkway Site Apartments

GREENVILLE COUNTY, SOUTH CAROLINA





MARY MARTINICH, PLA
Team Leader

Mary joined SeamonWhiteside in 2019 as a Landscape Architect and Project Manager to the team. She is passionate about promoting urban environments that are environmentally, socially, and economically sustainable. She has designed a variety of private and public projects including parks, streetscapes, plazas, mixed-use, multi-family, hospitality and commercial projects.

Mary's role as a Team Leader includes guiding team design efforts, ensuring quality and a high standard of work for all projects, mentoring the rising landscape architects in the department and working collaboratively with clients and consultants.

With a passion for low-impact design, she is a guest lecturer for the Clemson Extension Master Rain Gardener program in the Lowcountry and teaches Sustainable Landscaping for the Native Plant Society. Additionally, Mary is a Board Member and Secretary of the East Cooper Land Trust, the Lowcountry Regional Chair for the South Carolina Chapter of the American Society of Landscape Architects, and a Board Member of Charleston Moves. She has also participated in the Charleston Metro Chamber of Commerce 'Leadership Charleston' training and is an alumna of the Class of 2019.

EDUCATION

Master of Landscape Architecture

LOUISIANA STATE UNIVERSITY | BATON ROUGE, LA

Bachelor of Business Administration, Marketing

TEXAS STATE UNIVERSITY | SAN MARCOS, TX

REGISTRATIONS AND AFFILIATIONS

Professional Landscape Architect

SOUTH CAROLINA | #1450

TEXAS | #2928

American Society of Landscape Architects

LOWCOUNTRY REGIONAL CHAIR | 2007 - PRESENT

East Cooper Land Trust

SECRETARY & BOARD MEMBER | 2015 - PRESENT

Charleston Moves

BOARD MEMBER | 2020 - PRESENT

SIGNATURE PROJECTS

475 East Bay Street

(Liberty Place Charleston)

CHARLESTON, SC

Camp Hall Commerce Park Master Plan

BERKELEY COUNTY, SOUTH CAROLINA

Bolt Planned Development

WADMALAW, CHARLESTON COUNTY, SOUTH CAROLINA

Clements Ferry Gathering Place

CHARLESTON, SOUTH CAROLINA

Seabrook Island Club Pool Renovation

SEABROOK ISLAND, SOUTH CAROLINA

Nexton Mixed Use District

Retail | Restaurant

SUMMERVILLE, SOUTH CAROLINA

Nexton Northeast Village

SUMMERVILLE, SOUTH CAROLINA

Brighton Park Open Space Design

SUMMERVILLE, SOUTH CAROLINA

Mount Pleasant Way Multi-Use Path

MOUNT PLEASANT, SOUTH CAROLINA

Six Mile Cultural Heritage Trail

MOUNT PLEASANT, SOUTH CAROLINA





WHITNER KANE, PLA
Team Leader

Whitner first began working with SeamonWhiteside in 2004 as a landscape architect concentrating on municipal improvements, residential development, and higher education projects. She then spent several years in Europe, returning to SW+ in 2017 as a Senior Landscape Architect.

A Landscape Architecture Team Leader since 2022, Whitner guides the project management process to facilitate project consistency, productivity and accountability. She actively mentors the designers on her team, to ensure SeamonWhitesides' core vision and values are being upheld.

Whitner's experience includes all phases of site design from master planning through construction documents and construction administration. She is very knowledgeable about the public process including working with municipalities, governmental agencies, and special districts to master plan community projects, design recreation and park facilities, gather citizen approval, and provide the direction needed to complete the project.

EDUCATION

Master of Landscape Architecture

AUBURN UNIVERSITY | AUBURN, AL

Bachelor of Environmental Design

AUBURN UNIVERSITY | AUBURN, AL

REGISTRATIONS AND AFFILIATIONS

Professional Landscape Architect

SOUTH CAROLINA | #988

ALABAMA | #795

American Society of Landscape Architects

MEMBER 2004 - PRESENT

Junior League of Charleston

MEMBER 2007 - PRESENT

SIGNATURE PROJECTS

Charleston Place Hotel

CHARLESTON, SOUTH CAROLINA

Ashley Hall Sports Complex

JAMES ISLAND, SOUTH CAROLINA

Lucy Beckham High School Baseball Field Renovation

MOUNT PLEASANT, SOUTH CAROLINA

Credit One Stadium

DANIEL ISLAND, SOUTH CAROLINA

89 Warren Street Renovation Ashley Hall School

CHARLESTON, SOUTH CAROLINA

Carolina Park Sports Complex

MOUNT PLEASANT, SOUTH CAROLINA

Saint Mary of the Annunciation Church Courtyard Renovation

CHARLESTON, SOUTH CAROLINA

Nexton Design Committee Consulting

SUMMERVILLE, SOUTH CAROLINA

Newberry College Dormitories

NEWBERRY, SOUTH CAROLINA

Pardue Hall Gateway & Courtyard Ashley Hall School

CHARLESTON, SOUTH CAROLINA

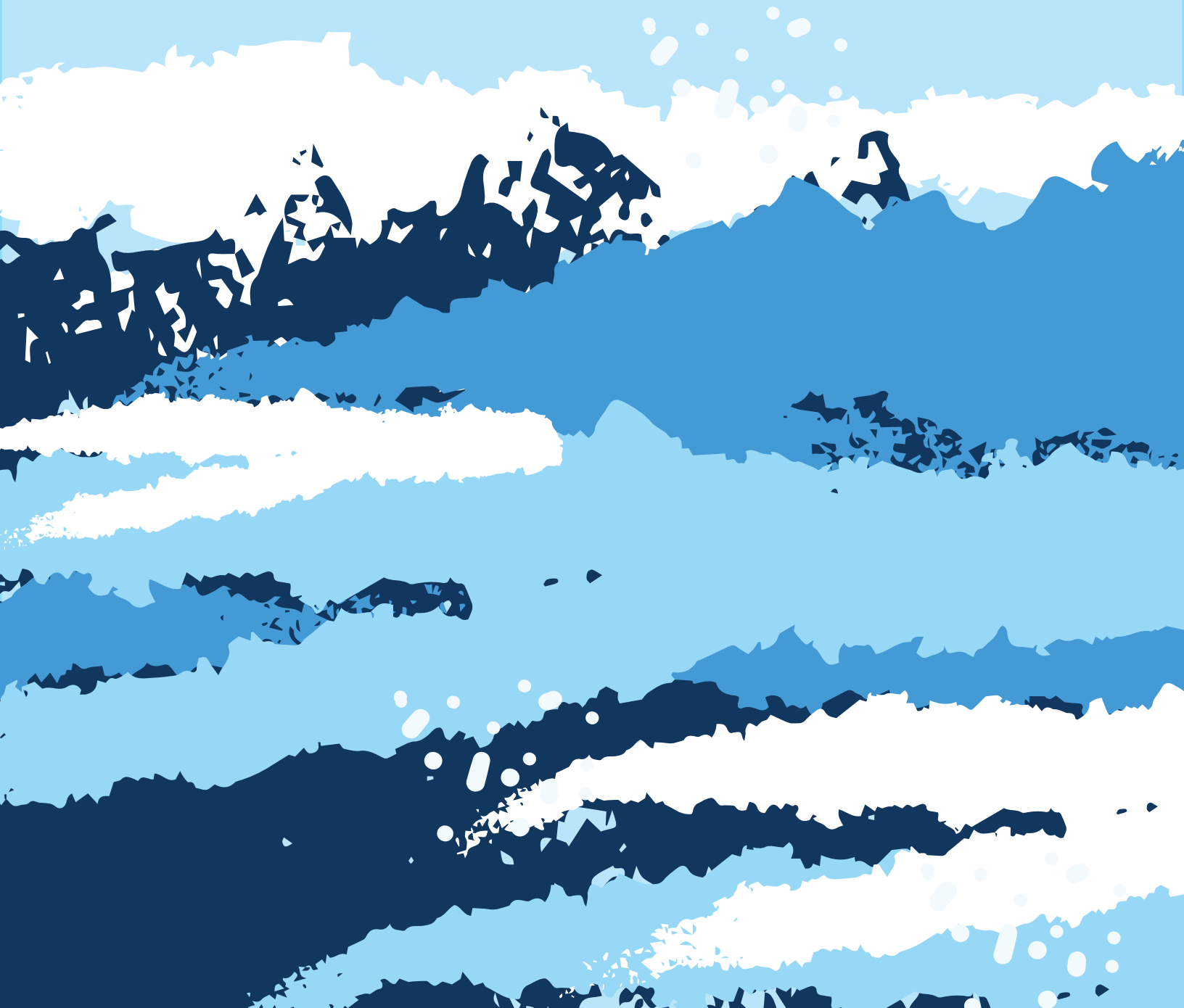




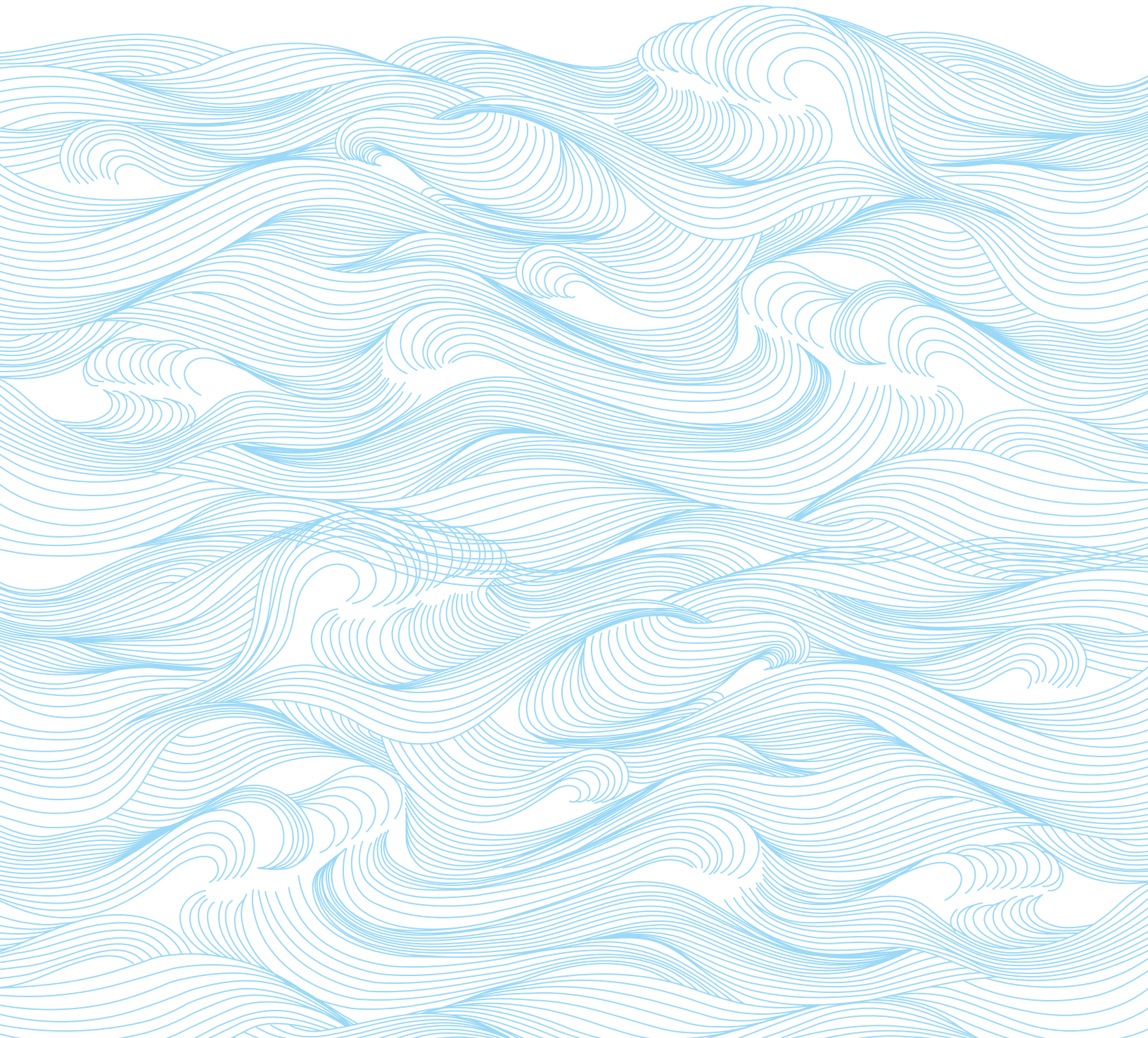


SEA LEVEL ADAPTATION PLAN

CITY OF ISLE OF PALMS, SOUTH CAROLINA



Transmittal Letter





TRANSMITTAL LETTER

City of Isle of Palms
Attn: Mr. Douglas Kerr
1207 Palm Boulevard
Isle of Palms, SC 29451

Re: Request for Proposals 2023-01, Sea Level Rise Adaptation Plan

Dear Mr. Kerr and Members of the Selection Committee,

Weston & Sampson and Coastal Science & Engineering (CSE) are pleased to present our proposal for the City of Isle of Palms Sea Level Rise Adaptation Plan. Our team provides **knowledge of localized impacts from climate change** as well as **nationally recognized climate resilience expertise**. We are passionate about this work and recognize the importance of preparing for sea-level rise in a community like Isle of Palms.

The partnership between Weston & Sampson and CSE yields a team of **engineers, coastal geologists, hydrologists, beach management experts, and environmental scientists** with unparalleled expertise in **modeling, planning, stakeholder engagement, and implementation**. Our team will deliver an actionable adaptation plan that assesses the vulnerability of the community, models potential scenarios at high resolution, identifies strategies to mitigate risk, and increases community resilience. Our team has the breadth of knowledge and expertise needed to craft a strategy that is **robust, usable, and meaningful** to Isle of Palm's residents and stakeholders.

Our team understands the needs of the City in regard to Plan development. We recognize that due to low elevation and aged infrastructure, the City is vulnerable to the impacts of sea level rise. Our team will inventory existing conditions and identify specific vulnerabilities of the City. Our team will then be able to combine the existing inventory of stormwater infrastructure with advanced flood modeling techniques to yield a range of scenarios for future conditions. This effort will inform mitigation strategies the City can enact to combat the long-range effects of sea level rise.

Both Weston & Sampson and CSE pride themselves on **innovation, creativity, and collaboration**. Working together with the City of Isle of Palms, our team will deliver a product of the highest caliber. We have the team and qualifications necessary to provide the professional services requested by the City. We are confident that our practical approach, technical capabilities, and experience in flood modeling and coastal resiliency will result in the identification of significant opportunities for mitigation throughout the City. Your consideration of our credentials is greatly appreciated and we look forward to the opportunity to discuss this project in greater detail. Please contact Jeannie Lewis, Senior Project Manager, at 843-790-0580 or Lewis.Jeannie@wseinc.com if you need any additional information.

Sincerely, 

WESTON & SAMPSON ENGINEERS, INC.
Kip Gearhart, Regional Manager
3955 Faber Place Suite 300, N Charleston SC 29405

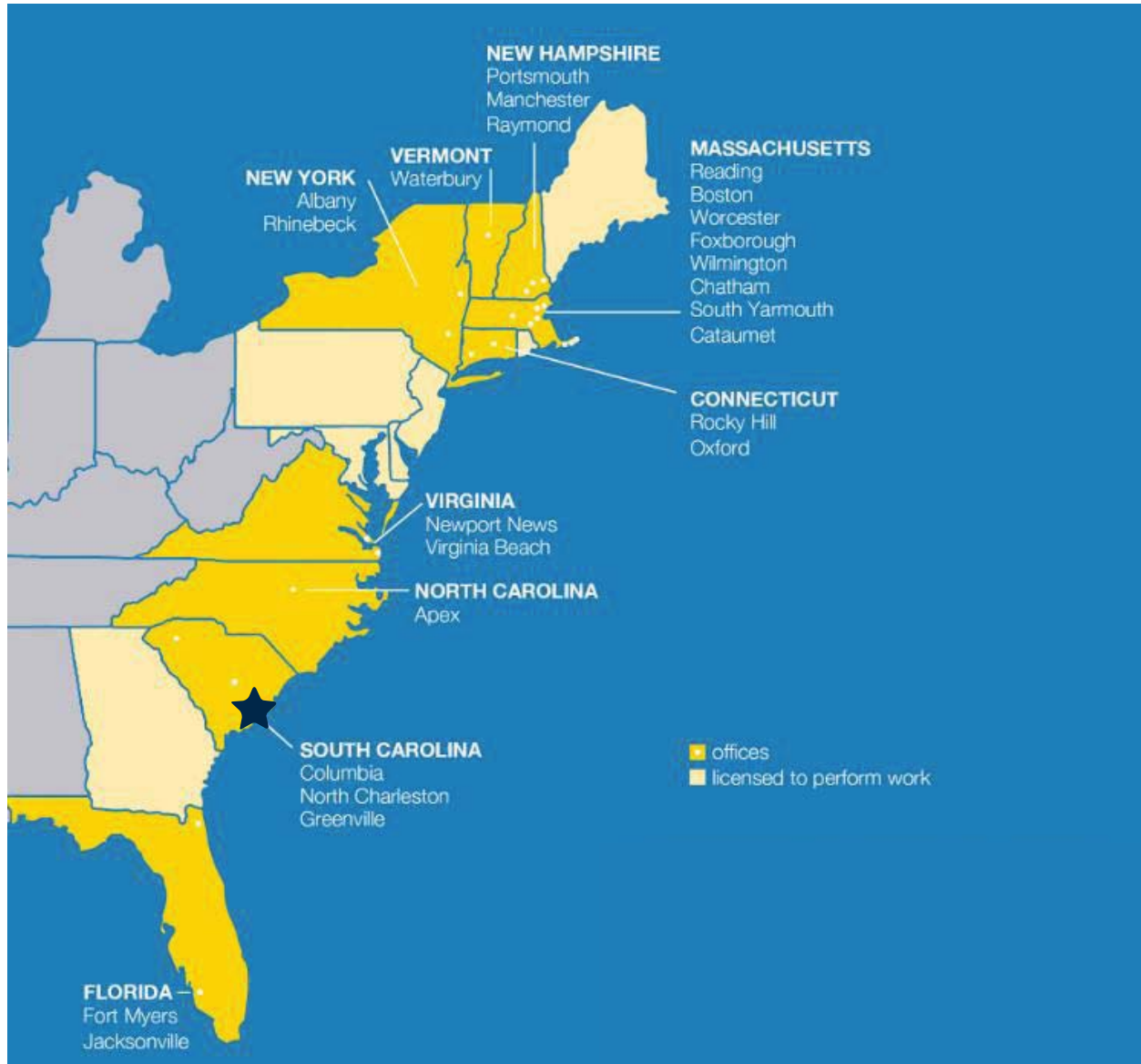


**Scope of
Work**





WHERE WE WORK



124
years in
operation

800
current
employees

24
office
locations

22
employees in the
Charleston office





VISION STATEMENT

Resilient

We envision an Isle of Palms where residents and property are safe from coastal climate impacts and the nature of the city is preserved in the face of rising challenges.

Way of Life

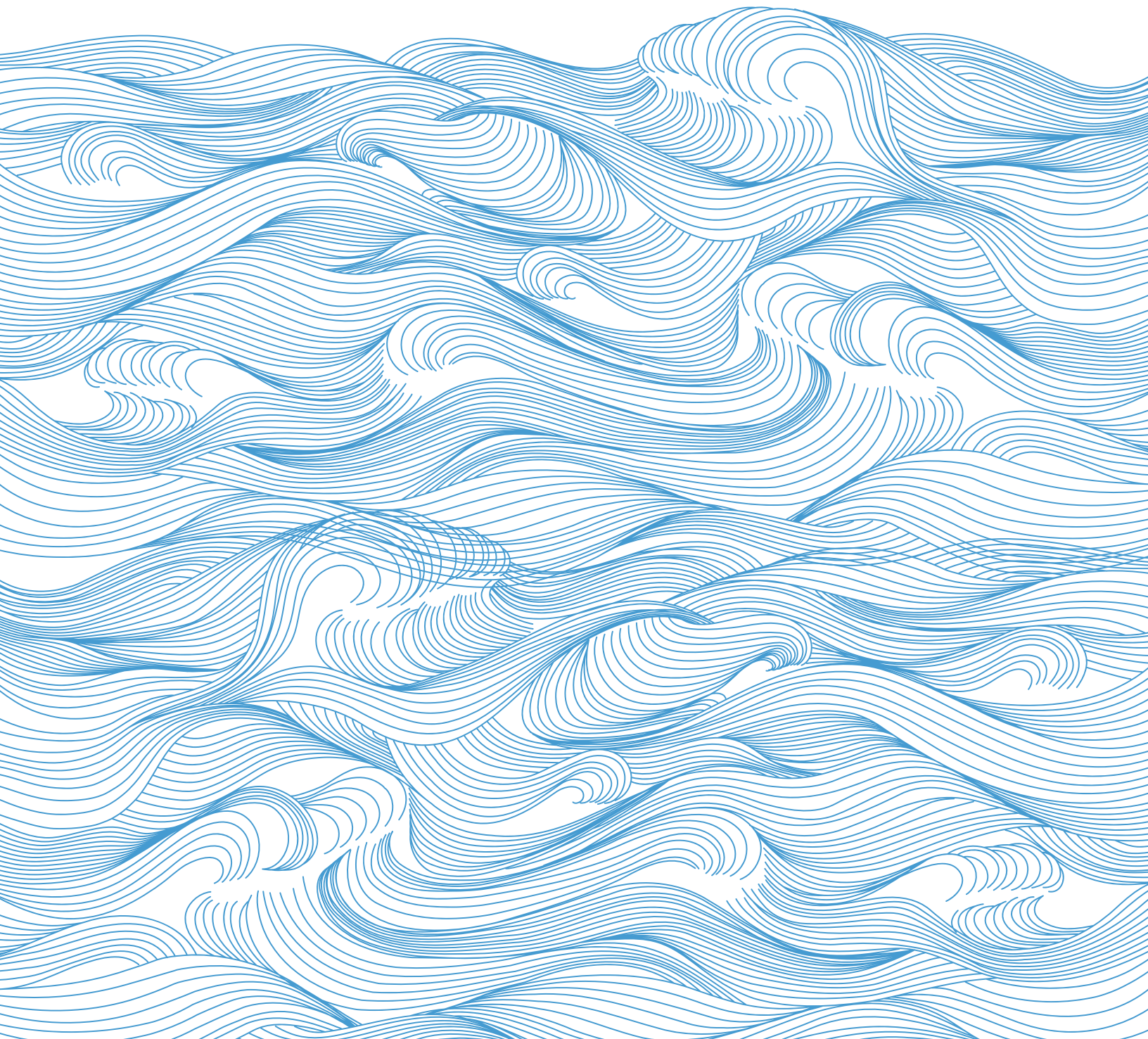
We envision an Isle of Palms where daily life is uninterrupted by rising sea levels and residents learn to live with water.

For all

The key to success is rooted in the engagement of Isle of Palm's stakeholders, residents, and climate champions who will work to encourage adaptation and mitigation as the City faces the challenges associated with sea level rise.



Work History & References



KIAWAH ISLAND FLOOD MITIGATION & SEA LEVEL RISE ADAPTATION PLAN

town of kiawah, south carolina



In 2017, the Town of Kiawah began researching the impacts of climate change, sea level rise, and flooding on the island. After 18 months, the subcommittee tasked with the research determined that over the next 30 years Kiawah Island will face significant flooding challenges. In order to combat these upcoming challenges, over 100 recommendations were made, including the creation of an Adaptive Management Plan to provide long-term planning for the community.

As part of the Flood Mitigation and Sea Level Rise Adaptation Plan, Lucas Hernandez, then a graduate research assistant at the College of Charleston Lowcountry Hazards Center and now staff with Weston & Sampson, created high-resolution 2-D flood maps of the island using NOAA's Relative Sea Level Change Projections (2017) and the most recent LiDAR digital elevation model. The models developed as part of this study included inundation from storm surges from 1 foot to 8 feet above Mean Higher High Water (MHHW) in half-foot increments and inundation from NOAA sea level rise predictions for the years 2030, 2050, 2075, and 2100.

All these models were validated using personal accounts from the subcommittee and provided a basis of understanding for vulnerable stormwater infrastructure, roads, and structures on the island. These models were later updated to include rainfall and drainage infrastructure to help the Community Association prioritize six major infrastructure projects that are currently being constructed.

- climate & coastal resiliency
- sea level rise
- flood impact assessment
- mapping
- stakeholder engagement

client contact

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NORTH CAROLINA RESILIENT COASTAL COMMUNITIES

elizabeth city and pasquotank county, north carolina



Weston & Sampson will start working in May of 2023 with two communities in coastal North Carolina to promote sustainability and improve resilience in the face of climate change and other hazards. Our approach will follow a framework to identify and prioritize projects that will mitigate risks and enhance community resilience. We are producing a Resilience Strategy, which will consist of a Risk & Vulnerability Assessment Report, evaluating the vulnerability of critical assets, natural infrastructure, and vulnerable populations to a range of hazards, including flooding (rainfall, tidal and riverine), storm surge, sea level rise, and other locally-relevant hazards. We will build upon existing work with involvement from a Community Action Team, North Carolina Coastal Zone Management agencies, and the public. A Project Portfolio will also be developed as part of the Resilience Strategy, which will outline a series of options aimed at reducing exposure, reducing sensitivity, and increasing adaptive capacity to flooding and other hazards. This portfolio will consider a combination of policy, nonstructural, hybrid, and structural approaches.

Our team recognizes the importance of identifying a diverse range of strategies that can be implemented to enhance community resilience. We will work closely with local leaders and stakeholders to identify specific projects that will advance the resilience of the community and to take the next steps towards shovel-readiness. Additionally, we will link these communities to funding streams to support the implementation of these projects. Through these deliverables, we will help these communities identify and prioritize the most effective approaches to address their unique challenges and promote a resilient and sustainable future.

- sustainability
- sea level rise
- green and gray solutions
- community resilience
- risk & vulnerability assessment
- prioritized project identification
- stakeholder engagement

client contact

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IMPROVEMENTS TO LOPRESTI PARK

boston, massachusetts | boston parks and recreation department



LoPresti Park is a four-acre park located on the waterfront of Boston's inner harbor in the southwest end of East Boston. In 2012, Boston Parks and Recreation Department selected Weston & Sampson to design a modern-day park that links the Maverick Gardens neighborhood back to the water and strengthens pedestrian connections to the surrounding housing development and, since that time, we have worked together to achieve that vision. This premiere location affords some of the most dramatic and sweeping views of the Boston skyline, July 4th fireworks, and sunsets all year long. With Piers Park as a nearby attraction, LoPresti Park is reportedly one of the best kept secrets of the city and often overlooked as a destination for anyone other than the locals. LoPresti functions as a well-used neighborhood park and playground and is frequented by residents who arrive mostly on foot or by bike.

The most recent improvements at LoPresti Park provide a number of active recreational amenities, including two basketball courts, a children's playground, splash pad, fitness equipment, an open lawn, and a state-of-the-art synthetic turf playing field that is the centerpiece of the park. Passive activities are organized in a way to complement the amazing vistas that exist throughout the park. A renovated harborwalk promenade serves as the spine of the park and provides for pedestrian circulation. Additional programming includes benches, ping-pong, and lounge chairs organized around the scenic promontory, as well as a kayak launch that provides direct access to the harbor waters. The park's new main entry plaza is centered on the Maverick Gardens housing development and provides sweeping views of the park and the city. These improvements to LoPresti Park are sure to become part of East Boston's legacy for years to come.

Our team researched and considered sea level rise and site resiliency throughout the design process. We explored iterations of seawall protection to find balance between defense against the rising sea and day-to-day access. Ultimately, we installed granite seawall blocks in a staggered pattern to diffuse wave action during extreme high tide conditions.

- **active and passive recreational designs**
- **waterfront amenities**
- **sea level rise and site resiliency considerations**
- **harborwalk promenade and improved pedestrian connections**
- **synthetic turf fields, basketball courts, playground/splash pad facilities**
- **environmental evaluations/assessments**

client contact

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EAST BOSTON CLIMATE RESILIENT COASTAL WATERFRONT DESIGN

boston planning and development agency



The East Boston waterfront has experienced rapid transformation due to recent development as well as an increase in flooding. In particular, the areas around Carlton Wharf and Lewis Mall were identified as near-term flood pathways through the City of Boston's Climate Ready Boston initiative in 2017. Weston & Sampson was selected to develop design options that advance flood protection along parts of the East Boston waterfront while at the same time ensuring waterfront access and enhancing nearby coastal habitat.

While close in proximity, Carlton Wharf and Lewis Mall present different challenges and serve as examples of different coastal conditions throughout the City of Boston. Both sites are near-term flood pathways that routinely flood during storm events since they are part of the waterfront's low-lying historic fill area. We developed several schematic design scenarios through review of existing conditions, engagement with neighborhood residents and other stakeholders, and resilience technical analysis. Each design scenario considered a design flood elevation of 22.5 ft. that was based on:

- the most up-to-date coastal model for Massachusetts
- evaluation criteria developed through Climate Ready East Boston
- technical feasibility
- public access and open space along the waterfront

The project demonstrates practicable and replicable solutions that meet resiliency goals despite site constraints and create more equitable access to the waterfront. The designs advanced through this project provide a basis to be continued through design, permitting, and construction. Our team's efforts are critical to ensuring the East Boston waterfront will continue to serve as an inviting and accessible part of the neighborhood and also provide a buffer to the long-term effects of climate change.

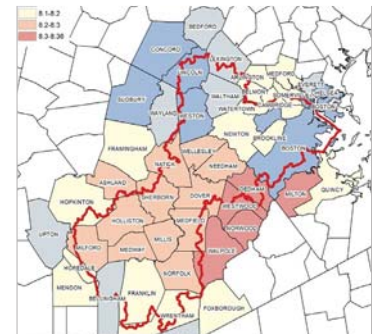
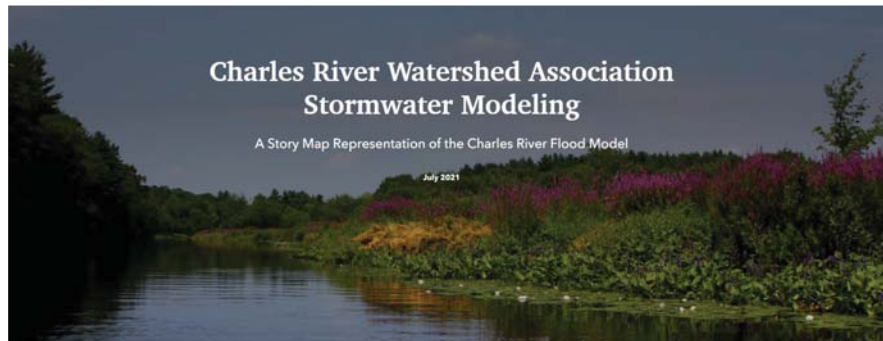
- climate resilience
- schematic design
- waterfront access
- stakeholder engagement

client contact

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CHARLES RIVER FLOOD MODEL

charles river watershed, massachusetts



The **Charles River Watershed** is experiencing climate change impacts, such as heavy precipitation and flooding, which can create significant damage. Weston & Sampson, along with the Charles River Watershed Association, was selected to develop the Charles River Flood Model (CRFM) to forecast expected flooding scenarios and test watershed scale adaptation strategies for 20 communities in the 270-square-mile portion of the Charles River watershed that drains to the Watertown Dam. The CRFM was developed using the PCSWMM 2D modeling platform. First the 1D model was developed in PCSWMM, which included over 700 subcatchments, over 1550 conduits, and more than 440 field verified structures, such as dams, culvert crossings, junctions. Next, the 2D flood model was developed to include areas within the existing 500-year floodplain to capture instream and near stream storage, as well as to reflect the capacity of those floodplains to convey flows downstream. Weston & Sampson modeled 10 different 24-hour duration rainstorms in the watershed:

- 3 present day storms: 2-year or 50% chance of occurring annually, 10-year or 10% chance of occurring annually, and 100-year or 1% chance of occurring annually
- 6 corresponding future storm scenarios: 2-, 10-, and 100-year design storm events projected for mid-century (2030/2050), and 2-, 10-, and 100-year design storm events projected by late in the century (2070/2090)
- 1 extreme rain event of 11.7 inches in 24 hours, which was used in a similar modeling effort in the neighboring Mystic River Watershed

The team assessed the impact of six different flood mitigation strategies employing green, nature-based solutions using the CRFM. These include adaptation measures such as onsite storage, raingardens, bioretention basins, reduction in impervious surfaces, and others that focus on the protection, restoration, and/or management of ecological systems to safeguard public health, provide clean air and water, increase natural hazard resilience, and sequester carbon. Weston & Sampson, in association with Communities Responding to Extreme Weather (CREW), also sought extensive public input to inform the modeling scenarios and develop solutions that would work best for each community. This stakeholder engagement and coordination of input led to an informed public and acceptance of the results.

The CRFM represents the impacts of flooding across the watershed from various types and sizes of rainstorms under both present and future climate scenarios and can be used to test the efficacy of various flood mitigation measures. It is augmented by the online [Flood Model Results Viewer](#), an interactive web-based GIS application to view present and future flood risks in the watershed that allows the user to see the flood mitigation benefits from an array of green infrastructure strategies.

- **urban and suburban watershed**
- **stakeholder engagement and coordination**
- **watershed model development**
- **flood impact assessment**

client contact

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MOAKLEY PARK VISION PLAN & IMPLEMENTATION

boston parks and recreation department | stoss landscape urbanism



The Boston Parks and Recreation Department (BPRD), as part of their plans to increase city-wide climate resilience, targeted the rehabilitation of Moakley Park as an opportunity to address climate vulnerabilities and advance climate resilience along the South Boston waterfront while re-programming opportunities for recreation and community gathering. Moakley Park, a 60-acre public open space, is located across from Carson Beach, and is increasingly vulnerable to flooding due to climate change and identified as one of the major flood pathways in Climate Ready Boston. The 2018 Moakley Park Vision Plan, by Stoss Landscape Urbanism (Stoss), presented concepts for a resilient Moakley Park. The plan called for the creation of an approximately 2,600-foot vegetated berm (levee) to provide flood protection.

Weston & Sampson supported BPRD in their successful application for a Massachusetts Municipal Vulnerability Program (MVP) Action Grant for the preliminary resilient design of Moakley Park; the state awarded BPRD the grant in July 2019. Subcontracted to Stoss, Weston & Sampson advanced the Vision Plan by analyzing current and future climate risks and analyzing challenging onsite conditions. We developed future design storm projections and recommended scenarios at the park to evaluate flooding impacts by combining extreme rainfall and sea level rise/storm surge under existing and proposed design conditions at the park. Weston & Sampson collaborated with Nitsch Engineering to develop a stormwater flood model in PCSWMM 2-D by building upon the stormwater flood model for the surrounding areas provided by Boston Water & Sewer Commission (BWSC) using BWSC's stormwater inundation model. We collaborated with BWSC and Massachusetts Water Resources Authority (MWRA) to understand operational needs and identify how park redevelopment might affect their respective area infrastructure. The resulting schematic design reflects strategies to manage changes in our climate over time, including sea level rise and storm surge with a flood barrier integrated into the park and floodable landscape/vegetation on the coastal side of the barrier; more frequent and intense rainfall events and changing groundwater conditions with green infrastructure and integrated stormwater management; and extreme heat conditions with increased tree canopies, light/reflective material selection, shade and cooling structure.

Weston & Sampson is leading design, bidding, and construction of the first phase implementation and is responsible for establishing the basis-of-design with respect to climate change projections, including design standards for sea level rise/storm surge, extreme precipitation, and extreme heat, and corresponding impacts to design. The performance of the park under current and future climate conditions is being modeled, including urban heat island modeling and peer review of coastal and stormwater modeling. This has involved continued close coordination with BWSC and integration of their stormwater model. Our team will help the city realize a new park that is more resilient to climate events and provides a range of active and passive recreational opportunities for a diverse, multi-generational population.

- waterfront park improvements
- climate & coastal resiliency
- geotechnical & environmental engineering
- flood barrier design
- stormwater management & green infrastructure strategies
- utility coordination
- successful MVP action grant application

client contact

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WASTEWATER TREATMENT FACILITY CLIMATE RESILIENCE ASSESSMENT

town of seabrook, new hampshire



The **Town of Seabrook** identified several critical wastewater treatment components vulnerable to the anticipated changes in sea level rise under projected future climate scenarios in the Town Master Plan Chapter on Coastal Hazards and Adaptation. The focus of this project was the town's critically important wastewater treatment infrastructure, which collects and treats domestic, commercial, and industrial wastewater from most of the town.

The wastewater treatment facility (WWTF) and other system treatment components are all located on Wright's Island, a small upland area within the salt marsh that straddles the New Hampshire/ Massachusetts border south of Route 286. Vehicular access to Wright's Island is via a single-lane causeway from Route 286. The isolated nature of the WWTF makes it particularly susceptible to sea level rise (SLR) and coastal surge, and any disruptions to WWTF operation quickly becomes a public health risk. The project involves assessing the specific vulnerabilities at the site and identifying/assessing up to four options for improving resiliency.

The project also involves identifying effective communication and outreach methods, building upon successful efforts of regional organizations to continue the conversation about climate change in Seabrook and engage the public in the results of the WWTF assessment. It is expected that our outreach process will be easily replicated by other New Hampshire coastal communities.

Key objectives of this project included:

- Identify current/projected flooding from SLR/storm surge and impacts
- Include new site-specific SLR and storm surge evaluations
- Incorporate new science on groundwater rise projections
- Identify and create design concepts, permit strategy, and costing for four options for improving the climate resiliency of the WWTF
- Engage over 50 residents through the development of public engagement strategy on climate threats and emergency procedures

client contact

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U.S. ARMY CORPS OF ENGINEERS CHARLESTON SC 3x3x3 PERIMETER PROTECTION PLAN

Clemson University Master of Resilient Urban Design-Design Alternatives



The historic City of Charleston, South Carolina faces diverse flood threats including tidal flooding, storm surge, sea level rise, and stormwater runoff from intensified rainfall. In response to storm surge concerns, the US Army Corps of Engineers (USACE) conducted a federal planning process referred to as 3x3x3 with a price tag of \$3 million to complete a study in three years with three concurrent levels of review. The result is a USACE proposed perimeter protection plan that includes a nearly eight-mile long seawall at 12' elevation which would wrap around Charleston's historic and beloved peninsula. In 2021, the Clemson University Master of Resilient Urban Design program completed a design alternative study to the Corps' Charleston perimeter protection plan. Kim Morganello, now staff with Weston & Sampson, had the opportunity to work on the project as part of her graduate studies, focusing on the iconic areas of Union Pier, Joe Riley Waterfront Park, and the High Battery. Alternatives sought to:

- Enhance public space and access to the water's edge for resident livability and visitor experience
- Provide edge repair to restore ecosystem services
- Design site specific perimeter protection based on existing physical, cultural, and natural resource conditions,
- Create a resiliency laboratory for research and education on a world stage

A Master Plan was created for Union Pier which includes approximately 30 acres of mixed-use development and 40 acres of open space. Portions of the existing pier deck are removed, daylighting open water and restoring a degraded tidal marsh ecosystem. The Joe Riley Waterfront Park provides 10 acres of public green space in Charleston's urban core. Special design considerations are essential to preserve the vision of Mayor Joe Riley. A Mounded T-Wall (above section) is proposed as part of the alternative design that largely hides the perimeter protection from view and protects a majority of existing live oaks and site line to the water. Since the first hurricane the High Battery withstood in 1797, the High Battery has been battered by storm events resulting in the need for near constant repair. The design calls for an offshore combo wall that protects the High Battery and the City within. The combo wall creates a polder system (above section), designed to allow water to enter with the ebb and flow of the daily tides.

Design alternatives were communicated to the City's Civic Design Center through plan view drawings, sections, renderings, a physical model, diagrams, and hand sketches. The design process included regular meetings with the client, presentations, poster sessions, and community engagement.

■ resilient urban design

■ historic areas & districts

■ site analysis & research

■ diverse visualization techniques

■ community engagement

■ design standards & guidelines

client contact

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KIAWAH ISLAND 2015 CHANNEL REALIGNMENT & LONG-TERM SAND MANAGEMENT

kiawah island, south carolina

CSE staff have assisted Kiawah Island for over 40 years, including assisting in the initial development plan for the community to ensure development was sufficiently set back from the ocean. In 2004, the encroachment of a flushing channel from Stono Inlet caused severe erosion on the northeastern end of Kiawah Island. CSE designed and implemented two channel realignment projects (2006 and 2015) to mitigate erosion threatening the 16th and 18th holes of the famed Kiawah Ocean Course and restore the sand flow to downcoast beaches. Each of these projects occurred in designated critical habitat for the piping plover and incorporated methods to reduce impacts and prolong habitat formation suitable for these birds. This required close consultation with state and federal resource agencies and detailed post-project monitoring. The 2006 and 2015 Kiawah Island channel realignment projects illustrate how engineering solutions can be used to balance the protection of property and the development of wildlife habitat. In addition to restoring the flow of sand to downcoast areas of Kiawah Island, these projects were also designed to prolong washover habitat crucial for the piping plover.

client contact

Jim Jordan, Wildlife Director
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■ **Total Volume: 650,000 cy**

■ **Project Length: 6,000 lf**



DARE COUNTY BEACH EROSION ASSESSMENTS & NOURISHMENT

dare county, north carolina

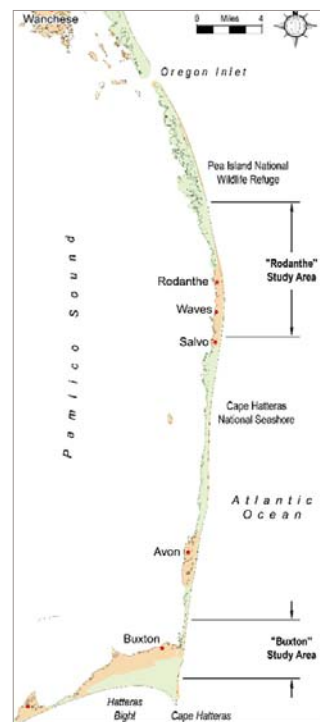
CSE was retained in 2013 to evaluate shoreline erosion along the critically eroding "S-curve" sections of Highway NC 12 and adjacent beaches in the areas of Rodanthe and Buxton on Hatteras Island (NC) and develop alternate plans for beach restoration. The study's primary goal was to determine the feasibility and probable costs of beach restoration and maintenance to protect community infrastructure (particularly along sections of Highway NC 12) from chronic erosion and flooding. Based on the profile volume analyses of the project area and the adjacent healthy beach, CSE developed 5-year and 10-year beach restoration plans. As the project area was located on a National Seashore, the effort required extensive coordination with federal agencies, local municipalities, property owners, and the County. This study has culminated in an ongoing coastal engineering consulting relationship with Dare County. Over the past 10 years, CSE has designed and managed two beach nourishment projects along 15,500 ft of coastline at Buxton (Jun 2017-Feb 2018 – 2.6 million cy; Jun-Aug 2022 – 1.2 million cy), a feasibility study and nourishment project for Avon (Jun-Aug 2022 – 1.0 million cy placed along 13,200 lf of beach), and a feasibility study for Rodanthe anticipated in 2023.

client contact

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■ **Total Project Volume: 4,008,000 cy**

■ **Project Length: ~8.5 Miles**



DEBORDIEU COLONY BEACH NOURISHMENT & GROIN CONSTRUCTION

DeBordieu colony, south carolina



CSE has provided coastal engineering services to DeBordieu Colony Community Association since 1984. Early work included the first shoreline erosion assessment and a comprehensive tidal wetlands management plan. This led to two nourishment projects by truck using inland sand resources (1990 and 1998). CSE also developed plans between 1989 and 1996 for beach stabilization via terminal groins at the south end of the 1.5-mile beach. Legal challenges related to groins delayed implementation of the project. After re-engaging CSE in 2015, the project was permitted successfully, including a rigorous monitoring and mitigation plan to compensate for future downcoast impacts. CSE's modeling and empirical measurements predict the project will double or triple the renourishment interval (from 5 years to 10-15 years) and save the community over \$30 million in renourishment costs over the next 30 years.

- 2022 Total Project Volume: 718,346 cy
- 2022 Groin Numbers: 3 Built

client contact

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LITCHFIELD BEACH SHORELINE ASSESSMENT & BEACH RESTORATION

litchfield beach, south carolina



- 2022 Total Project Volume: 450,000 cy
- Project Length: ~3,500 lf

client contact

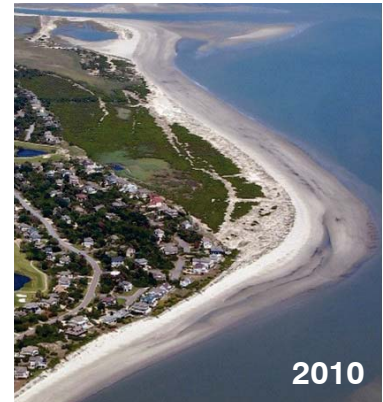
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Property owners' groups retained CSE within the Inlet Point community to provide a feasibility assessment and restoration plan for ~1 mile of shoreline. This involved a substantial community outreach effort to build support for the privately funded project. Based on the plan, CSE designed and administered the first large-scale restoration project along Litchfield Beach, adding 450,000 cy of sand to ~3,500 lf of shoreline. CSE leveraged its relationship with the contractor to coordinate the Litchfield project with a nearby effort and provide the community with a more economical alternative. As a result, the contractor completed both projects on a single deployment and provided both communities with cost savings of \$1,000,000 each.

SEABROOK ISLAND INLET RELOCATION & LONG-TERM SAND MANAGEMENT

seabrook island, south carolina

Seabrook's shoreline is bounded by an unstable migratory inlet (Captain Sams Inlet) to the north and a large, stable inlet (North Edisto River Inlet) to the south. CSE has served as the project engineer for Seabrook Island sand management projects since 1984. Our company has prepared dozens of beach monitoring, shoreline feasibility studies, and environmental reports tracking long-term changes along the beach. This has led to beach preservation designs that work with the inlets' natural dynamics and complex sediment pathways. CSE projects have helped sustain the sand supply along the island, buried most of the seawalls, and maintained the dry sand beach without groins. CSE projects have added ~2 million cubic yards alongshore using highly cost-effective inlet relocations (three at <\$950,000 each (\$2015) and one channel realignment by dredge (1990). CSE has also assisted in preparing Seabrook's two LCBMPs (1991 and 2014).



client contact

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- **2015 Total Volume:**
165,000 cy
- **Project Type:** Inlet Relocation

TOWN OF EDISTO BEACH, BEACH NOURISHMENT & GROIN LENGTHENING

town of edisto beach, south carolina



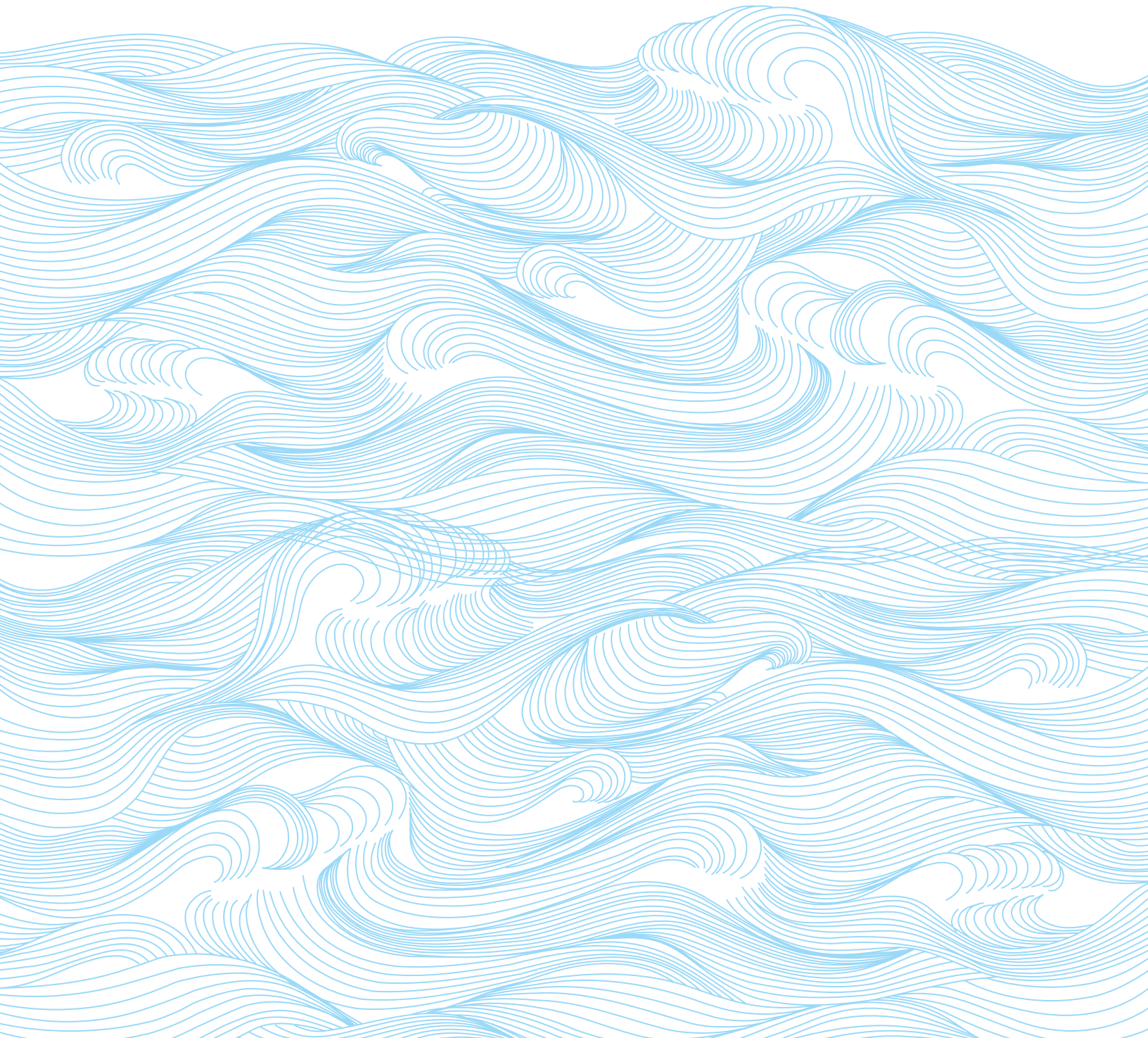
- **2017 Total Volume:**
1,006,000 cy
- **Project Length:**
~19,000 lf
- **Groin Extensions:** 26

Following a 922,000 cubic yard nourishment project managed by CSE in 2006, the Town of Edisto Beach anticipated the need for a renourishment project around 2016. Planning for the project began in 2012 with the initiation of a groin-lengthening study. CSE determined that most of the groins were too short to hold a beach that could withstand seasonal fluctuations in the shoreline position without damage to developed property. The renourishment project included lengthening 26 groins to maintain an adequate berm width and protective dune for storm damage reduction. The project was completed between January and June 2017 and placed 1,006,000 cy along 3.6 miles, including Edisto Beach State Park. FEMA Category G disaster assistance funds were approved after Hurricane Matthew (2016) and paid for a portion of the project. CSE presently provides annual post-project monitoring for the Town.

client contact

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Project Team





WHY OUR TEAM

Our team takes a “local knowledge first” approach.

We believe our team, comprised of Weston & Sampson and CSE, provides the essential balance between proven resilience expertise and an understanding of local stakeholder engagement. The proposed mitigation strategies developed by Weston & Sampson and CSE will be the most effective with extensive local stakeholder buy-in. Local knowledge of and experience with the impacts of sea level rise will be invaluable to the development of mitigation strategies. Our team consists of engagement experts who are skilled at soliciting this local knowledge from stakeholders and citizens.



- **Nationally recognized** climate resilience team
- Nimble team of **local champions and specialists**
- **Graphic forward** approach to document development
- **Technical excellence**
- **Dynamic** engagement methodologies

WHO WE ARE

Resilience Specialists

Community Planners

Visualization Specialists

Certified Floodplain Managers

Coastal Resources Experts

Beach Management Specialists

Engagement Innovators

Modeling Experts





MEET OUR TEAM



Management



Jeannie Lewis
Project Manager



Steven Traynum
Assistant Project Manager
& Engagement Lead

Technical Review



Indrani Ghosh, Ph.D.
Senior Technical Leader

Climate



Rupsa Roy, Ph.D.
SLR Analysis



Bella Purdy
Urban Planner



Adria Boynton, AICP
Graphic Designer

Community



Anna Kimelblatt, CFM
Certified Floodplain Manager &
Community Resilience Planner



Tim Kana, Ph.D. PG
Senior Coastal Scientist



Kim Morganello
Resilient Urban Designer &
Engagement Specialist

Technical



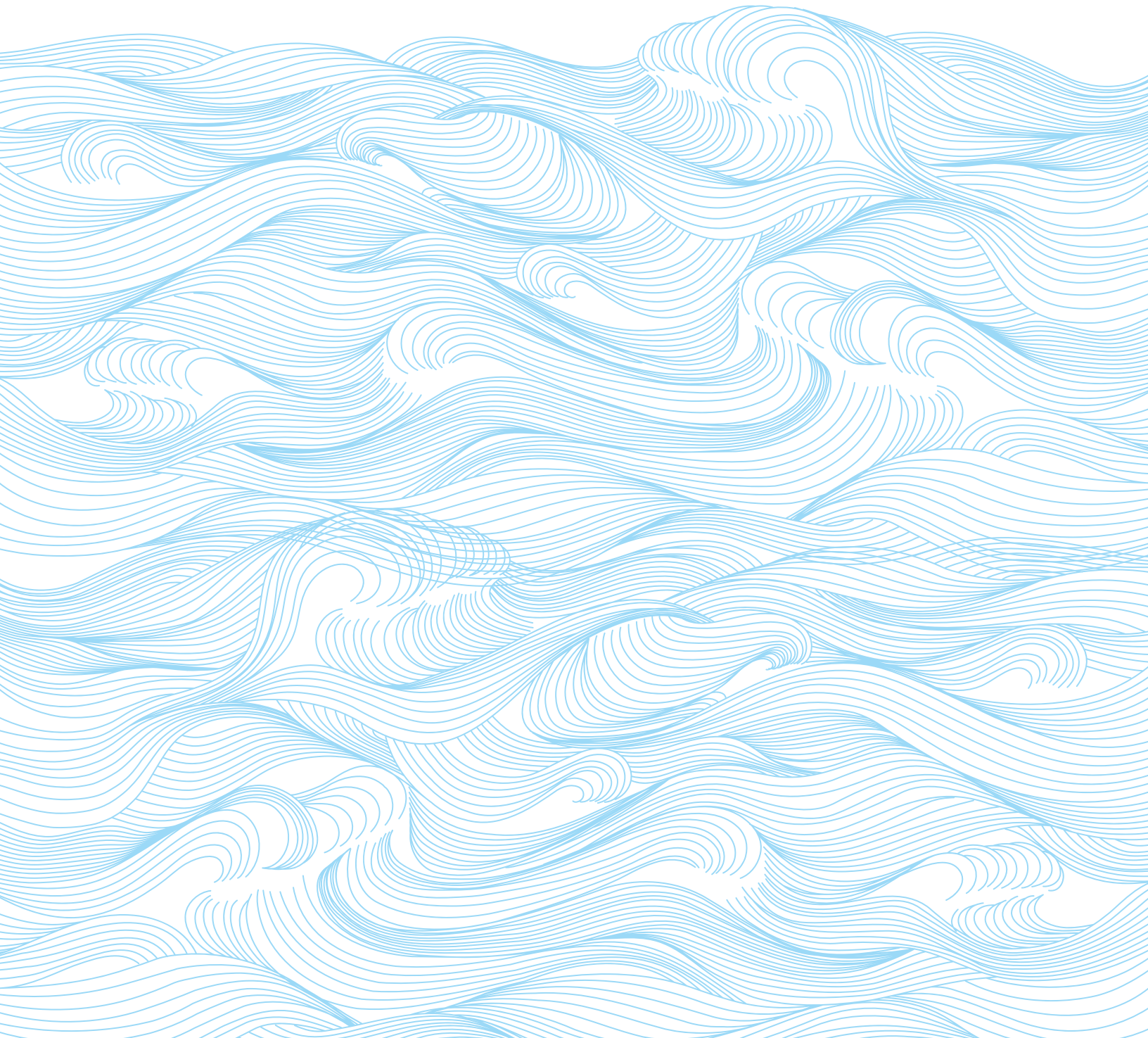
Lucas Hernandez
Modeling Lead



**Patrick Barrineau,
Ph.D. PG**
Coastal Scientist



Sub- Consultants/ Contractors





SUB-CONSULTANTS/ CONTRACTORS

CSE specializes in engineering, planning, and scientific studies in the coastal zone.

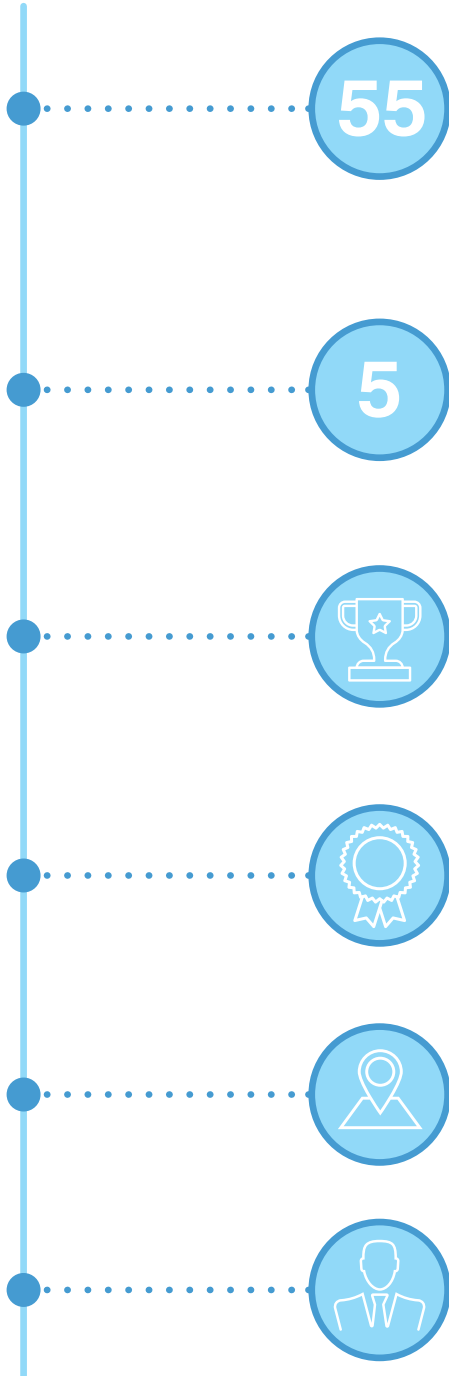
Coastal Science & Engineering Inc. operates in the State of South Carolina as a registered Engineering firm with LLR South Carolina State Board of Registration for Professional Engineers and Surveyors with current registration from 2021 to 2023 (COA #1950). CSE's founder, Dr. Tim Kana (Lic #564) and Dr. Patrick Barrineau (Lic #2773), are also actively registered professional geologists with the LLR South Carolina Board of Registration for Geologists.

Since 1984, our experts in coastal and environmental engineering, geology, oceanography, and surveying have developed innovative engineering solutions to problems related to changing coastlines. CSE has in-house capabilities and experience to provide turn-key beach management services in conducting the following engineering work:

- Shoreline erosion assessment and feasibility studies
- Developing local and/or regional short-term and/or long-term beach management plans
- Community outreach and education
- Coastal shoreline numerical modeling and alternatives analysis
- Topographic mapping and bathymetric surveys from the beach zone to deep water
- Inland and offshore sand searches and geotechnical studies
- Project cost analysis to assist the client with public financing and planning
- State and federal permitting, environmental compliance, and documentation
- FEMA coordination and cost estimation for public assistance funds
- Development of plans and specifications for construction
- Bidding and negotiating with contractors
- Construction Administration
- Post-project monitoring to evaluate project performance



Among CSE's Milestone Are:



A total of 55 large-scale nourishment projects (~42 million cubic yards) via hydraulic dredge, hopper dredge, truck hauling from inland and offshore sources, sand transfers from accreting zones, and inlet relocation/realignment. These projects have helped protect property worth over \$15 billion.

Five projects have been recognized as Best Restored Beaches by the American Shore & Beach Preservation Association (ASBPA), including Sagaponack–Bridgehampton, NY (awarded 2018), Seabrook Island, SC (2016), Folly Beach County Park, SC (2015), Nags Head, NC (2013), and Isle of Palms, SC (2011).

The 2011 Nags Head (NC) project was the largest locally funded nourishment project ever constructed in the US at 4.6 million cubic yards and received an ACEC National Engineering Excellence Award in 2013.

CSE's innovative relocation of Captain Sams Inlet (SC) (1983, 1996, and 2015) was recognized by the National Academy of Sciences as "both environmentally sensitive and cost-effective, indicating the benefits of combining fundamental research on coastal processes with coastal engineering practices."

Developed methodology for establishing objective setback lines for development in South Carolina (enacted as part of the State's Beach Management Act in 1988)

Consultant to the federal government (eg – US Army Corps of Engineers, US Environmental Protection Agency), state government (South Carolina, North Carolina, Georgia, and New York), and numerous municipal governments throughout the Carolinas.



EXTENSIVE SOUTH CAROLINA BEACH MANAGEMENT EXPERIENCE

CSE is the most experienced beach nourishment design firm in South Carolina, with more project experience than the USACE-Charleston District. Since 1984, CSE has provided engineering or consulting services for every developed beach in South Carolina.

CSE maintains the largest database of volumetric and linear erosion measurements in South Carolina, developed over 35 years of hands-on field data collection and aerial photo analysis. Our team has conducted over 40 engineering projects along South Carolina's highly irregular coastline and is intimately familiar with the erosion challenges, regulatory obstacles, and funding hurdles that local coastal communities face.

ISLE OF PALMS EXPERIENCE

CSE has been involved with shoreline management at the Isle of Palms for over 35 years. Over the past decade, CSE has worked for the City in all aspects of beach management, including surveys, permitting and execution of beach restoration projects, hurricane response, coastal policy, education, and outreach.

Beyond our consulting role for the City, CSE has invested in the Isle of Palms and the beach processes affecting the island by supporting studies, preparing conference presentations and scientific papers, and sponsoring graduate-level student research of the island. These efforts increase our professional understanding of the area while providing the City with a work product that exceeds simple beach volume calculations, which improves future beach management decisions.

PUBLIC OUTREACH AND ENGAGEMENT

Education and outreach are vital to improving the public's understanding of coastal resiliency. This includes increasing general awareness that beach erosion and sea level rise are happening and explaining the steps that coastal communities are taking to combat these problems.

CSE's goal is to help our clients communicate the challenges our coastline faces, the strategies adopted to mitigate them, and explain science and engineering evidence supporting these strategies. We provide various outreach and engagement tools to assist local communities in sharing relevant information regarding coastal resiliency planning and projects. These collaborative tools promote the benefits of beach nourishment and help broaden community participation and support.



SUB-CONSULTANTS/ CONTRACTORS (CONTINUED)

CSE's communication tools assist project planners in the following ways:

- Promote the economic benefits of beach nourishment to local businesses and property owners
- Communicate potential benefits to coastal habitats and local wildlife
- Increase outreach to property owners impacted by beach nourishment activities
- Provide opportunities to increase community awareness and participation in resilience planning
- Communicate information about beach management planning and processes
- Highlight progress on planning and execution of beach nourishment projects

The following tools and techniques are used to provide user-friendly information to educate stakeholders on specific issues related to beach nourishment activities. These materials are customized to match our clients' branding styles to help ensure that messaging is consistent with all other types of public communications.

- Town meetings
- GIS maps
- Education materials
- Newsletter/project updates
- Public notices
- FAQ sheets
- Workshops, roundtables, and public meetings

CSE understands that our clients have a vital role to play in educating the public about beach management initiatives. At the beginning of each project, CSE works with our clients to define a communication strategy and a suite of materials that will be used to provide consistent and regular messaging. Through close coordination with our clients, we keep all stakeholders updated with timely information throughout the life of the project.



Sea Level Rise Impacts to the Beach & Dune System

CSE has been projecting SLR and monitoring associated environmental changes for decades, with some of our earliest reports occurring in the Charleston region under contract for the EPA in the 1980s. That work forecasted future sea level rises and provided estimates for changes in water levels and marsh habitats over 50- and 100-year periods. We have updated those findings with each successive round of the Intergovernmental Panel on Climate Change (IPCC) report issued in recent years. Our findings have been included as a cost-free add-on in our annual monitoring reports for clients from Long Island (NY) to Sea Island (GA), including the Isle of Palms.

Beaches and dunes can more easily adjust to SLR because waves simply build (and erode) these features at the ambient water level – whatever that level may be. As sea levels rise, the beach profile will be displaced proportionately upward and landward. The amount of displacement is related to many factors, but for much of Isle of Palms, a one-foot rise in sea level equates to 15–30 ft of landward shoreline movement. The change depends on the natural slope of the beach, such that the relatively steep Dewees and Breach Inlet shorelines will experience less displacement than the relatively shallow beaches along the center of the island.

Assuming this average rate of displacement, every mile of developed beach will need 100,000 to 300,000 cubic yards (cy) of sand to hold the shoreline position constant through one foot of SLR. This volume will be gained naturally along shorelines experiencing natural accretion – as often happens along portions of the Isle of Palms when shoals from Dewees Inlet attach. But along eroding shorelines, more than this volume will be needed to offset erosion. Isle of Palms should expect 1 ft of SLR by 2050, with an additional foot likely by 2080.

Considering accelerated SLR rates are highly likely for the next several decades, CSE is already assisting clients to quantify sand deficits under a range of SLR conditions and erosion rates. Using this information, we identify eligible sand resources for placement via truck or dredge, and assist clients by effectively managing environmental restoration projects with a hands-on approach.

CSE's extensive knowledge of implementing renourishment projects on Isle of Palms and our decades of experience working with state and federal partners to obtain permits place us at the forefront of oceanfront environmental restoration projects in South Carolina.

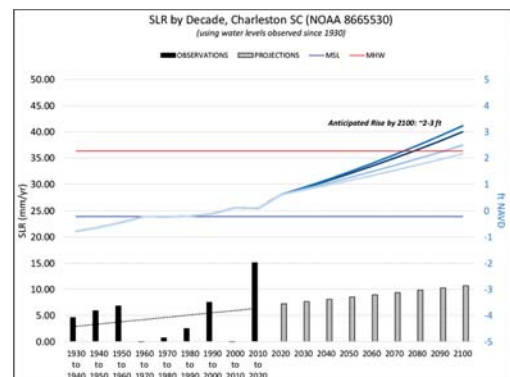
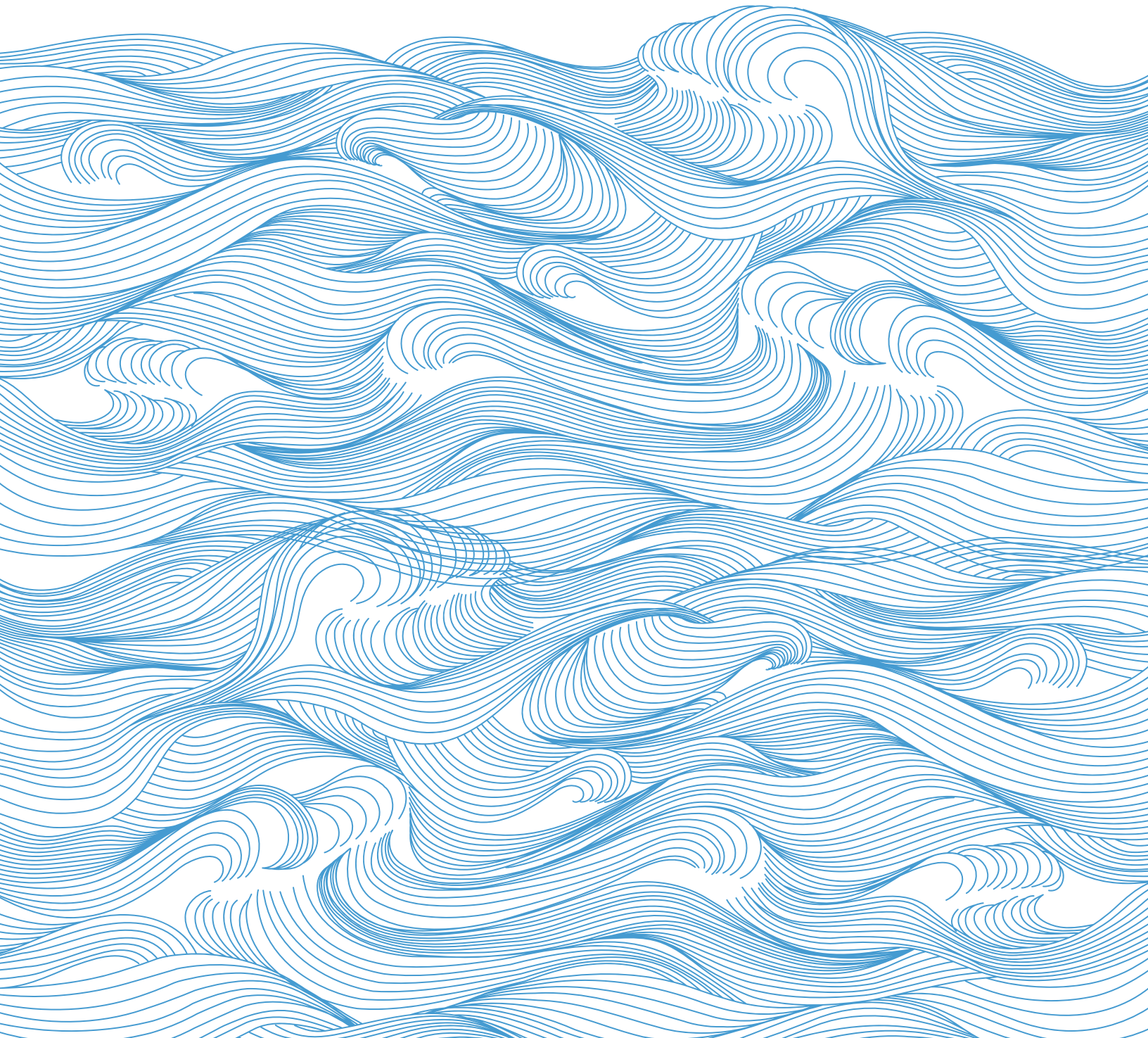


FIGURE A. CSE actively tracks up-to-date water level observations at Charleston to provide our clients with the latest information on their vulnerability to enhanced beach erosion as well as nuisance flooding. Observed sea level rise rates from 1930 to 2020 (black bars), with the average decade-to-decade increase (dotted black trend line) used to predict future sea level rise rates through 2100 (gray bars). If the average increase in sea level rise rates from 1930 to 2020 holds steady, 2 to 3 feet of sea level rise are possible by 2100. Current Mean High Water (MHW – red line) would be Mean Sea Level by ~2070.



Scope of Work





SCOPE OF WORK

Isle of Palms needs a comprehensive approach to sea level rise mitigation and adaptation.

Our team is confident that the Sea Level Rise Adaptation Plan will result in tangible, accessible, and equitable actions that will help protect Isle of Palms from future impacts of sea level rise and preserve its island way of life.

This process also provides the opportunity to drive regulatory discussions around climate adaptation and resilience. Through the development of the Plan, stakeholders will come together to define their goals and vision in regard to climate resilience. These conversations will contribute to a more comprehensive project review and implementation process.

Our approach will exceed standard modeling practices and provide better insight into the impacts of sea level rise on Isle of Palms. Our team has the capacity to build in-depth hydrologic models that consider a wide variety of variables, such as varying levels of sea level rise, storm surge, and precipitation. Our team has the ability to develop 2D model outputs at the parcel level to help the Isle of Palms Community confirm known locations vulnerable to sea level rise and storm surge and identify new areas that may not be immediately recognized by the community or island staff. Additionally, we can use the stormwater model currently being developed by Davis & Floyd to provide an analysis for how storm surge and future sea level rise scenarios will impact the island's drainage network through the manipulation of tidal boundary conditions. This type of analysis would provide enough information to develop potential solutions and test proposed solutions against the capabilities of the existing stormwater infrastructure. We are committed to providing Isle of Palms with the most detailed possible output with the intent that these models will be used to drive mitigation and adaptation strategies.



Determine
vulnerabilities
and model future
scenarios



Use stakeholder input
and model output to
develop mitigation
strategies



Make a document
that is robust but
accessible and
usable



Our team is confident that the Plan we produce will align well with the priorities and goals of the IOP Strategic Plan for 2022-2027. The Plan will not only engage citizens on environmental issues but will also put IOP at the forefront of resilience and sustainability in South Carolina. We are confident that we will produce a Plan that will help IOP be the most sustainable and family-friendly beach community in the area, both presently and for many years to come.

1. Information Gathering

Deliverables: background report with current slr and groundwater data, and findings from stakeholder interviews.

1.1 Internal Meetings and Interviews

The project team will hold a series of internal meetings and interviews with the City staff, the Planning Commission, the Environmental Advisory Committee, utility providers, and other relevant staff to establish expectations, finalize timelines, assess existing capabilities, and determine which critical assets are considered vulnerable to sea level rise.

Document Review:

- Isle of Palms Comprehensive Plan
- Local Comprehensive Beach Management Plan for Isle of Palms
- City of Isle of Palms Strategic Plan 2022-2027 State of South Carolina Statewide Resilience and Risk Reduction Plan
- Charleston County Regional Hazard Mitigation Plan
- 2023 Drainage Master Plan (upcoming)
- Flood Mitigation and Sea Level Rise Adaptation for Kiawah Island, SC
- 2023 Flooding and Sea Level Rise Strategy Update for the City of Charleston



SCOPE OF WORK

1. INFORMATION GATHERING (CONTINUED)

1.2 Personal and Small Group Interviews with Stakeholders

The project team will develop a comprehensive and diverse contact list of potential participants for personal and small group interviews that includes public officials, representatives from special districts and regional agencies, local community groups, service organizations, businesses, neighborhood groups, developers, local colleges, and other interest groups.

Stakeholders:

- IOP Neighborhood Association
- IOP Environmental Advisory Committee
- IOP City Council
- IOP Building, Planning & Zoning Depts
- Isle of Palms Business Council
- Isle of Palms Exchange Club
- Wild Dunes Resort
- IOP Police Department
- IOP Fire Department
- Shipwatch Homeowners Association
- Wild Dunes Community Association
- Sea Cabins on the Ocean HOA
- College of Charleston Lowcountry Hazards Lab
- Coastal Conservation League
- Charleston Resilience Network
- South Carolina Department of Natural Resources
- South Carolina Department of Health & Environmental Control
- US Army Corps of Engineers
- South Carolina Department of Transportation
- Charleston County Public Works
- Charleston County Floodplain Management



1.3 Compile SLR Data

The project team will compile the best available sea level rise data at the local, regional, and national levels. The project team will also review and incorporate all data within the City of Isle of Palms Drainage Master Plan, such as groundwater level data.

1.4 Public Outreach Workshops

In conjunction with City staff, the project team will host a series of public outreach workshops. These workshops will introduce the project to the public, define project parameters, inform the community of project opportunities and constraints, and solicit opinions from the community to shape the Plan. Feedback from these workshops will be incorporated into the Plan.





Photos from recent engagement events



2. Draft Plan Development

Deliverables: draft plan and presentations.

2.1 Develop Goals and Visions

The project team will use feedback from stakeholder and staff interviews to develop goals and priorities for the Plan.

2.2 Draft Illustrative Map of Vulnerabilities

The project team will create a map to geographically illustrate the vulnerabilities of the City. Such vulnerabilities may include commonly flooded areas, common road closures, areas of particularly low elevation, critical facilities, or areas experiencing severe erosion.

2.3 Draft Adaptation Strategies

Using the information and data collected from Task 1, the project team will devise a set of draft adaptation strategies. Strategies may include structural projects, green infrastructure projects, enhancements to emergency services, public outreach projects, amendments to ordinances, property protections, retrofits, or other regulatory tools.

2.4 Draft Cost Estimates of Potential Projects

The project team will develop cost estimates for each of the strategies proposed in section 2.3.



SCOPE OF WORK

2. DRAFT PLAN DEVELOPMENT (CONTINUED)

2.5 Potential Funding Sources

The project team will identify potential funding sources for the strategies developed in section 2.3. Staff will provide a review of grant opportunities that are available to local municipalities for hazard and flood mitigation.

2.6 Presentation of Draft Findings

The draft of the Plan will be presented at a public meeting. Staff will review the proposed goals, visions, strategies, and funding sources and will solicit feedback from City staff and stakeholders.



Public meeting presentations



3. Final Plan Development

Deliverables: final plan including inventory of existing conditions, projections, vulnerabilities, visions, goals, strategies, potential projects, maps, cost estimates, potential funding sources, and any other documentation necessary to meet the stated goals of the request.

3.1 Refine the Draft Plan

The Plan will be revised based on stakeholder and staff feedback received at the public meeting in task 2.6. Stakeholder and staff feedback will be recorded at the public meeting and incorporated into the revised Plan.



SCOPE OF WORK

3. FINAL PLAN DEVELOPMENT (CONTINUED)



Photos from a stakeholder meeting

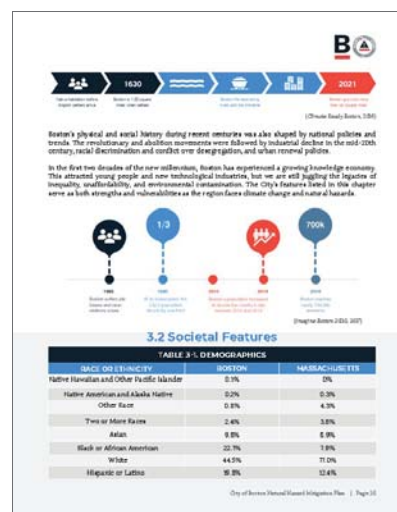


3.2 Present the Final Plan to Interested/Affected Parties

The project team will first present the final plan to smaller groups of stakeholders and other relevant affected parties. This will allow staff an additional opportunity to obtain feedback and gauge any concerns that stakeholders may have.

3.3 Present the Final Plan to IOP Council

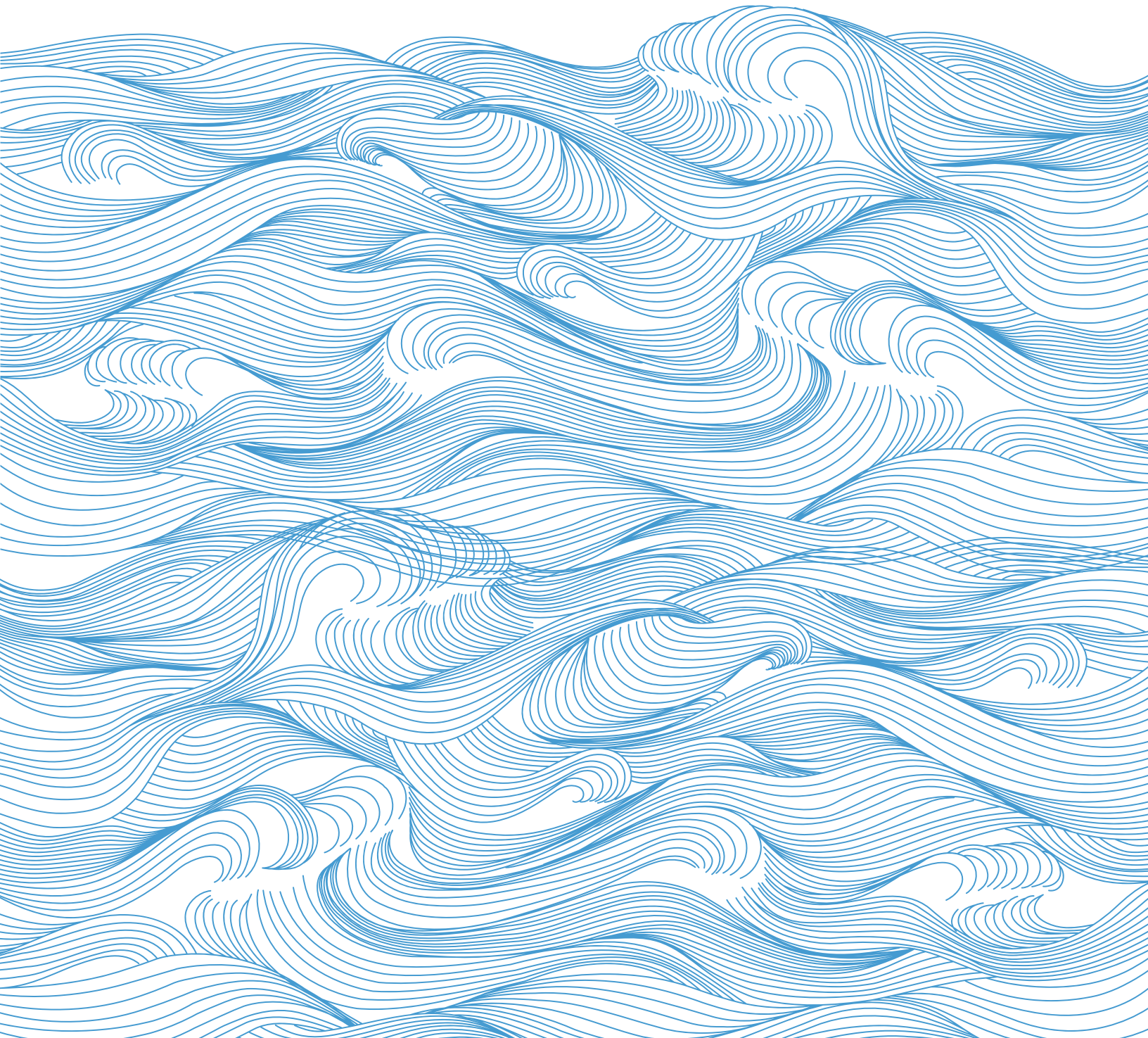
A presentation on the final plan will be provided for the City of Isle of Palms Council. The project team will discuss the process through which the plan was developed and review the proposed strategies and funding sources. The goal of this presentation will be to have Council officially adopt the Plan.



An example of a formatted report



Our Experience





OUR EXPERIENCE

Weston & Sampson has robust technical knowledge in **actionable climate resilience, municipal vulnerability assessments, equitable engagement practices, infrastructure adaptation, and climate resilient design and engineering for coastal communities**. Our team has worked with many communities along the east coast to develop their plans which often address historical assets, districts, and flood risks. On the following pages, there are descriptions of our team's experience with these plans and links to prior projects that our team has completed.

Local Resilience Plans

Our team regularly supports communities across the East Coast in creating their resilience plans.

- Weston & Sampson is currently working on the Central Virginia Planning District Commission's Resilience Plan through Virginia Department of Conservation and Recreation's Community Flood Preparedness Program.
- Weston & Sampson is developing **resilience plans for two coastal North Carolina communities**, Elizabeth City and Pasquotank County through the Resilient Coastal Communities Program.
- Weston & Sampson has provided support to Massachusetts communities as they complete their Municipal Vulnerability Preparedness (MVP) Plans through the Massachusetts Executive Office of Energy and Environmental Affairs. Our team has supported over **30 resilience plans or projects** through this program.
- Weston & Sampson supported resilience planning in Lynn, Chelsea, Everett, Boston, and Hingham - historic New England towns - through the **MA Coastal Zone Management Program**.
- Weston & Sampson is currently working on a vulnerability assessment and **resilience plan for Lee County, Florida** through the Resilient Florida Program.
- Weston & Sampson was the technical advisor for the **City of Cambridge's Resilience Plan**. This plan included a vulnerability assessment and focus on equity and community connection, as well as a section on Resilient Buildings with an emphasis on Cambridge's historic nature.



Historic buildings in Chelsea



Chelsea City Hall



OUR EXPERIENCE
(CONTINUED)

We've worked
with more than

47

communities on
flood resilience
projects

We've worked on
resiliency grant
projects totaling
nearly

\$9M

in grant funding

Completed over

\$6.2M

worth of climate
resiliency work

\$6.5M

resilience grant
funding secured
for clients since
2018

**HISTORY
OF GRANT
SUCCESS**

Completed over

100

climate resiliency
projects

Over

20

staff members
dedicated to flood
resilience projects

Completed

15

Hazard Mitigation
Plans

21

municipal climate
resilience grant
applications
completed





OUR EXPERIENCE (CONTINUED)

BOSTON COMMON MASTER PLAN

Boston, MA

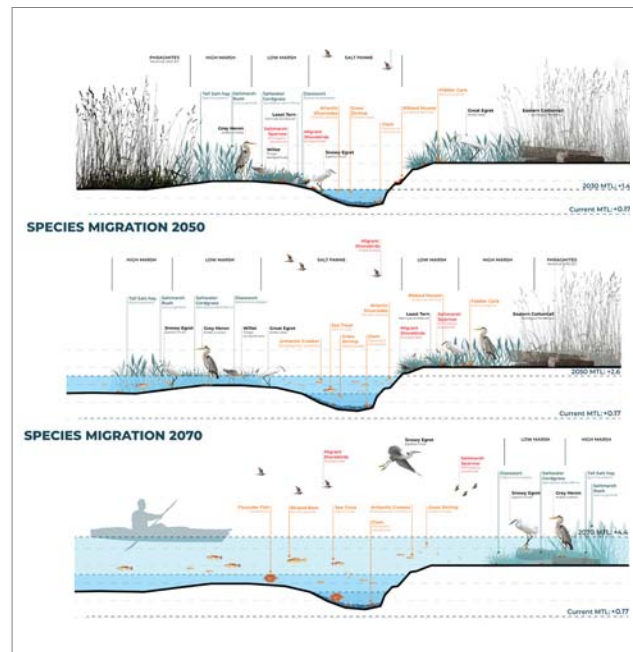
The Boston Parks and Recreation Department (BPRD) commissioned Weston & Sampson Design Studio to develop a creative, historically compatible, and flexible master plan for the revitalization of Boston Common, America's first public park. A robust public outreach process captured diverse voices across the city and beyond. Nearly 6,000 individuals took our online survey or engaged with us at an in-person event and these interactions provided valuable data about how people use the Common now and how it can better serve them in the future.



MASSACHUSETTS DEPARTMENT OF CONSERVATION AND RECREATION CLIMATE VULNERABILITY ASSESSMENT

Massachusetts, Statewide

Weston & Sampson led the second phase of DCR's climate change vulnerability assessment which involved developing interactive engagement tools, adaptive nature-based design solutions, and integration with the state's ongoing initiatives. Weston & Sampson refined the methodology for assessing the exposure, sensitivity, and adaptive capacity of DCR's properties. The map above shows exposure to sea level rise/storm surge. The map below is an output from an online ArcGIS portal that shows automated maps and evaluations. Nearly 500 DCR facilities exist in both coastal and non-coastal environments.



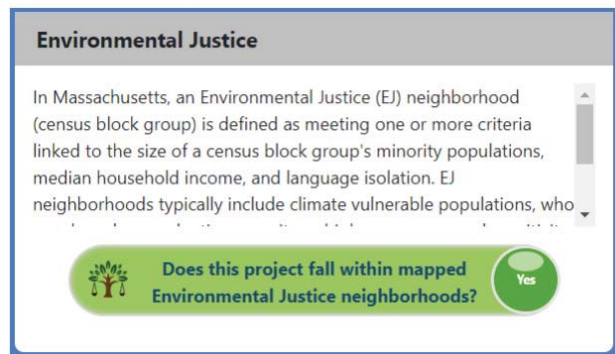


OUR EXPERIENCE (CONTINUED)

CLIMATE RESILIENCE DESIGN STANDARDS TOOL

Massachusetts, Statewide

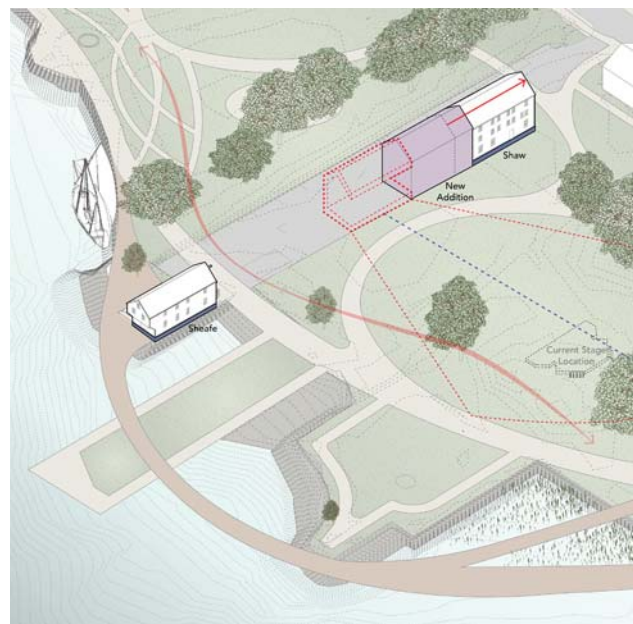
Weston & Sampson led this project for the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) and the Massachusetts Emergency Management Agency (MEMA). The first of its kind, this project developed statewide climate resilience standards and guidelines that integrate specific climate resilience actions into state and municipal capital planning efforts through a web-based tool. This free, interactive GIS-based application enables users to create a project online and receive data-driven output within 15 minutes, including a preliminary climate exposure and ecosystem services benefits score, climate risk ratings, and recommended design standards.



PRESCOTT PARK MASTER PLAN & IMPLEMENTATION

Portsmouth, NH

Prescott Park hosts hundreds of thousands of visitors annually for passive daily use and special events. The goal of the master plan is to revitalize this high-profile and high-visibility waterfront space, provide active and passive recreation opportunities, create essential pedestrian connections, and sustain the lasting legacy of park benefactors Josie and Mary Prescott for generations to come. Weston & Sampson performed a thorough site analysis, conducted extensive public engagement, and developed a comprehensive master plan that identifies inspired, yet achievable, renovation and restoration strategies for this signature property.





OUR EXPERIENCE (CONTINUED)

ISLE OF PALMS (SC) BEACH RESTORATION & SHORELINE MANAGEMENT

2018 Total Volume: 1,700,000 cy
Project Length: ~2.1 miles

The northeast end of Isle of Palms (SC) is periodically subject to significant and rapid shoreline fluctuations in response to “shoal-bypass” events, during which sand bars in Dewees Inlet detach from the delta and migrate onshore. These shoal-bypass events act as breakwaters and create areas of rapid accretion on the beach, flanked by areas of rapid erosion. A large event occurring from 2004 to 2008 caused severe erosion of the beach and necessitated the use of emergency sandbags in front of several large condominiums.

CSE was retained in 2007 to develop and implement a plan to restore the recreational beach, to provide dune protection, and to restore beach habitat along an ~11,000 ft stretch encompassing the northeast end of the island. CSE developed a plan consisting of periodic nourishment of the beach using offshore sand deposits coupled with land-based sand transfers as needed in response to attaching shoals.

For the initial project, CSE fast-tracked permitting for a ~850,000 cy dredging project, which was completed in July 2008, just 13 months after CSE's initial involvement. The project also involved documenting the removal of 13,000 emergency sandbags that were placed to protect structures.

Following the successful completion of the first project, CSE provided annual monitoring services for the City to document project performance and anticipate future beach changes due to shoal movements.





OUR EXPERIENCE (CONTINUED)

KIAWAH ISLAND ADAPTIVE MANAGEMENT PLAN

In 2018, The Town of Kiawah Island completed their Flood Mitigation and Sea Level Rise Adaptation Report. This report included over 100 recommendations, one of which was to develop an Adaptive Management Plan to better cope with the impacts of sea level rise and climate change.

An Adaptive Management Task Force was formed to initiate **development of an actionable plan to address sea level rise, climate change, and flooding on the island.** Weston & Sampson's Lucas Hernandez, lead the plan development and Task force, then as the Resilience Specialist for Kiawah Island.



The Sea Level Rise Adaptive Management Plan would include a structured process to identify goals and objectives, implement management decisions, and carefully monitor the island's key systems (green and gray infrastructure):

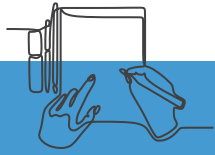
- Roads/Access
- Salt Marsh
- Public/Common Property
- Beaches and Dunes
- Utilities
- Maritime Forest

The Task Force, at Lucas' direction, organized focus groups, community surveys, commercial entity studies, and stakeholder interviews to reach community consensus for intolerable conditions for community's key systems. **Over 1,500 people** responded to the Task Force's survey. **The unique community outreach identified thresholds for which mitigation or adaptation actions should be implemented by community decision makers.**

As part of developing thresholds for this study, both frequency and duration of a system disruption were considered. Additionally, the proposed plan outlined what parameters should be monitored and what timeframes should be considered. Once a threshold is reached, a management strategy can be implemented. Management strategies can be revised or improved depending on the severity of the disruption to provide an immediate resolution or to establish a more in-depth monitoring program to better inform decision making. This helps to account for the high level of uncertainty surrounding both local and national sea level rise projections, the challenges associated with cross-organizational collaboration, and funding community resilience.

This work was an exceptionally important step to sea level rise and climate change adaptation on Kiawah Island.





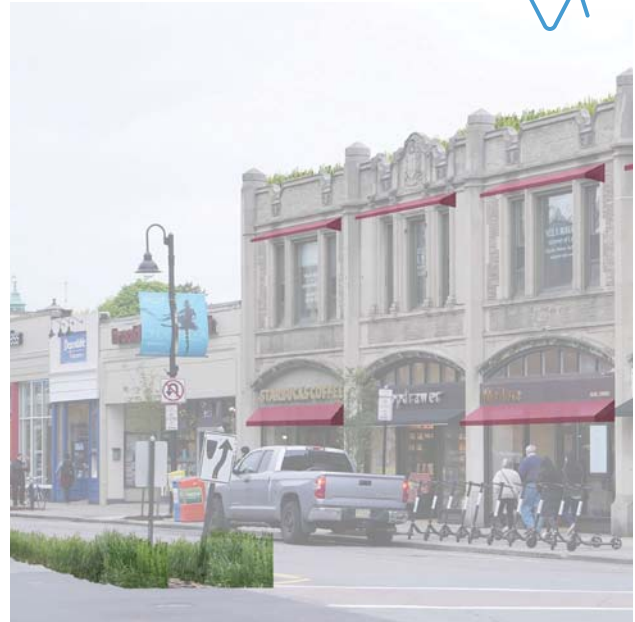
EXPERIENCE IN DEVELOPMENT OF GRAPHICS



BROOKLINE CLIMATE RESILIENCE DESIGN CHECKLIST & REGULATIONS

Brookline, MA

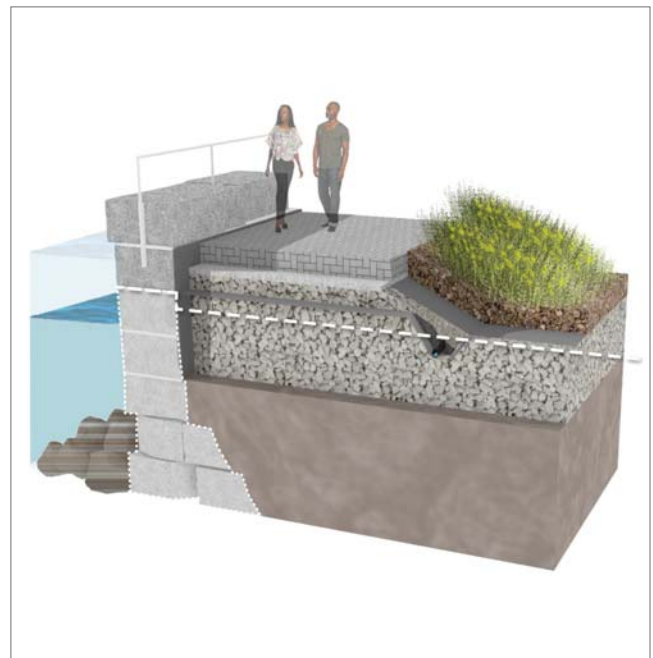
The Town of Brookline wanted to pursue climate adaptation and resiliency proactively by updating their local bylaws and regulations. Weston & Sampson assisted the town by conducting an extensive literature review of regional and national examples and then reviewed 23 of the town's bylaws, regulations, and guidelines to identify gaps and opportunities to incorporate climate resiliency language. Weston & Sampson also provided an in-depth analysis and recommendations on how to promote nature-based solutions and strategies such as green infrastructure (GI), low impact development (LID), open space protection, and floodplain protection.



CLIMATE-RESILIENT DESIGN STANDARDS & GUIDELINES

Boston, Massachusetts

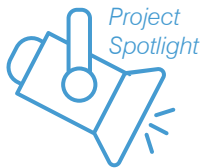
Weston & Sampson assisted the Boston Public Works Department in establishing climate-resilient design standards/guidelines for managing adaptation projects to achieve four feet of flood protection by 2070, with the option to add an additional 2 feet in the future. Our team developed sample specifications, drawings, design, operations, maintenance, and cost considerations for 4 barrier options: harborwalk, raised roadway, deployable flood barriers, and vegetated berms. Our design considerations include adjacent development, accessibility, structural, geotechnical, transportation, utilities, stormwater, groundwater, vegetation, site boundary constraints, off-site impacts, and incremental adaptation.





EXPERIENCE WITH STAKEHOLDER ENGAGEMENT

Weston & Sampson believes in meeting people where they are and reducing barriers to participating in community engagement. We are life-long learners and explore innovative methods for engagement in our monthly public engagement collaborative. Our team frequently supports projects that serve climate vulnerable populations and environmental justice communities. We are committed to providing translation services as needed, accessible language, and multiple-touch points for engagement. We have trained facilitators on our team, and frequently lead workshops and working groups on sensitive topics related to climate resilience trade-offs. Our North Carolina staff regularly support engagement work to identify key input from residents.



Our team provides “**high-tech**” as well as “**high-touch**” engagement methods, and have used the following methods to help reach underrepresented populations:

- Educational **videos** posted and shared on social media
- Youth and family-oriented engagement **events** that use demonstrations and hands-on projects
- Have **translators** on-site at events
- Create online **surveys** or ArcGIS **Storymaps** so that residents can access information on their own time
- Created **multi-lingual** materials
- **Partnered** with community organizations to help build trust with residents
- Identified “**neighborhood captains**” so that residents can interact directly with other residents
- Provide **childcare, food, or compensation** for participating in a workshop

WALTHAM RESILIENT STORMWATER PLAN

Waltham, MA

Weston & Sampson conducted youth-focused STEM engagement for Waltham. Our team developed an educational video on climate change and climate-related careers, developed a web-page with youth-focused resources, and a informative fact sheet.



¿Qué proyectos de infraestructura verde le gustaría ver en Waltham? Marque todos los que correspondan.

- ☐ Plantación de árboles
- ☐ Restauración de la corriente de agua
- ☐ Jardines de lluvia y bioretención
- ☐ Proyectos de infraestructura ecológica y la rehabilitación de la infraestructura de aguas pluviales, como alcantarillas y tuberías
- ☐ Otras:



About Our Firm

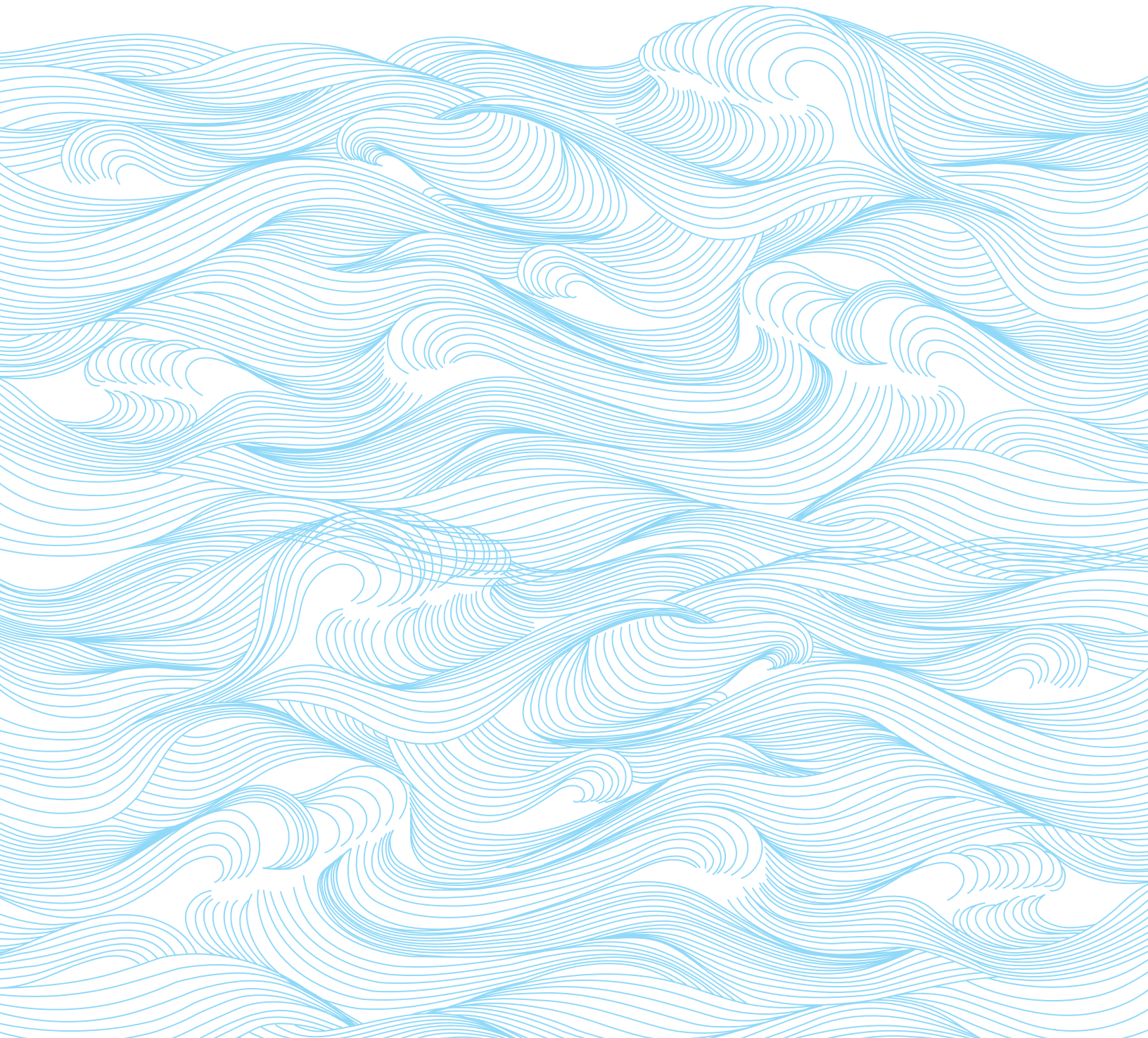


photo credit: Bret Clancy

CLIMATE RESILIENCY

transform your environment

Weston & SampsonSM



ADAPT. SURVIVE. THRIVE.

Weston & Sampson's climate resiliency services support creating designs that adapt, survive, and thrive both chronic and catastrophic changes in the natural environment. Since 1899, Weston & Sampson has been providing municipalities, public agencies, and private sector clients along the East Coast with cost-effective and innovative solutions to their infrastructure and environmental challenges.

Our climate resilience practice provides several interdependent services, including: Climate Modeling, Risk and Vulnerability Assessments, Planning, Design Guidelines, Public Engagement, Design and Adaptation, and Mitigation and Sustainability.

Weston & Sampson's interdisciplinary team of engineers, scientists, climate specialists, architects, landscape architects, designers, and planners incorporate relevant climate models and data into the design of our infrastructure and facility projects. We work with our governmental (municipal and state) clients to study, plan, and implement resilient and cost-effective strategies for their infrastructure, buildings, and natural resources.

What is climate resiliency in practice

- Model climate scenarios, assess risk, and develop plans and strategies
- Design projects to adapt to new design criteria and manage uncertainty
- Emphasize natural systems to mitigate climate impacts and create value

Our design approach

- Evaluate current and future climate risk
- Conduct a regulatory review
- Establish basis of design for climate resilience
- Propose actionable design recommendations



climate modeling

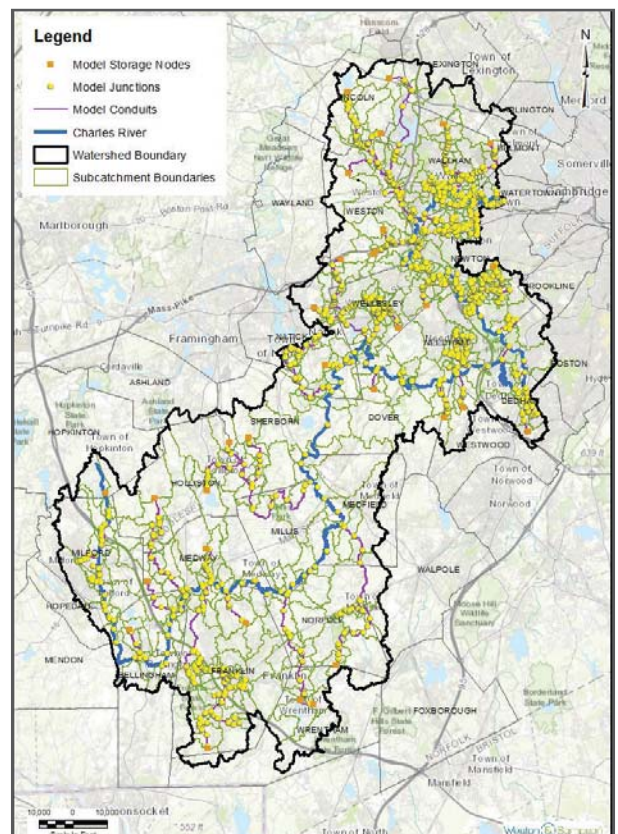
- Climate projections using global climate models (GCMs)
- Coastal modeling using sea level rise (SLR) projections
- Cumulative probability/risk analyses with climate projections
- Estimating climate impacts to water quality
- Estimating impacts of extreme precipitation and/or SLR on groundwater
- Extreme precipitation analyses (H&H modeling)
- Future & extreme wind analyses
- Future drought analyses & impacts to water supply
- Heat analyses (UHI modeling)
- Visualization and analysis of climate projections

Urban Heat Island Mitigation | City of Chelsea, MA
Transportation . Resiliency . Planning . Architecture

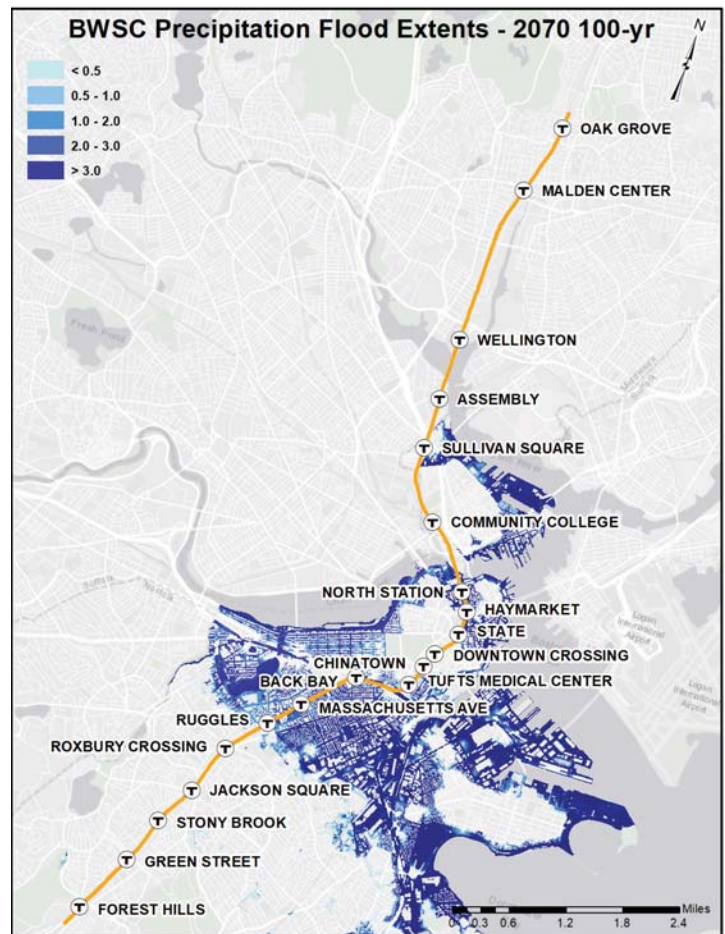
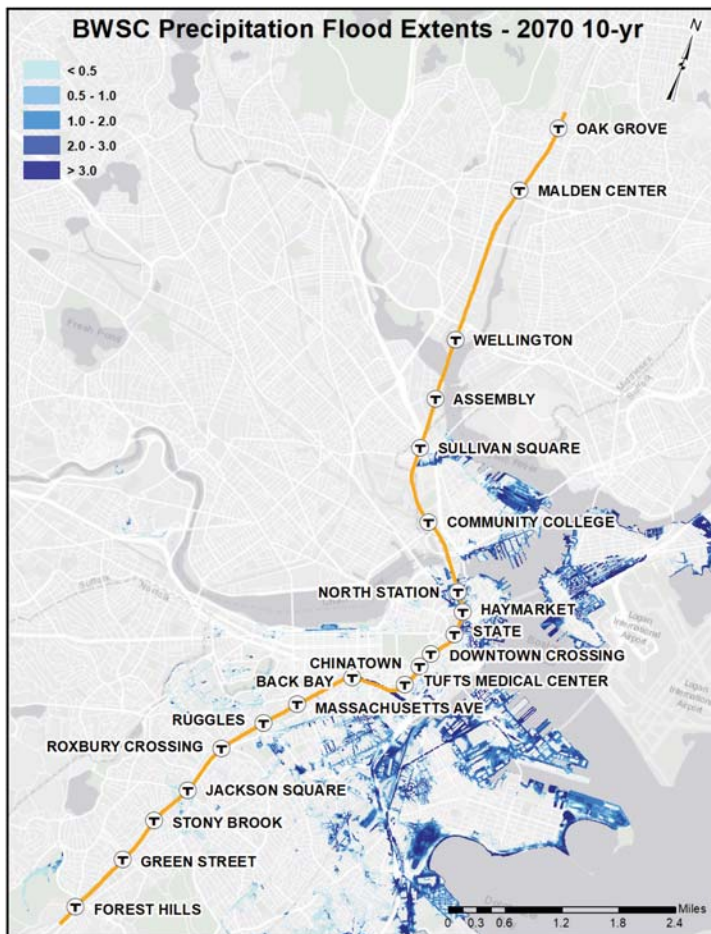
Charles River Watershed Flood Model | MA

Water . Resiliency . Planning

View the ArcGIS StoryMap [here](#),
Green Infrastructure StoryMap [here](#),
and the Charles River Flood Model Viewer [here](#).



A field team member measuring the diameter of a culvert



Flood data layers provided by the Boston Water and Sewer Commission Stormwater Model

MBTA Orange Line Vulnerability Assessment | City of Boston, MA

Planning . Resiliency



risk & vulnerability assessments

- Adaptive capacity and sensitivity assessments - buildings, natural resources, infrastructure, or community
- Applying ICLEI framework
- Applying ISO 31000 framework
- Applying transportation vulnerability assessment tool (VAST) framework
- Applying water and wastewater risk assessment tool (VSAT) framework
- AWIA risk and resilience assessments
- Consequence evaluation criteria
- Criticality analyses
- Installation Energy and Water Plans (IEWP) - military installation assessments
- Risk assessment (probability/consequence - different levels)



Church Creek Drainage | Charleston, SC

Water . Planning . Public Engagement . Resiliency



planning

- AWIA emergency response plan updates
- Capital improvement plans/asset management
- Cost-benefit analyses (FEMA or otherwise)
- Economic impact analyses (using economic models, such as IMPLAN)
- Establishing alternative governance structures for implementing resilience
- Financial capability analyses
- Grant applications
- Hazard mitigation planning
- Implementation roadmaps using climate projections/tipping points
- Integrating resilience and sustainability into master plans
- Local food systems analysis
- Municipal vulnerability preparedness (MVP) planning
- Open space planning
- Resilience funding/financing analyses
- Zoning/by-laws/regulations update recommendations



Strawberry Brook Resilient Stormwater Management & Implementation Plan | City of Lynn, MA

Water . Planning . Resiliency

View the ArcGIS StoryMap [here](#).



ONE: INTRODUCTION

The City of Boston through the Office of Emergency Management (OEM) prepared a Natural Hazard Mitigation Plan (NHMP) to create an action roadmap to reduce the impacts of natural hazards and climate change within the community and the region. This project is funded by a Federal Emergency Management Agency (FEMA) grant.

What are...?

Natural hazards can include flooding, extreme wind events, winter weather, earthquakes, fires, extreme temperatures, drought, and more.

Hazard Mitigation is the effort to reduce impacts from natural hazards through planning, policy, education, infrastructure projects, and more.

A Natural Hazard Mitigation Plan (NHMP) is a strategy to reduce risks and vulnerabilities associated with natural hazards and climate change, to protect homes, businesses, and the critical infrastructure that keeps our City running.

Resilience is the ability to withstand and recover from an extreme event. Ideally, resilient systems "bounce forward" to create healthier, greener, and more equitable systems and spaces.

1.1 What is a Natural Hazard Mitigation Plan?

Natural hazards, such as earthquakes, hurricanes, and flooding, can result in loss of life, disruptions to everyday life, and property damage. Hazard mitigation is the effort to reduce these impacts through community planning, policy changes, education programs, infrastructure projects, and other activities (FEMA, 2020). Natural hazard mitigation planning uses a stepped process with the participation of a wide range of stakeholders to:

1. define local hazards
2. assess vulnerabilities and risks
3. review current mitigation measures
4. develop priority action items

The resulting plan and implementation of action items saves lives and money. For every dollar spent on federal hazard mitigation grants, an average of six dollars are saved (NIBS, 2019).

EVERY \$1 SPENT ON MITIGATION

SAVES \$6 ON DISASTER RECOVERY

Benefits of Natural Hazard Mitigation Planning

- Increases public awareness of natural hazards that may affect the community
- Allows state, local, and tribal governments to work together and combine hazard risk reduction with other community goals and plans
- Focuses resources and attention on the community's greatest vulnerabilities

What is...?

Climate change
According to the 2018 Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan (SHMCAP), climate change is "a change in the state of the climate that can be identified by statistical changes of its properties that persist for an extended period, whether due to natural variability or as a result of human activity." Changes in climate impact the NHMP development process, making it necessary to consider climate change predictions even for a five-year plan.

Climate adaptation
An action that seeks to reduce vulnerability and risk to an anticipated climate impact. This may include flood barriers, living shorelines, elevated buildings, and increased tree canopy.

Wondering what's in the plan?
See page 14!



By completing an NHMP, municipalities also become eligible for specific federal funding which allows the use of potential funding sources to reflect a community's priorities (FEMA, 2020). Hazard mitigation funding is available through the Federal Emergency Management Agency (FEMA). To be eligible for FEMA Grants, local governments are required to prepare an NHMP meeting the requirements established in the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000. Please refer to Chapter 7 for more information on FEMA grants and other potential funding sources.

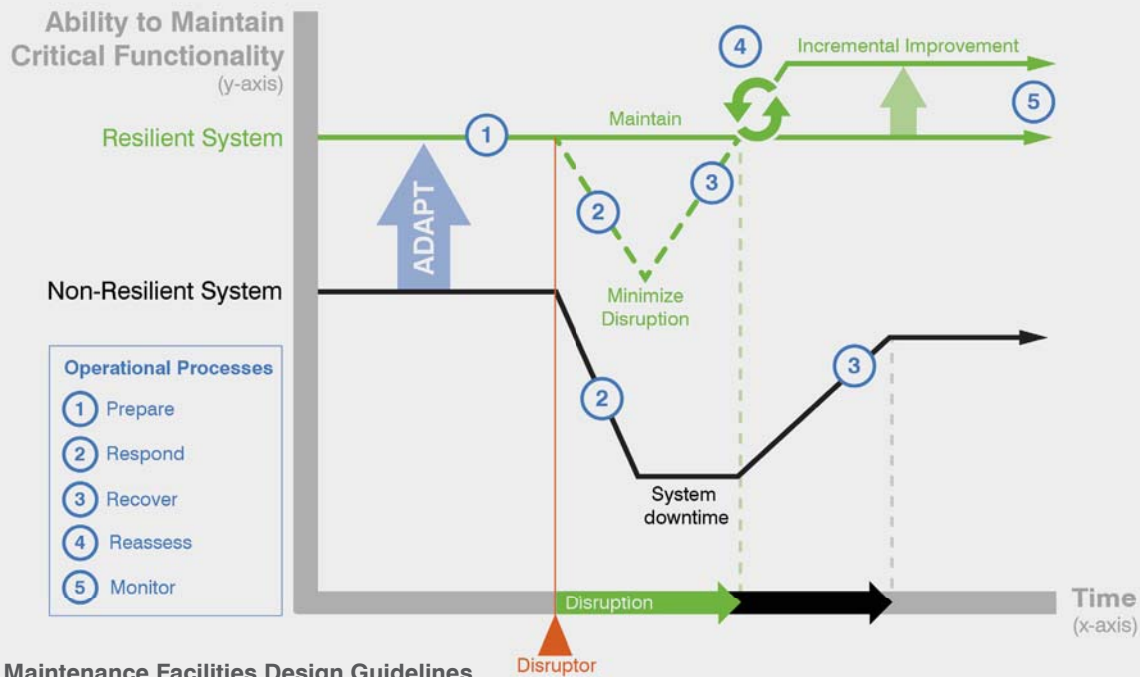
Many of the hazards that Boston commonly experiences are projected to worsen due to climate change. Climate change refers to changes in regional weather patterns that are linked to warming of the Earth's atmosphere as a result of both human activity and natural fluctuations. The Earth's atmosphere has naturally occurring greenhouse gases (GHGs) like carbon dioxide (CO2) that capture heat and contribute to the regulation of the Earth's climate. When fossil fuels (including oil, coal and gas) are burned, GHGs are released into the atmosphere and the Earth's temperature tends to increase. The global temperature increase affects the jet stream and climate patterns.



A diagram of the greenhouse gas effect

Page 36 | Chapter 1

City of Boston Natural Hazard Mitigation Plan | Page 37



MBTA Bus Maintenance Facilities Design Guidelines

Resilience Section | Boston, MA

Resiliency . Planning . O&M . Transportation . Facilities . Architectural . Civil . MEP . Structural



design guidelines

- Applying existing design guidelines credits (WEDG, LEED, ENVISION, STARS, etc.)
- Case study development
- Climate adjustments/design standards recommendations
- Developing evaluation criteria
- Discipline-specific considerations
- Existing best practices/literature review
- Flexible adaptation pathways considerations
- Flowchart or process graphics development
- Forms or templates development
- O&M considerations
- Policy recommendations
- Regional coordination considerations
- Site suitability considerations
- Translating climate projections into design criteria



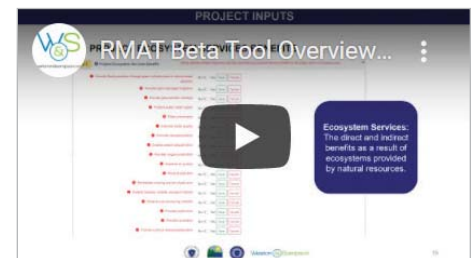
A berm rendering



Boston Public Works Guidelines City of Boston, MA

Resiliency . Planning . O&M . Water . Transportation
Infrastructure . Geotechnical . Structural .
Landscape Architecture

View the guidelines [here](#)



Resilient Massachusetts Action Team Technical Support

MA Executive Office of Energy and
Environmental Affairs

Resiliency . Applied Technology



public engagement

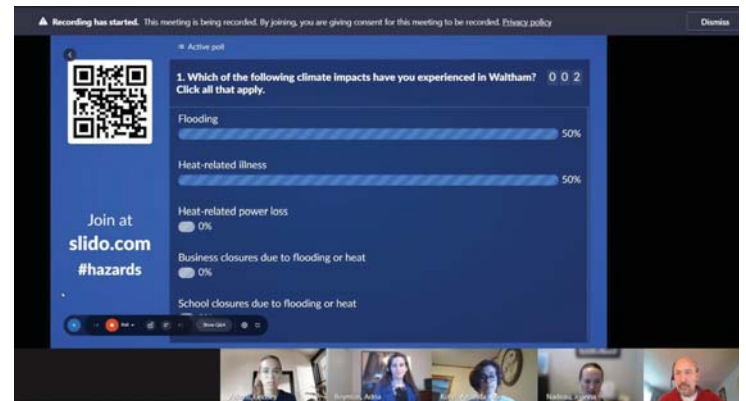
- Commitment to inclusion, diversity, equity, and access
- Data visualization and fact sheets
- Dynamic multimedia formats including videos, social media, mapping, and webpage content
- Focus groups and interviews
- Hosting site walks/tours
- Identifying stakeholders and building partnerships
- In-person workshops and open houses
- Interactive engagement games and coloring pages
- Online and in-person polling and surveys
- Print media
- Synthesizing stakeholder feedback
- Translation, interpretation, and captioning support
- Virtual workshops, open houses, webinars, and related technical support



Flood Reduction Program | City of Charleston, SC
Planning . Resiliency . Water



Interactive engagement pinwheels



A virtual workshop

CAMBIO CLIMÁTICO EN FITCHBURG

¿Qué es el Cambio Climático?

Definición

El clima es el patrón de eventos climáticos observados a lo largo del tiempo.

El cambio climático es un fenómeno causado por el aumento de gases de efecto invernadero en la atmósfera de la tierra, lo que resulta en una temperatura global más alta. Las temperaturas globales afectan a corrientes de aire y patrones climáticos.

El uso de los combustibles fósiles emiten dióxido de carbono a la atmósfera. La atmósfera es como una manta que rodea la Tierra. El dióxido de carbono hace que la manta sea más gruesa, atrapando el calor que calienta el planeta. En Massachusetts, los impactos del calentamiento global incluyen el aumento de temperaturas altas, nivel del mar y precipitaciones.

¿Cómo se refleja esto en Fitchburg?

Fitchburg experimenta conmociones tanto como tensiones.

Las conmociones son eventos repentinos de corto plazo que causan el mayor daño a los sistemas y poblaciones vulnerables.

Las tensiones son tendencias de largo plazo que aumentan la vulnerabilidad de la ciudad y sus residentes.

Ejemplos de conmociones incluyen:

- Fitchburg experimentó olas de calor en los veranos del 2018 y '19.
- La temperatura promedio podría aumentar 10 ° F para el 2100.
- Fitchburg resistió cinco tormentas de nieve en los primeros tres meses del 2018.
- La tormenta de nieve del 2013 dejó a casi 400,000 residentes de Massachusetts sin electricidad.
- Las fuertes lluvias en el Noreste aumentaron más de un 70% entre 1958-2010.
- Las sequías podrían aumentar un 75% para el 2100. Fitchburg tuvo una sequía en el 2016.

¿Cómo me puedo preparar?

seguir el sitio web y redes sociales de Fitchburg

Identificar el refugio más cercano

preparar kit de suministros de emergencia

Compartir la información con amigos y familiares

reducir el consumo de energía y agua

Ejemplos de estrés incluyen:

- Fitchburg tiene una importante población de justicia ambiental.
- Más del 12% de los residentes de Fitchburg tienen una discapacidad.
- El ingreso familiar promedio es de \$ 51,412, más bajo que el promedio estatal.
- Casi el 18% de los residentes de Fitchburg viven en la pobreza.

A fact sheet in Spanish visualizing the potential local impacts of climate change

HMP & MVP | City Fitchburg, MA
Planning . Resiliency . Water



design & adaptation

- Stormwater and green infrastructure strategies
- Conceptual adaptation strategies - cost estimation
- Conceptual adaptation strategies - visualization
- Deployable flood barriers evaluation
- Ecological restoration
- FEMA levee certification compliance evaluation
- Flood protection strategies (inland or coastal)
- Invasive species management
- Life cycle/adaptability assessment
- Living shoreline and climate migration design
- Permitting matrix and timelines
- Resilient building strategies
- Resilient infrastructure strategies
- Resilient natural resource strategies
- Resilient parks/open space strategies

Pump Station Resiliency Implementation

City of New Haven, CT

Wastewater . Resiliency . Construction



raised deck built on top of an existing sea wall

Langone Park & Puopolo Playground | City of Boston, MA

Landscape Architecture . Water . Geotechnical . Environmental . Planning . Permitting . Resiliency



mitigation & sustainability

- Carbon sequestration strategies
- Energy efficiency strategies
- Greenhouse gas/carbon emissions analyses
- Renewable energy projects
- Sustainable materials selection
- Water use reduction strategies
- Climate action planning

SUSTAINABILITY

- Anticipates impacts of the project on the site, community, natural resources, MBTA workforce
- Manages resources responsibly to avoid negative impacts to people, natural resources, and economy
- Efficiency focus



RESILIENCE

- Anticipates impacts of future conditions on the project operations and MBTA staff
- Adapts to future climate conditions
- Recovers from disruptions
- Maintains functionality

BOTH

- Long-term vision and adaptability
- Manages uncertainty
- Considers impact on people and promotes equity
- Wholistic, integrated multi-discipline design
- Balance economic, environmental, and societal priorities; better long-term functional performance than short sighted capital cost cutting
- Considers redundancy in both infrastructure and operations

MBTA Bus Maintenance Facilities Design Guidelines

Resilience Section | Boston, MA

Resiliency . Planning . O&M . Transportation . Facilities . Architectural . Civil . MEP . Structural



Solar Energy Facility at a Former Coal-Fired Power Plant
City of Orlando, FL

Resiliency . Energy . Environmental . Permitting . Civil/Site



Babson College Electric Vehicle Charging Station

Town of Wellesley, MA

Water . Resiliency . Energy

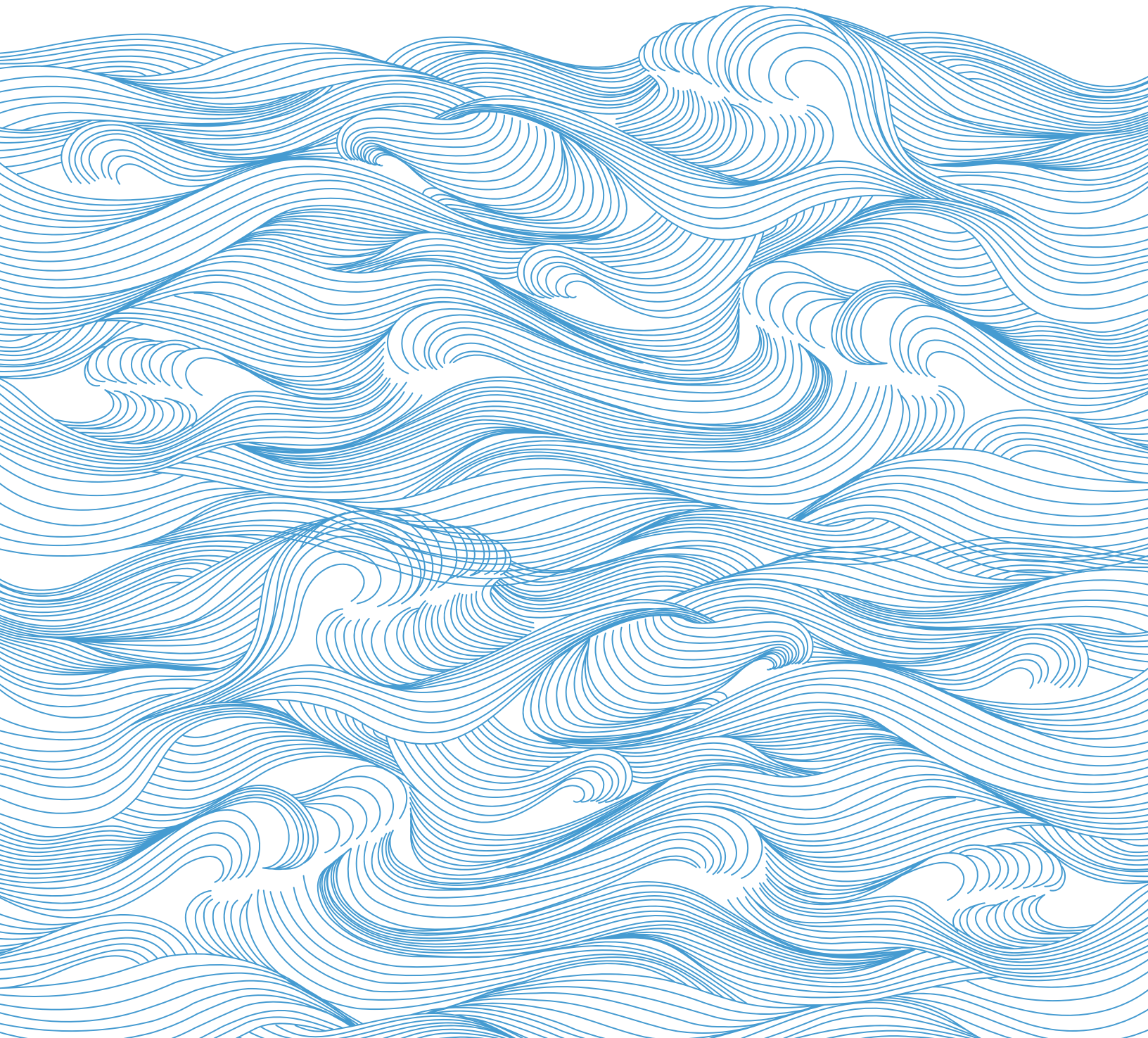


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an employee-owned company

Qualifications: Resumes



BACKGROUND

2021-Present
Senior Project Manager
Weston & Sampson

2016-2021
Coastal Zone Consistency Project
Manager
SC Department of Health and
Environmental Control

2013-2016
Natural and Coastal Resources
Consultant
Brunswick, GA

2013-2014
Coastal States Organization
Chair/Facilitator, National Nonpoint
Source Workgroup

2005-2013
Natural Resources Biologist
GA Department of Natural
Resources- Environmental
Protection Division

2001-2005
Marsh and Shore Regulatory
Program Manager
GA Department of Natural
Resources- Coastal Resources
Division

1994-2001
Senior Program Coordinator
VA Department of Environmental
Quality

1990-1994
Analyst
VA Department of Environmental
Quality

1989
Analyst
US Geological Survey/University of
Virginia Coastal Research

EDUCATION

1988
Graduate Studies Environmental
Science, Coastal Geomorphology

1987
Bachelor of Arts
University of Virginia

Jeannie is a coastal resources expert and innovator with more than 30 years of government experience in the Southeast and Mid-Atlantic. She has in-depth knowledge of and practice in regulatory permitting and compliance, sustainable and resilient design, and community development strategies for protection of wildlife, water quality, wetlands, and preservation of cultural and historic resources in a changing climate. Jeannie is known for her collaborative team-building, multidisciplinary approaches and as a catalyzing problem solver and communicator. She has extensive experience with outreach, community engagement, grant writing and management and working with diverse stakeholders.

**SPECIFIC PROJECT EXPERIENCE**

- SE Regional Technical Lead for Climate Resilience, Weston & Sampson
- Charleston Region OCRM-SHPO Liaison, SC DHEC
- City of Charleston Stormwater Design Manual, Team Member, SC DHEC
- Sustainable Communities Team, Project Leader, GA DNR
- Model Ordinance Development and Outreach for Coastal Communities, Project Leader, GA DNR
- Green Infrastructure / Better Site Design Coastal Stormwater Manual, Project Leader, GA DNR
- Georgia Green Growth Guidelines, Project Leader, GA DNR
- Riparian Buffer Protection Models, Project Leader, GA DNR
- Priority Species Identification and Scaled Habitat Protection through Permitting, GA DNR
- Nontidal Wetlands Protection Project, Project Leader, GA DNR
- Virginia River Country Sustainable Economic Development Project, VA DEQ

Senior Project Manager, Weston & Sampson Engineers, Charleston. Team Leader SE Resilience and Regulatory Group. Develop and support projects designed to elevate preparedness for a changing climate and in current and upcoming regulatory framework.

Coastal Zone Consistency Project Manager, SC DHEC - Ocean and Coastal Resource Management, Charleston. Evaluated and provided coastal zone consistency determinations (environmental impact review) for all development activities requiring state and federal permits with a focus on the Charleston region.

Chair, Coastal States Organization: National Coastal Nonpoint Source Workgroup, Washington, DC. Lead dynamic workgroup representing all coastal management and water quality programs of the US coastal states and territories. Assisted program/project development, provided leadership to build and foster stronger relationships and regular dialogues between intrastate, regional, and interstate interests.

BACKGROUND

2023-Present
Associate/Senior Technical Leader
Weston & Sampson

2022-2023
Senior Technical Leader
Weston & Sampson

2019-2022
Technical Leader
Weston & Sampson

2010-2019
Senior Professional
Kleinfelder

2005-2010
Teaching and Research Assistant
Department of Civil and
Environmental Engineering
Northeastern University

2004-2005
Design Engineer
Thermax India Ltd.

2002-2004
Research and Teaching Assistant
Department of Civil Engineering
Indian Institute of Technology

EDUCATION

2010
Doctor of Philosophy (PhD)
Environmental Engineering
Northeastern University

2004
Master of Science
Environmental Engineering
Indian Institute of Technology

2002
Bachelor of Science
Materials & Metallurgical
Engineering
Jadavpur University

CERTIFICATION

Municipal Vulnerability
Preparedness (MVP) Certified
Provider

AWARDS & HONORS

Clean Charles Award
Charles River Watershed
Association
2022

Indrani has more than 15 years of experience as a water resources engineer and as technical lead in climate change resiliency projects, specializing in leading interdisciplinary teams and stakeholders through risk-based prioritization of adaptation solutions. She has industry-leading experience in translating climate change projections to engineering design criteria for new and existing infrastructure and modeling climate impacts for the purposes of vulnerability assessment and adaptation planning for many projects. She has worked with numerous municipalities and public agencies to model their exposure to coastal and stormwater flooding using the best available and most appropriate sea level rise, storm surge, and rainfall projections. She has extensive experience integrating climate projections in hydrologic/hydraulic models of urban storm and sanitary sewer systems. Indrani is frequently invited to be part of panel discussions on climate risk and resiliency at New England universities, and has won national awards for her contributions to the engineering profession. In addition, Indrani is fluent in Bengali, English, and Hindi.



SPECIFIC PROJECT EXPERIENCE

Coastal Climate Change Vulnerability Assessments and Adaption Plans, Various Locations, Massachusetts and Connecticut. Served as technical lead for projects in Duxbury, Gloucester, Hingham, Hull, Marshfield, Oak Bluffs, Scituate, and Swampscott, Massachusetts, and Waterford, Connecticut. Led coastal flood modeling and mapping tasks, including the development of appropriate sea level rise and storm surge scenarios for present, medium-, and long-term time horizons. The resulting models and maps were used to assess the vulnerability of public infrastructure and natural resources and prioritize adaptation planning efforts.

Climate Ready DC, District Department of Environment, Washington, DC. Served as lead modeler for the climate change adaptation plan for Washington DC to integrate climate change resiliency in the district's capital improvements, planning, policies, and programs. Led the development of sea level rise and storm surge scenarios and downscaled precipitation and temperature projections. Also led the translation of climate change impacts into engineering design criteria for drainage infrastructure.

Moakley Park Master Plan, Boston Parks and Recreation Department (BPRD), Boston, Massachusetts. Providing resiliency support for the advancement of the Moakley Park Vision Plan, for which Weston & Sampson serves as a subconsultant to Stoss. Moakley Park is the largest waterfront park in Boston and is increasingly vulnerable to flooding due to climate change. The project scope includes baseline technical assessments, community engagement, and schematic flood barrier design. Responsibilities include the review of inland stormwater modeling and integrating with coastal flood modeling results, climate resilient engineering, and assessment of green infrastructure strategies.

BACKGROUND

2020-Present
Project Scientist
Weston & Sampson

2017-2019
Research Associate
School for Marine
Science and Technology
University of Massachusetts –
Dartmouth

2010-2017
Graduate Teaching & Research
Assistant
Department of Earth, Ocean,
and Atmospheric Sciences
Florida State University

2007-2009
Seismic Data
Processing Geoscientist
CGG Veritas India, Ltd.

2005-2007
Research & Teaching Assistant
Department of Earth Sciences
Indian Institute of Technology

EDUCATION

2017
Doctor of Philosophy (PhD)
Environmental Geochemistry
Florida State University

2007
Master of Science
Applied Geology
Indian Institute of Technology

2005
Bachelor of Science
Geological Sciences
Jadavpur University

PROFESSIONAL AFFILIATIONS

President, FSU Regional Student
Association

Secretary, Indian Student
Association

American Geophysical Union

Association for Women
Geoscientists

Geological Society of America

Rupsa is a project scientist with more than 10 years of experience as an environmental geochemist, researching climate change, water contamination, and water chemistry. She is currently working on modeling climate data to predict future climate change and analyzing the projections for vulnerability assessment and adaptation planning for projects in the Northeast. She is working with several municipalities and public agencies to support their HMP and MVP report writing and modeling their exposure to extreme heat, sea level rise/storm surge and extreme precipitation. She has extensive experience with modeling and interpreting large volumes of data using excel, R, and GIS platforms.



SPECIFIC PROJECT EXPERIENCE

Hazard Mitigation & Municipal Vulnerability Preparedness Planning and Action Grant, Lowell, Massachusetts. Supported the preparation of a joint Hazard Mitigation Plan (HMP) and Municipal Vulnerability Preparedness (MVP) plan. Responsible for equitable community engagement through interviews and an online survey, vulnerability assessments of the city, and writing the MVP report. The work led to a successful MVP Action Grant filing. Responsibilities also included analyzing the urban heat island effect under existing and proposed conditions in the Claypit Brook Area of the city as part of the Action Grant.

Implementation of the Master Plan for Prescott Park, Portsmouth, New Hampshire. Provided coastal resiliency support for the implementation of the Prescott Park Master Plan. Identified future extreme rainfall projections using methodologies outlined in NCHRP 15-61, "Applying Climate Change Information to Hydrologic and Coastal Design of Transportation Infrastructure" to be used in inland stormwater modeling and sizing of infrastructure.

Moakley Park Master Plan, Boston Parks and Recreation Department (BPRD), Boston, Massachusetts. Providing resiliency support for the advancement of the Moakley Park Vision Plan, for which Weston & Sampson is a subconsultant to Stoss. Moakley Park is the largest waterfront park in Boston and is increasingly vulnerable to flooding and high heat due to climate change. Responsibilities included the review of existing urban heat island (UHI) effects, analyzing changes in temperature under various projected scenarios, and assessing green infrastructure strategies to reduce UHI.

Revitalization of Draw Seven Park, Massachusetts Department of Conservation & Recreation (DCR), Somerville, Massachusetts. Providing resiliency support for the revitalization of this signature park along the banks of the Mystic River. Work involved developing sustainability/resiliency services related to park redevelopment. Worked closely with Woods Hole Group to develop BH-FRM flood vulnerability design criteria and identifying strategies to mitigate risk, accommodate/embrace future flood waters (living shoreline), and design for incremental flood protection measures.

BACKGROUND

2021-Present
Project Planner
Weston & Sampson

2019-2021
Climate Resource Planner
Water Resource Team
Kleinfelder

2018-2019
Climate and Environmental
Planning Fellow
City of Boston Department of
Environment, Energy, and Open
Space

2014-2017
Designer
KieranTimberlake Associates

EDUCATION

2019
Masters in City Planning
Housing, Community and
Economic Development
Massachusetts Institute of
Technology

2014
Bachelor of Science in Architecture
University of Virginia

PAPERS & PRESENTATIONS

Spring 2023
"A Practical Guide to
Updating Local Regulations
for Climate Resilience"
American Planning Association

Bella is a climate resiliency specialist and urban planner with eight years of professional experience. She works with institutions, government agencies, and municipalities to address their environmental and climate concerns through adapted design, land use, and policy. She is skilled in urban design, graphic communication, spatial analysis, research, and innovative outreach. She uses these skills to convey climate change as an opportunity to create more just and equitable urban environments. As a City of Boston Climate and Environmental Planning Fellow, Bella wrote an amendment to the historic preservation regulatory standards to include resiliency standards for Bay Village District and was the author and illustrator of the Boston Resilient Historic Buildings Design Guide. She has three years of experience as an architectural designer, specializing in the design of university buildings and green building techniques.



SPECIFIC PROJECT EXPERIENCE

Hampton Circle Area Adaptation Roadmap and Design Alternatives Analysis, Hull, Massachusetts. Project manager for a coastal design alternatives analysis in the Hampton Circle neighborhood of Hull. This project included an intensive community engagement process, climate vulnerability assessment, and design recommendations for an area exposed to coastal flooding. The adaptation roadmap is the result of the engagement and analysis and includes a phased approach to climate adaptation over several decades. Design alternatives for the area include redesign of critical infrastructure, nature-based solutions for coastlines, home elevations, and potential planned retreat. Bella has provided both timely delivery of complex deliverables as well as relationship building with the community.

North Carolina Resilient Coastal Communities Program, Resilience Plans for Elizabeth City and Pasquotank County, North Carolina. Serving as project manager for two resilience plans to be completed during 2023-2024 through the NC DEQ Resilient Coastal Communities Program (RCCP). These resilience plans will include a vulnerability assessment and identification of critical assets, a comprehensive outreach strategy, and development of prioritized actions. The RCCP provides funding for coastal communities with an emphasis on equitable outcomes, nature-based solutions, and data-driven decision making.

Hazard Mitigation Plan, Boston, Massachusetts. Developed the City of Boston's Natural Hazard Mitigation Plan. Researched and compiled existing citywide mitigation measures, documented progress on the past plan, and identified future priority actions through interviews with critical stakeholders. Conducted inclusive community outreach to receive feedback on the plan recommendations. Wrote the final Plan and ensured compliance with FEMA's HMP guidelines

Climate Resilience Zoning Task Force, Cambridge, Massachusetts. Contributed to the development of the 'Cambridge Cool Factor' - one of the nation's first zoning ordinances that uses development regulations and design guidelines to reduce urban heat island impacts. Conducted extensive research about the relative temperature reduction various landscape and building elements can provide to the urban environment. Developed outreach materials to present to an expert advisory panel on climate resilient zoning.

BACKGROUND

2023-Present
Project Planner & Visualization
Specialist
Weston & Sampson

2022-2023
Senior Environmental Planner &
Resiliency Specialist
Metropolitan Area Planning Council

2020-2022
Planner III
Weston & Sampson

2018-2020
Planner II
Weston & Sampson

2018-2020
Resiliency Specialist
Weston & Sampson

2017-2018
Sinclair Kennedy Traveling Fellow
Harvard University, Università degli
Studi di Firenze

EDUCATION

2017
Master in Design Studies, Risk and
Resilience
Harvard University
Graduate School of Design

2015
Bachelor of Architecture
Bachelor of Fine Arts
Rhode Island School of Design

PROFESSIONAL REGISTRATIONS & CERTIFICATIONS

American Institute of Certified
Planners (AICP)
American Planning Association

Municipal Vulnerability Preparedness
(MVP) Certified Provider

SELECTED AWARDS

2021, Weston & Sampson Innovation
Committee, Shark Tank Competition
Winner, collaborative entry

2021, Weston & Sampson
Corporate Recognition Award for
leading transition to virtual public /
stakeholder engagement during
COVID-19, collaborative entry

2020, Weston & Sampson Innovation
Committee, Shark Tank Competition

Adria is a Project Planner & Visualization Specialist with Weston & Sampson, working on interdisciplinary projects. Adria works collaboratively to advance the use of graphics to accessibly communicate technical information to a range of audiences. A certified Planner and a certified MVP Provider, Adria's experience includes working on Climate Action Plans, FEMA Hazard Mitigation Plans (HMP), Municipal Vulnerability Preparedness (MVP) Planning and Action Grant projects, Risk & Resilience Assessments (RRA), Emergency Response Plans (ERP), resilient design guidelines, master plans, public outreach and engagement, and more.



SPECIFIC PROJECT EXPERIENCE

Moakley Park Master Plan, Boston Parks and Recreation Department (BPRD), Boston, Massachusetts. Assisting with climate resilient design features and project management tasks for the advancement of the Moakley Park Vision Plan. Moakley Park is the largest waterfront park in Boston and is increasingly vulnerable to flooding due to climate change. Work includes baseline technical assessments, community engagement, and schematic flood barrier design.

Climate Resilient Design Standards and Guidelines, Boston Public Works Department, Boston, Massachusetts. Resiliency specialist responsible for assisting the city in its efforts to establish resilient design standards and guidelines. Provided as-needed support for the development of sample specifications for resilience options (e.g., harborwalk barriers, raised roadways, deployable flood barriers, and vegetated berms), sample design drawings, and design considerations.

Charles River Climate Compact Resilience Strategic Plan, Charles River Watershed Association and Medway, Massachusetts. Led the development of a strategic plan for the Charles River Watershed Association's Climate Compact. The Compact is a group of municipalities planning for climate impacts at a regional scale. The project included outreach and engagement to define a vision, values, and goals for the plan (including an Equity Focus Group); the development, refinement, and prioritization of strategies; and the creation of an interactive online dashboard. This project was funded by a Technical Assistance Program (TAP) grant from MAPC.

Flood Protection along Island End River, Chelsea, Massachusetts. Assisted with analysis and design related to a proposed incremental flood barrier in Chelsea and the identification of conceptual flood resilience strategies in Everett as part of a Vision Plan funded by a Coastal Zone Management (CZM) grant. Also assisted with the creation of a Climate Resilience Scope of Services and participated in a site visit to document existing conditions and considerations that may impact future design recommendations. Supported the city in writing a successful grant application to fund the next phase of work through a Municipal Vulnerability Preparedness (MVP) Action Grant. Reviewed engagement materials, which included an Equitable Climate Resilient Engagement Framework, promotional materials to get the word out about events, and plans for community meetings, including a socially distanced outdoor cleanup and open house.

BACKGROUND

2023-Present
Resiliency Planner II
Weston & Sampson

2021-2023
Floodplain Management
Coordinator
Charleston County Building
Inspection Services Department

2019-2021
Administrative Support Coordinator
Charleston County Zoning and
Planning Department

2016-2018
Biologist
South Carolina Department of
Natural Resources

EDUCATION

2021
Master of Science cum laude
Environmental and Sustainability
Studies
College of Charleston

2015
Bachelor of Arts
Biology
The College of the Holy Cross

PROFESSIONAL CERTIFICATION

ASFPM Certified Floodplain
Manager

Anna is a Resiliency Planner and Certified Floodplain Manager with over three years of experience in resilience planning and floodplain management. Her expertise includes hazard mitigation planning, Community Rating System administration, National Flood Insurance Program administration, flood mitigation, retrofitting, resilience integration via regulatory tools, sustainable and resilient design, smart growth initiatives, and low impact development. She also has experience with public outreach, community engagement, and grant administration. Anna has worked with diverse stakeholders across numerous projects in the Southeast.



SPECIFIC PROJECT EXPERIENCE

Sea-level Rise Mitigation and Adaptation Planning, Charleston, South Carolina.

Graduate Assistant conducting a study on sea-level rise mitigation planning in South Carolina. Compiled and reviewed all available comprehensive plans from the coastal counties of South Carolina. The plans were analyzed quantitatively for the presence of regulatory tools or development standards that would contribute to sea-level rise mitigation or adaptation. Planners and other relevant stakeholders across the coastal counties of South Carolina were interviewed for their experience with sea-level rise planning. The analysis contributed to her master's thesis, Sea-level Rise Mitigation and Adaptation Planning in South Carolina Using Regulatory Tools and Land-use Optimization.

Resilience Planning, Charleston County, South Carolina. Floodplain Management Coordinator participating as a member of the Charleston County Resilience Committee. Attended all monthly Committee meetings. Extensively researched possible strategies and initiatives that would increase the resilience of Charleston County. Worked in conjunction with other committee members to comprehensively review the County's building, floodplain, and development ordinances for opportunities to integrate resilient strategies and initiatives. These opportunities were then presented to Charleston County Council and new ordinance language to include resilience strategies and initiatives was drafted. Met with stakeholders to discuss potential changes to the ordinances. Addressed questions and concerns from both stakeholders and Charleston County Council members.

Hazard Mitigation Plan Update, Charleston County, South Carolina. Floodplain Management Coordinator responsible for leading the annual update to the Charleston Regional Hazard Mitigation Plan. Coordinated and lead all meetings related to the update. Coordinated all stakeholder engagement, which included 33 jurisdictions and utilities. Researched and updated all hazard frequencies. Updated the plan with the latest information concerning outreach projects, public information, mitigation strategies, repetitive loss properties, and drainage projects. Conducted analysis to determine how many structures were at risk in the Special Flood Hazard Area for all 17 jurisdictions included within the Regional Plan. Obtained the most recent data from the National Flood Insurance Program for Charleston County and the participating jurisdictions to conduct a Community Rating System-approved flood insurance assessment.

BACKGROUND

May 2023 Start
Senior Project Manager
Weston & Sampson

2020-2023
Water Resources Extension
Associate
Clemson University

2017-2023
Assistant Program Team Leader,
Water Resources
Clemson University

2011-2020
Water Resources Extension Agent
Clemson University

2007-2011
Stewardship Biologist
South Carolina Department of
Natural Resources, ACE Basin
National Estuarine Research
Reserve

EDUCATION

2022
Master of Resilient Urban Design
Clemson University

2008
Masters of Science Environmental
Studies, College of Charleston

2002
Bachelor of Science Elementary
Education, Presbyterian College

SELECT PUBLICATIONS

Collins, K. & Jackson, K. . Editor
K.C. Morganello. (2022). Stream
Bank Repair Manual for South
Carolina. Cooperative Extension,
Clemson University, Clemson, S. C.

Morganello, K.C. (2021). "Life Along
the Salt Marsh: Troubleshooting
Salt Marsh Decline." HGIC 1891.
Cooperative Extension Home
& Garden Information Center,
Clemson University, Clemson, S.C

Kim specializes in community resiliency and adaptation as it relates to water quantity and quality management concerns. Kim has developed tools, resources, and programming to broaden the application of nature based solutions; practices of focus include bioretention, vegetative buffers, rainwater harvesting, living shorelines, stormwater pond retrofits, and native plant landscaping. Kim has designed in-the-ground projects that serve as community demonstration sites for green infrastructure. She has extensive experience assisting local governments with NPDES permit compliance. Kim enjoys collaborative development of innovative approaches to better steward water resources for current and future generations.

**SPECIFIC PROJECT EXPERIENCE**

U.S. Army Corps of Engineers Charleston SC 3x3 Project, Clemson University Master of Resilient Urban Design. Created design alternatives to the proposed USACE perimeter protection plan for peninsular Charleston, SC. Performed site analysis which incorporated historical, cultural, ecological, and economic considerations. Area of focus included iconic High Battery, Joe Riley Waterfront Park, and Union Pier. Kim's design alternatives placed emphasis on place-making, ecological restoration, and resilient urban design. Design alternatives are communicated through master planning, sections, renderings, diagrams, and hand sketches.

Features proposed:

- Polder system seaward of High Battery & tidal creek daylight at Market Street.
- Terraced Joe Riley Waterfront Park utilizing a split T-wall approach.
- Edge repair with emphasis on public access and multi-modal transportation.

Folly Beach Resiliency Study, Clemson University Master of Resilient Urban Design & Clemson University Extension. The Folly Beach Resiliency Study is a three-year study in which data was collected during restricted public access, associated with COVID-19, and when access was not restricted. The study objective is to provide insight into how human presence may influence barrier island ecosystems. The information gathered applies more broadly to coastal communities and provides insight on public education strategies, resource management, and urban design. A better understanding of humans in nature lends to a more thoughtful, diversified approach that protects environmental integrity and enhances the user experience.

Features proposed:

- Redevelopment of the island causeway for multi-modal & green infrastructure.
- Emphasis on community art installations as a stewardship communication tool.

BACKGROUND

2022-Present
Environmental Scientist III
Weston & Sampson

2019-2022
Resilience Specialist
Kiawah Island Community
Association

2017-2019
Graduate Assistant
College of Charleston

2017-2018
Marine Science Educator
Patriots Point Naval & Maritime
Museum

Lucas is a Climate Adaptation and Resilience Specialist with over five years of experience in resilience planning. His expertise includes raster-based flood modeling, sustainable and resilient design, environmental monitoring, community development, green infrastructure, wildlife and water quality protection strategies, stormwater management, cultural and historic resources, and associated legal and regulatory frameworks. In addition, he has experience with public outreach, community engagement, and grant administration. Lucas has worked with diverse stakeholders across numerous projects throughout the Southeast.



EDUCATION

2019
Concurrent Degrees, Master of
Environmental and Sustainability
Studies and Master of Public
Administration
University of Charleston

2016
Bachelor of Science
Environmental Technology &
Management
North Carolina State University

PROFESSIONAL AFFILIATIONS

Charleston Resilience Network
South Carolina Beach Advocates
Southeast Sustainability Directors
Network
Johns Island Task Force
National Weather Service Weather
Ready Nation Ambassador

SPECIFIC PROJECT EXPERIENCE

Kiawah Island Flood Mitigation and Sea Level Rise Adaptation Plan Experience, Kiawah island, South Carolina. Graduate research assistant at the College of Charleston Lowcountry Hazards Center in charge of developing storm surge and sea level rise maps for the Town of Kiawah Island in support of the Town's Flood Mitigation and Sea Level Rise Adaptation Plan. As part of this project, the graduate research assistant was provided a grant from the Town of Kiawah Island to develop high-resolution 2-D flood maps of the island using NOAA's Relative Sea Level Change Projections (2017) and the most recent LiDAR digital elevation model. The models developed as part of this study included inundation from storm surges from 1 ft. to 8 ft. above Mean Higher High Water (MHHW) in half-foot increments and inundation from NOAA sea level rise predictions for the years 2030, 2050, 2075, and 2100. All these models were ground-truthed using personal accounts from the subcommittee and provided a basis of understanding for vulnerable stormwater infrastructure, roads, and structures on the island. Later, through work with Stantec Consulting Services Inc. and the Kiawah Island Community Association's Water Management Task Force, these models were updated to include rainfall and drainage infrastructure to help the Community Association prioritize six major infrastructure projects that are currently being constructed.

Community Flood Modeling Exposition, Mt Pleasant, South Carolina. Responsible for developing high-resolution flood models and participating in community outreach and engagement. This effort was funded by a National Oceanic and Atmospheric Administration Regional Coastal Resilience Grant obtained by through the S.C. Sea Grant Consortium on behalf of the Charleston Resilience Network. The original goal of this outreach event was to gather anecdotal flooding data from residents to ground-truth storm surge and rainfall models developed by the Low Country Hazards Center, housed at the College of Charleston. This event involved coordination with local stormwater engineers, emergency managers and public works departments to develop a list of study areas, rainfall/ storm surge scenarios, historic storms, and future scenarios of sea level rise to model for the events. After developing and presenting the models to each municipality, presented the models to the public in two separate outreach events and answered questions about modeling methods. Recorded anecdotal reports from community members.



TIMOTHY W KANA, PHD PG

SENIOR COASTAL SCIENTIST

Email: tkana@coastalscience.com

PROFILE

Founder of Coastal Science & Engineering (CSE) (1984–present) and Adjunct Professor of Geology at the University of South Carolina (1981–2009). Prior to 1984, he was a founder and principal in the firm Research Planning Institute Inc. Kana is an internationally recognized expert in coastal and estuarine processes, and has written over 300 publications and technical reports. Contributions to coastal engineering literature include reports on estuarine sedimentation and harbor shoaling, sediment partitioning among marshes, beaches and tidal channels, potential impacts of sea level rise on beaches and coastal wetlands, preparation of sediment budgets, and beach nourishment design.

BEACH NOURISHMENT EXPERIENCE

Kana has served as project director or technical advisor on more than 40 beach restoration projects totaling over 35 million cubic yards. His work emphasizes soft engineering solutions to erosion along the oceanfront. Among the innovative projects Kana has directed was an inlet relocation at Seabrook Island (SC) which resulted in long-term restoration of two miles of eroded beach. Major nourishment projects Kana directed in North and South Carolina and New York include:

- Myrtle Beach (1.3 million cubic yards)
- Hunting Island (0.75 million cubic yards)
- Bogue Banks (4.5 million cubic yards)
- Seabrook Island (0.6 million cubic yards)
- Bridgehampton–Sagaponack (2.5 million cubic yards)
- Nags Head (4.6 million cubic yards)

INTERNATIONAL EXPERIENCE

Dr. Kana has served on design and environmental impact assessment teams for numerous projects in the Caribbean, West Africa, Kuwait and other Middle East countries. From 1977 to 1989, he served as coastal processes and environmental monitoring consultant on the 20-km Kuwait Waterfront (KWF) project. Work included establishing a beach erosion monitoring program, periodic field measurements over many years, and assistance to the project engineers on Phases I–V. Kana was senior scientist for a Kuwait Foundation for the Advancement of Science (KFAS) study of environmental and water quality impacts of the KWF (1984–1986).

SEA LEVEL RISE STUDIES

Pioneering work by Dr. Kana includes two of the earliest case studies of potential impacts of sea-level rise on coastal wetlands for the U.S. Environmental Protection Agency (1984–1988), which quantified the controlling physical conditions and processes for tidal wetlands evolution.

EDUCATION & ACADEMIC TRAINING

PhD. Geology (Coastal Processes), University of South Carolina (USC)
MS. Geology (Coastal Geology), USC
BA. Natural Sciences (Geological Oceanography), The Johns Hopkins University

PROFESSIONAL AFFILIATIONS & AWARDS

Board of Directors – American Shore & Beach Preservation Association
Associate Editor – Journal of Coastal Research
Affiliate Member – American Society of Civil Engineers
Registered Professional Geologist (NC and SC)
ASBPA Morrough P. O'Brien Award (2015)

EXPERT TESTIMONY

Qualified and admitted in the following areas:

- Marine geology
- Coastal Processes
- Estuarine processes
- Beach erosion

COASTAL EROSION STUDIES

Technical work by Kana includes development of a methodology for objective delineation of present shorelines and setback lines along the South Carolina coast. Prototype application of the methodology was implemented by Myrtle Beach (1984) and incorporated in local zoning ordinances. In 1988, the methodology was incorporated into the state's Beach Management Act and used to establish development setback lines throughout the coast. The methodology was the first in the U.S. to provide for quantitative placement of setback lines based on the volumetric condition of the beach.

Kana has been principal investigator for contracts from the US Army Corps of Engineers for a number of coastal engineering studies, including Buffalo District (inventory and analysis of 200 shore protection structures, Lake Ontario), New York District (sediment budget, Fire Island Inlet to Montauk Point), Charleston District (sand search, Horry County, SC; and ICWW erosion), and CERC (sediment transport at Duck, NC; and performance evaluation of three SC beach nourishment projects).



COASTAL SCIENCE & ENGINEERING



STEVEN B TRAYNUM

COASTAL PHYSICAL SCIENTIST

Email: straynum@coastalscience.com

PROFILE

Mr. Traynum specializes in coastal hydrodynamics and estuarine processes (2007–present). He also serves as project manager for numerous beach monitoring programs and nourishment projects. Mr. Traynum is experienced in critical area permitting including analysis of environmental impacts and preparing biological assessments and EIS documents. Liaises between resource agencies and clients, and assists in developing appropriate monitoring plans to determine project impacts to endangered and threatened species. His coastal engineering project experience includes design of coastal erosion mitigation projects, monitoring and analysis of erosion and morphological changes of natural and nourished beaches and coastal inlets, measurement and analysis of tidal inlet currents, and on-site land and hydrographic surveys.

TECHNICAL EXPERIENCE

Extensive experience in estuarine and coastal settings including deployment and recovery of hydrographic equipment, such as acoustic Doppler current profilers (SonTek, RDI, Nortek), acoustic Doppler velocimeters, CTDs, and pressure sensors.

Mr. Traynum has collected thousands of beach profiles using the latest surveying techniques (RTKGPS). He is a certified (SSI), open-water diver.

COASTAL EROSION/RENOURISHMENT EXPERIENCE

Managed restoration projects at Nags Head (NC) involving placement of 4.6 million cubic yards (cy) of sand, Isle of Palms (SC) involving placement of 2.5 million cy, Folly Beach (SC) involving placement of 415,000 cy and 745-ft-long terminal groin construction, and Edisto Beach (SC) including placement of one million cy and construction management for 25 groin extensions (~\$5 million).

Project manager for beach monitoring programs involving collection and analysis of land-based and hydrographic profile data to determine short- and long-term erosion rates and project performance and impacts. Monitoring sites include: Isle of Palms, SC Hunting Island, SC Edisto Beach, SC Kiawah Island, SC

Critical area permitting for projects in SC and NC, including Biological Assessments, Essential Fish Habitat reports, EIS documents, and monitoring programs coordinated with USFWS, USACE, NMFS, and state agencies.

MatLab® scripts for automatic generation of sediment grain-size distributions, beach profile analysis, and nourishment profile design.

EDUCATION

MS. Marine Science, University of South Carolina

BS. Marine Science, USC Honors College

Coastal Engineering Certificate, Old Dominion University

ME. Coastal Engineering (pending) Old Dominion University

SPECIALTIES

- Beach nourishment design and monitoring
- Design of coastal structures
- Environmental impact assessments
- Coastal and estuarine processes
- Collection and analysis of beach profile data
- Hydrographic instrument deployment
- Collection and analysis of coastal sediments

SOFTWARE PROGRAM CAPABILITIES

- ArcGIS
- Global Mapper
- MatLab
- Microsoft Office

SELECT PUBLICATIONS

Traynum, SB, TW Kana, HL Kaczowski. 2019. The construction and impacts of a groin-lengthening project at a southeast U.S. beach. In Proc. Coastal Structures 2019 (Hanover Germany) 30 Sep – 20 Oct, 10 pp.

Traynum, SB, TW Kana, and DR Simms. 2010. Construction and performance of six template groins at Hunting Island, South Carolina. *Shore & Beach*, Vol 78(3), pp 21–32.

Kana, TW, HL Kaczowski, and SB Traynum. 2015. (BC) An empirical approach to beach nourishment formulation. Chapter 4 in YC Kim (ed), *Design of Coastal Structures and Sea Defenses*, Vol 2, Series on Coastal and Engineering Practice, World Scientific, pp 105–144.

Kaczowski, HL, SB Traynum, TW Kana, and M Rentz. (2015) Terminal groin and beach restoration at Folly Beach County Park (South Carolina). In D Cox and L Wallendorf (eds), *Proc. Coastal Structures and Solutions to Coastal Disasters*, ASCE– COPRI (Boston MA, 9–11 September 2015), 12 pp.

Kana, TW, SB Traynum, D Gaudiano, HL Kaczowski, and T Hair. 2013. The physical condition of South Carolina beaches 1980–2010. *Jour Coastal Research*, Special Issue 69, pp 61–82.



C PATRICK BARRINEAU, PHD PG

COASTAL SCIENTIST

Email: patrick@coastalscience.com

PROFILE

Dr. Barrineau serves as a coastal scientist and project manager for CSE, performing work in the field, laboratory, and office. He served as project manager at Arcadian Shores and Singleton Swash (2018), Myrtle Beach (2017-present), Pawleys Island (2020), Sea Island (2018-present), and regularly curates coastal data from collection to publication in concert with CSE staff.

While at CSE, Dr. Barrineau has prepared reports and/or permit documents for projects at Nags Head (NC), Buxton (NC), Myrtle Beach (SC), Pawleys Island (SC), Debidue Island (SC), Edisto Beach (SC), and Sea Island (GA). Prior to joining CSE, Dr. Barrineau studied coastal processes and landforms through field-based research on sediment transport and barrier-lagoon evolution. He has organized and led field studies in South Carolina, Texas, New Mexico, California, Brazil, and Israel. In addition to his work at CSE, Dr. Barrineau teaches a graduate-level course in Coastal Zone Management at the University of South Carolina.

REGISTRATION

Professional Geologist (SC #2773, NC #2761)

RESEARCH EXPERIENCE

Conceptual modeling of landscape evolution in coastal systems; modeling fluid dynamics and sediment transport; identifying controls on sediment transport patterns; and monitoring beach and dune response and recovery following storm impact. Field research at Isle of Palms (SC); Padre Island (TX); White Sands (NM); Pismo Beach (CA); Jericoacoara, Brazil; Ashkelon, Israel.

TECHNICAL EXPERIENCE

Dr. Barrineau has extensive experience working in coastal and desert settings, collecting elevation and geophysical data using RTK-GPS, Total Station, ground-penetrating RADAR, and Electromagnetic Induction Profilers.

He has also collected vibracores and analyzed hundreds of sediment samples for grain size, sorting, and X-ray fluorescence analysis.

EDUCATION

PhD. Geography, Texas A&M University
MS. Geography, University of South Carolina
BS. Geography, Auburn University

SPECIALTIES

- Collection and analysis of elevation and geophysical data
- Collection and analysis of coastal sediments
- Beach and Dune processes
- Conceptual models of landscape evolution

SOFTWARE PROGRAM CAPABILITIES

- ArcGIS
- ERDAS Imagine
- QGIS
- ENVI

SELECT PUBLICATIONS

Barrineau, P., Janmaat, R., Kana, T., 2021. Empirical depths of closure along the US East Coast. *Coastal Engineering*, Vol. 170, DOI 10.1016/j.coastaleng.2021.104009.

Barrineau, P., Tchakerian, V., 2021. Geomorphology and dynamics of a coastal transgressive dune system, central California. *Physical Geography*, 43:1, 122-144, DOI: 10.1080/02723646.2021.1944462.

Harris, M., Ellis, J., Barrineau, P., 2020. Evaluating the geomorphic response from sand fences on dunes impacted by hurricanes. *Ocean and Coastal Management* 193 DOI 10.1016/j.ocecoaman.2020.105247.

Barrineau, P., Kana, T., 2019. Unpacking Storm Damages on a Developed Shoreline: Relating Dune Erosion and Urban Runoff. *Shore and Beach* 87(3), 35-45.

Houser, C., Barrineau, P., Hammond, B., Saari, B., Rentschler, E., Trimble, S., Wernette, P., Young, S., 2017. Role of the foredune in controlling barrier island response to sea level rise. In: *Barrier Islands*, ed. Moore and Murray.

Barrineau, P., Wernette, P., Weymer, B., Trimble, S., Hammond, B., Houser, C., 2015. Coastal Landscapes in the Critical Zone. In: *Principles and Dynamics of the Critical Zone*, Vol. 19, pp. 495-420



COASTAL SCIENCE & ENGINEERING

Planning Commission STR Considerations
May 5, 2023

1. Limit occupancy of newly constructed, substantially reconstructed homes or homes that have allowed the license to lapse for one year or more to 8 people, excluding children.
2. Require minimum of 3-night stays – year-round or seasonal.
3. Require STR listings to include STR license number.
4. ~~Amend parking requirements to incentivize less vehicles and more carpooling.~~
5. ~~Require new STR applicants to be considered for a special exemption by BOZA.~~

Amended Comprehensive Plan

for the

City of
Isle of Palms,
South Carolina

Prepared by the
Isle of Palms Planning Commission

Revised May 26, 2015

DRAFT

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
INTRODUCTION	5
Vision Statement	
LOCATION AND HISTORY	9
POPULATION	13
ECONOMIC	19
NATURAL RESOURCES	23
RESILIENCE	29
CULTURAL RESOURCES	35
COMMUNITY FACILITIES	37
HOUSING	50
LAND USE	52
TRANSPORTATION	59
PRIORITY INVESTMENT	64
APPENDIX A:	70
Summary of Meetings	
APPENDIX B:	78
List of Sources	
APPENDIX D:	71
Land Use Map	
APPENDIX E:	73
Official Zoning Map, June 2000	

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INTRODUCTION

In 1994 the State of South Carolina adopted the Comprehensive Planning Enabling Act. This Act revised the State's planning laws, including the process by which municipalities may develop and adopt comprehensive plans. The Isle of Palms Comprehensive Plan was prepared in accordance with the 1994 Act. During the many months of preparation, numerous workshops and public hearings were held and many experts in various fields were consulted. A list of meetings at which the plan was discussed and the topics discussed at those meetings appear in Appendix [A](#). All meetings were open to the public and public participation in the planning process was encouraged.

This Comprehensive Plan is intended to document the history of development on the Isle of Palms, identify the community's problems and needs, and articulate a vision for its future. The Plan is also intended to help guide future decision making in matters affecting the physical, social, and economic growth, development and redevelopment of the community. This plan is not a final product; it is part of a continuing planning process and should be updated and revised as new information becomes available or as new problems and needs arise.

The first plan adopted pursuant to the 1994 Act was adopted in December 1997 and then amended with the addition of time frames for implementing strategies that were contained in the plan in March of 1998. In November 2002, the Planning Commission began on what was intended to be a five year review. However, the number of changes became significant enough to warrant a ten-year update to the plan. The revisions from this review were incorporated in early 2004. The plan was reviewed by the Planning Commission in 2008, and as a part of this review, two new elements were added, Transportation and Priority Investment, as required by the 2007 South Carolina Priority Investment Act. In 2014, the Planning Commission reviewed the plan and recommended that the plan be updated to include information regarding the 2010 Census and beach erosion issues. In 2023, the Planning Commission updated the plan again to include data from the 2020 Census and matters associated with drainage, sea-level rise and efforts to expand the public sewer system.

The Plan includes nine major elements: Population, Economic, Natural Resources, Cultural Resources, Community Facilities, Housing, Land Use, Transportation and Priority Investment. Each element includes background information, and may also include a list of key issues and a set of goals and implementation strategies where appropriate. Preceding these elements is an overall vision statement and brief description of the island's location and history.

Time frames and priorities for implementing the strategies contained in this plan are included in parentheses at the end of each strategy.

Vision Statement

Isle of Palms has developed into a premier barrier island residential community with a variety of housing styles, commercial uses and recreational facilities. Despite the natural cycle of beach erosion and low-lying terrain that is inherent on barrier islands and the extensive development of the island, the natural resources that make Isle of Palms such a wonderful place to live and visit remain intact and in good condition. Measures that will enhance the existing character of the island as a quality place to live, and protect the environment both on and around the island, must be taken to guide development and preserve the quality of life for generations to come.

January 31, 2002 (revised May 26, 2015)

DRAFT

LOCATION AND HISTORY

Location and Climate

Isle of Palms is a seven-mile-long barrier island located eight miles east of Charleston on the South Carolina coast. This long and relatively narrow island varies in width from .35 miles to 1.6 miles, and its slightly curving shoreline has an orientation of southwest to northeast.

For descriptive purposes, the end of the island nearest Charleston is referred to as the “west” end, while the opposite end of the island is referred to as the “east” end. The total area of the island is four and one-half square miles.

The island is bounded on the north by Hamlin Creek and the Intracoastal Waterway, on the east by Dewees Inlet and Dewees Island, on the south by the Atlantic Ocean, and on the west by Breach Inlet and Sullivan’s Island.

The average annual temperature is 66 Degrees F, with a low monthly average of 50 degrees in January and a high monthly average of 81 degrees in July and August. Precipitation averages 46.8 inches annually and varies from 2.1 inches in November to 6.2 inches in August.

History

Originally known as Hunting Island and then between the mid-18th century and 1898 as Long Island, the Isle of Palms served for many years as a place of refuge and recreation and, during the American Revolution, as a staging area for troops. In fact, Breach Inlet at the west end of the island derives its name from an event in 1776, when Sir Henry Clinton’s British troops landed on Long Island and attempted to cross the inlet to Sullivan’s Island to attack the American fort from the rear. Clinton’s troops were intercepted by American troops, led by Colonel William Thomson, and repulsed as they attempted to “breach” the treacherous waters of the inlet, thus giving us Breach Inlet.

In 1898, the first house was constructed on the island by Nicholas Sottile. The next year, Dr. Joseph S. Lawrence changed the name of the island to

Isle of Palms and provided the first overland access by means of a trolley rail line running from Mount Pleasant across Sullivan's Island to Isle of Palms. Dr. Lawrence was a physician and business entrepreneur who wanted to create a holiday resort. A restaurant and Ferris wheel were opened for island visitors the following year, and in 1902 the Seashore Hotel was completed.

As the island's popularity continued to increase, a long, covered pavilion, which stood until the late 1930s, was constructed along the beach. However, in 1924, Isle of Palms was effectively closed when the ferry service from Charleston to Mount Pleasant was discontinued due to financial difficulties.

In 1926 a wooden bridge replaced the trolley trestle, enabling visitors to come by car. With the opening of the Grace Memorial Bridge in 1929, linking Charleston and Mount Pleasant, and the advent of other road and bridge improvements, it soon became even easier to reach the Isle of Palms by automobile. Isle of Palms, Incorporated, which was formed to capitalize on the improved accessibility of the island, inaugurated a new program of improvements on the island, including paving of roads. But the effects of the Great Depression cut short these plans, and in 1934, the Hardaway Contracting Company took control of the island. Once again, the venture failed as Hardaway's efforts did not generate a return on his investment.

In 1944 J.C. Long, a Charleston attorney, purchased the Hardaway interests and otherwise un-owned portions of the island and formed a new land development company called The Beach Company. Mr. Long immediately began to make major improvements on the island, and the first substantial development of the Isle of Palms began.

Residential development began on the western end of the island, where many of the remaining homes date back to the 1940s. Residential subdivision and construction continued through the 1950s and into the 1960s. In 1975, the City approved plans for the development of a "recreational-oriented residential community" at the eastern end of the island. This private, gated development soon became known as Wild Dunes. The current year-round population is estimated at over 4,000 people with a peak population of 20,000 people during major summer holiday weekends.

In 1953 the island was incorporated as the City of Isle of Palms by an Act of the South Carolina Legislature. The City currently has a council form of

government with a Mayor and eight City Council members, each elected to four-year terms. The City also employs a City Administrator to manage its daily affairs.

The commercial development on the island was originally centered around Ocean Boulevard between 10th and 14th Avenues, known as the “Front Beach” area. The commercial area now includes Palm Boulevard as well. Over the years, the type of commercial buildings have changed from open-air pavilions for seasonal activities to more substantial, enclosed buildings and shopping centers housing businesses which operate year-round. The Island Center on Palm Boulevard opened in 1959, followed by the Ocean Park shopping center in 1992. In the meantime, the Pavilion Shops on Ocean Boulevard opened in 1989. The Sea Cabin condominiums, used mainly for seasonal occupancy, opened in 1980 and 1981. The island has had two hotels and several multi-family developments built since the late 1990s.

The Isle of Palms has experienced many storms and hurricanes, but none as devastating as Hurricane Hugo, which hit the South Carolina coast at midnight on September 21, 1989. This category four hurricane damaged nearly every structure on the island and destroyed more than 200 structures.

In October 1993 the Isle of Palms Connector opened, providing direct access between Isle of Palms and Mount Pleasant over a fixed span bridge. The Connector, named for the late Representative Clyde Moultrie Dangerfield, improved the ability of residents to evacuate in time of emergency.

DRAFT

POPULATION

Characteristics

According to the 2020 Census, the population of the City of Isle of Palms has been relatively stable over the last decade. Between 2000 and 2010 the total population dropped slightly from 4,538 to 4,133 in 2010 and grew modestly to 4,371 in 2020. During the summer beach season, the island's population rises to 12,000 people and may increase to as many as 20,000 people during peak weekends such as Memorial Day, Fourth of July and Labor Day, based on Police Department estimates.

The number of year-round residents of the Isle of Palms is not expected to change significantly in the near future. This can be attributed to: a decreasing supply of residential development sites on the island, especially sites aimed at year-round residents, and a continuing decline in the average number of persons per household.

The 2020 Census indicates a 33% increase in the number of people over the age of 65, with the number of people in every other age category either decreasing or marginally increasing.

The 2020 Census indicates that the number of housing units increased by three-percent over the 2010 Census to 4,376 units. However, the number of owner-occupied units also increased by nearly fourteen percent over the same period to 1,684 units. The Census category that includes units rented on a short-term basis and second homes increased by 26% from 1,939 units to 2,446 units.

Population- year round								
		1960	1970	1980	1990	2000	2010	2020
	Isle Of Palms[Census]	1,183	2,657	3,421	3,680	4,583	4,133	4,371
	Mount Pleasant [Census]					47,386	67,843	90,801
	Charleston-North Charleston MSA							799,636
	Charleston County		247,561	276,556	295,159	310,749	350,998	413,024
	Other Barrier Islands[Census]							
	Sullivan's Island				1,623	1,911	1,791	2,177 1,891
	Folly Beach				1,398	2,116	2,617	2,664 4078
	Kiawah Island				718	1,163	1,626	1,772 2,013
	Seabrook Island				948	1,250	1,714	1,810 2,050

Isle of Palms Housing Units							
		1970	1980	1990	2000	2010	2020
	Total[Census]			3,063	3,881	4,274	4,376
	Occupied[Census]	821	1,305	1,482	1,942	1,828	1,906
	by Owner			1,172	1,568	1,481	1,684

	by Renter			310	374	347	<u>222</u>
	Seasonal/Vacant			2,109	1,939	2,446	2,470
	Total within Wild Dunes[as of 4/8/2012]				1,923	2,067	2,160
Vacant Residential Sites				<u>1995</u>	<u>2001</u>	<u>2010</u>	
	Total			975	375	215	99
	Single Family			825	206	117	

Income (per census)

Income- median

Isle of Palms

1980- \$9,177
1990- \$25,421
2000- \$44,221
2010- \$68,759
2020- \$91,893

Mount Pleasant

1980- \$9,038
1990- \$25,421
2000- \$30,823
2010- \$40,808
2020- \$58,409

Charleston County

1980- \$6,358
1990- \$13,068
2000- \$21,393
2010- \$29,738
2020- \$43,141

Household income- median

Isle of Palms

1980- \$24,096
1990- \$60,682
2000- \$76,170
2010- \$86,477
2020- \$128,523

Key Issues

- The impact of a growing seasonal population.
- The impact of a growing year-round population of retirement age (60 years and over).

Goals and Implementation Strategies

Goal 1.1: Improve services for residents.

Strategy 1.1.1 The City should continue to monitor the Emergency Medical Services serving the island (see also Goal 5.1). *(Ongoing; Fire Department, General Government and City Council)*

Strategy 1.1.2 Recreational opportunities for residents should be expanded or added, including additional safe walking or biking areas on the island (see also Strategy 5.4.3). *(2008; Recreation Department, General Government and City Council)*

Goal 1.2: Balance the needs of island residents with seasonal visitors.

Strategy 1.2.1 Support commercial development only within the parameters set by the existing zoning regulations and consistent with the City's established character as a residential community. *(Ongoing; Building Department and City Council)*

Strategy 1.2.2 While the needs of island residents should be paramount, efforts should be made to adjust the level of City services to meet the needs of seasonal visitors as well. *(Ongoing; General Government and City Council)*

Strategy 1.2.3 The City should continuously monitor and keep records of the effect of seasonal visitors on the quality of life of the permanent residents; this

should include, but not be limited to the issues of parking, noise, trash, and general livability.
(Ongoing; General Government and City Council)

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ECONOMIC

Characteristics

Isle of Palms is primarily a residential community consisting of year-round residents, second home owners, vacation rentals, long-term rentals and a commercial district. There is also a [first World class residential, vacation, and recreational complex](#) ~~resort~~ at the north end of the island with a similar blend of properties as well as resort amenities. . Of the approximately 2,880 acres on the island, approximately 40.6 acres or 1.4 percent of the island is zoned commercial, excluding resort amenities within the gated section of Wild Dunes. Only a small portion of the commercially zoned land remains undeveloped. The island's economic diversity and high property values provide a strong tax base and has allowed the millage rate, the factor that is multiplied by the assessed value of a property to determine the amount of property tax to be paid, to be the lowest of all municipalities within the Charleston area.

The island's ocean beach, tidal marshland, and marinas constitute the most important economic assets. They are the main reason residents, daily visitors and tourists alike are drawn to the area. Only by maintaining and improving these natural assets will the island's community continue to grow and prosper. The desirability of living near these natural resources has created relatively high property values, which in turn raises the tax base. These same resources attract tourists, which results in accommodations tax revenue. This revenue is essential in the support of services and infrastructure.

The gated community of Wild Dunes includes the major resort, conference, golf and tennis facilities, as well as single-family and multi-family dwelling units. Wild Dunes LLC owns and operates these facilities and also manages many of the short-term rental properties within Wild Dunes. Short-term rental of these units in season is reaching capacity while unoccupied units remain during the off season. The Planned Development District, "PDD" zoning district and Conservation-Recreation zoning district "CR," which applies to most of the Wild Dunes community, allows for a maximum of 297 inn rooms, which are made up by the Boardwalk Inn, The Village, and The Sweatgrass Hotel. ~~and The Village,~~

Key Issues

- Assure continuous economic vitality of the island by maintaining the quality of natural resources and community facilities.
- Assure the quality of life of full-time residents is not diminished by the daily visitors or vacation rental commerce.
- Maintain and expand City services as needed.
- Determine the impact that daily visitors and tourists may have on natural resources, services and infrastructure.
- Maintain a sound tax base on the island.

Goals and Implementation Strategies

Goal 2.1: Balance the needs of residents and tourists with those of the environment.

Strategy 2.1.1: Maintain policies and procedures to ensure that beaches, marshlands and marinas are protected and preserved. *(Ongoing; Building Department and City Council)*

Strategy 2.1.2: Encourage business development commensurate with the needs of the local community. *(Ongoing)*

Strategy 2.1.3: Maintain and enhance an effective monitoring system to ensure beaches, marshlands and marinas are properly maintained. *(Ongoing; General Government and City Council)*

Goal 2.2: Maintain a sound tax base.

Strategy 2.2.1: Monitor the activity of the State Legislature to ensure an equitable formulation of accommodation tax revenue for island communities. *(Ongoing; General Government and City Council)*

Strategy 2.2.2: Investigate other sources of revenue that can be generated from daily visitors and longer term tourists. *(Ongoing; General Government and City Council)*

Strategy 2.2.32: Analyze revenue streams each year to ensure an appropriate balance is maintained. *(Ongoing; General Government and City Council)*

Goal 2.3: Determine the impact of tourists (daily, short-term and long-term) on the island's revenue and cost structure.

Strategy 2.3.1: Initiate comprehensive study by an outside agency to determine economic impact of visitors on recreational facilities, City services and infrastructure. *(2008; Recreation Department, General Government and City Council)*

Goal 2.4: Minimize escalating cost structure.

Strategy 2.4.1: Personnel costs make up approximately three-quarters of the City's general fund expenditure budget. Continually scrutinize planned projects for additional long-term personnel costs that may be associated with them. *(Ongoing; General Government and City Council)*

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NATURAL RESOURCES

Characteristics

Isle of Palms, like most South Carolina barrier islands, is characterized by a beach and dune ridge system with an extensive tidal marsh along the northeastern side of the island. The island is surrounded by navigable waters and provides some opportunities for access by boat and numerous beach access points. Prior to development, the island was covered by maritime forest.

Despite erosion, flooding and susceptibility to coastal storms, the beautiful sandy beaches, marshes, creeks, ocean, clean air, trees, fish and wildlife make the Isle of Palms a very attractive place to live. Protection of these natural resources is essential to maintaining a high quality of life on the Isle of Palms.

Water Quality

The quality of waters surrounding the island is inextricably connected to the quality of life on the Isle of Palms. Early in the 1990s the South Carolina Department of Health and Environmental Control (DHEC) conducted a water quality monitoring program along the Intracoastal Waterway from Charleston harbor to McClellanville. The program monitored water quality at 51 sites in the study area, three of which were located on the Isle of Palms. In addition, DHEC routinely monitors shellfish beds in the Waterway.

Results of the above testing indicate that of the 51 sites in the testing area, as many as 41 sites have not met water quality safety standards for harvesting oysters, and 26 sites have not met safety standards for swimming.

An informed City government and population are required to protect the sensitive ecosystem of the island and the impact of pollutants on its water quality. In an effort to better understand, and ultimately address, the island's

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water quality issues, the City Council voted in August 2001 to apply for grant monies to study the waters behind the island. The grant monies were offered by the Environmental Protection Agency (EPA) through DHEC under a program entitled “319 Non-point Source Pollution;” to match funds allocated by the City to pay for the cost of such a study. The study began in August 2001 and was completed in March 2004. Pollutants that adversely impact the island’s back waters are nutrients, pesticides, heavy metals and fecal coliforms.

In 2007, the City developed a program in conjunction with Charleston County to improve water quality and comply with the requirements of the Clean Water Act. This program is explained in more detail in the Community Facilities element of this Plan.

Beach

The Isle of Palms shoreline generally is accreting, with sand bypassing Dewees Inlet and moving onto the northern shoreline in the form of large sand shoals. Once the shoals attach to the beach, the sediment shifts laterally along the shoreline, with the majority moving along the island’s beaches in the direction of Breach Inlet and some moving in the opposite direction onto the Dewees Inlet shoreline. Sediment that moves down the shore accumulates along the southwestern 1.5 miles of the Isle of Palms shoreline, which is accretional over the long-term. Some of the moving sediment bypasses Breach Inlet in the form of sand bars that ultimately attach to Sullivan’s Island.

As a result of the episodic nature of shoal attachment and sediment redistribution, the Isle of Palms shoreline closer to Dewees Inlet tends to exhibit unstable characteristics. This instability creates concerns that are described in more detail in the Resiliency element of this Plan.

State regulatory responsibility for protecting the beach and dune system rests with the South Carolina Office of Ocean and Coastal Resources Management (OCRM), which is a division of South Carolina Department of Health and Environmental Control (DHEC). This state agency was created in 1977 as the South Carolina Coastal Council, when the State Legislature adopted the South Carolina Coastal Zone Management Act, SC Code section 48-39-10, et. seq. The Act also established the first comprehensive set of regulations for protecting coastal resources in the eight South Carolina

coastal counties. In 1988, DHEC's jurisdiction on the beachfront was amended by passage of the South Carolina Beachfront Management Act, SC Code section 48-39-270, et. seq. which was further amended in 1990. In 1998, OCRM began a program to periodically test the quality of water along the shoreline. This testing has proven that the water at the beach is very clean, with only two swim advisories ever issued and the most recent advisory being in summer of 2002.

In addition to state regulatory authority over the beaches, the City of Isle of Palms also exercises jurisdiction over the beach on some issues. In areas where the City retains jurisdiction, it has adopted amendments to the zoning ordinance to protect areas abutting the OCRM jurisdiction. The City has marked the beach access paths with a numbering system that corresponds to the opposing street number. Also, provisions for handicapped accessible parking spaces and paths have been added at the 9th and 21st Avenue beach accesses.

The Isle of Palms Local Comprehensive Beach Management Plan was approved by the City and OCRM in April of 2023~~08~~. The Plan, which is required by state law and must be updated every ten years, reports on the state of the island's beaches and dunes and provides guidance for the City in managing these important assets.

The method of restoration, off-shore dredging, was recommended by a Long-Term Beach Management Report (not to be confused with the overall Local Comprehensive Beach Management Plan, mentioned above). This report was developed by a group of people with varying interests working with a coastal engineer to develop recommendations that reflect the consensus of the community for future beach management policies and actions. The City continues to monitor erosion on the entire shoreline and occasionally undertakes projects to address affected areas.

In 2015, the City Council approved a resolution expressing the City's opposition to seismic testing and offshore oil and gas development off the South Carolina Coast. Additionally in 2015, the City became the first community in South Carolina to ban the use of single-use plastic bags in commercial operations.

Wildlife and Vegetation

Seven species of birds are listed on the federal endangered or threatened list which may be found in the area. The endangered species are the bald eagle, Bachman's warbler, wood stork and red-cockaded woodpecker. Threatened birds are the piping plover, peregrine falcon and red knot.

The loggerhead sea turtle, a threatened species, visits the island to lay eggs along the beach. South Carolina beaches have the largest number of nest sites in the "population" tracked between North Carolina and Northern Florida. In recent years the nests have numbered between 20 and 60 on the beaches of the Isle of Palms. It is thought that individual turtles may return to historical/ regional nesting sites every two to five years, accounting for the wide fluctuation in the number of nests from year to year. Enforcement of the island's lighting ordinance, which prohibits lighting directed at the beach, as well as ordinances requiring the removal of overnight beach furniture, filling in holes in the sand and properly disposing of all trash and garbage is going to help save this threatened species by protecting nests on the island.

No federally listed endangered or threatened plants are known to be located on the island. The primary tree species on the island are palmetto, live oak, loblolly pine, wax myrtle, and crepe myrtle. In 1989 the City adopted its first tree ordinance to prevent parcels from being completely cleared during development. In 2002, the ordinance was amended to include further protection for all live oak trees and other trees in excess of eight inches diameter.

After hurricane Hugo, Palm Boulevard was lined with palmetto trees through a privately organized and funded "Plant-a-Palm" program.

Key Issues

- Improvement and maintenance of water quality.
- Protection of beach, dunes and marsh lands.
- Protection of wildlife and vegetation.

Goals and Implementation Strategies

Goal 3.1: Conclude whether obtaining an improved flood insurance Community Rating System (CRS) rating is feasible.

Strategy 3.1.1: Pursue improving the CRS rating when feasible.
(Ongoing; Building Department)

Goal 3.2: Improve the water quality of the ocean, waterway and creeks surrounding the island.

Strategy 3.2.1:

Monitor and/or participate in local and regional water quality studies.
(Ongoing; General Government)

Strategy 3.2.2: Monitor DHEC/OCRM testing of ocean waters impacting the island. (Ongoing; General Government and Building Department)

Goal 3.3: Protect marshes, dunes and beaches.

Strategy 3.3.1: Create a public awareness/education program aimed at protecting the sensitive ecosystem of a barrier island, to include protection of dunes and marshes and their vegetation, as well as the importance of removing animal waste and trash from the beaches. (; General Government and Building Department)

Strategy 3.3.2: Support efforts to minimize the impact of erosion throughout the island including beach nourishment projects, as the need arises. (Ongoing; General Government)

Goal 3.4: Promote the maintenance of green spaces throughout the island.

Strategy 3.4.1: Investigate the potential for establishing, or acquiring, City owned, undeveloped green spaces.
(; Recreation Department and Building Department)

Goal 3.5: Protect the island's wildlife and vegetation.

Strategy 3.5.1: Pursue enforcement of ordinance(s) aimed at protecting loggerhead turtle nesting activities and sites. (Ongoing; Building Department and Police Department)

Strategy 3.5.2: Support other regulations that protect wildlife and vegetation. (Ongoing; General Government and Police Department)

Goal 3.6: Improve air quality on the island.

Strategy 3.6.1: Pursue development of ordinances, education and awareness programs to improve air quality, such as smoking regulations and support of public transportation.

RESILIENCY

Resilience is defined as the community's capacity to withstand and recover from natural disasters and long-term changes as a result of sea level rise rather than simply reacting to impacts (National Ocean Service, NOAA).

Existing Conditions

The topography of the island is relatively low and flat, with average ground elevations of 7 to 10 feet above mean sea level (MSL). There are several areas as high as 17 feet above MSL along a ridge on the ocean side of the island.

The tide range, low tide to high tide, is 5.2 feet with the spring tide range increasing to 6.1 feet.

Because of low ground elevations, most of the island lies within a Special Flood Hazard Area of the National Flood Insurance Program. The most common flood zone designations on the island are AE and VE zones, which delineate the statistical threat of flooding from a "100-year storm," for which there is a one percent probability of occurring in any given year. Low elevations, coupled with storm drainage that is significantly influenced by the ebb and flow of the tides, are causes for serious accumulations of storm water, whether generated by heavy rainfall or storm surge.

During severe storm events water levels can be much higher, with the potential for reaching an elevation of 12 feet MSL and wave crests up to 18 feet MSL. In 1989 the storm surge from Hurricane Hugo covered most of the island with peak water levels ranging between 15.5 feet above MSL along the beach and 12.5 feet above MSL along the back of the island.

The City's drainage system is comprised of portions owned and maintained the South Carolina Department of Transportation (SCDOT), the City, Charleston County, and private owners. Some drainage infrastructure is 70 years old, undersized and deteriorating, but other sections are newly constructed and well-functioning.

Considering the City's vulnerability to natural hazards and the increasing severity of flooding events over the past several years, it has become readily

apparent that the City must plan and identify strategies to make the community more resilient. Specifically, the city must devise a resiliency plan to address the impacts of flooding, beach erosion, and sea level rise on public infrastructure, businesses, and the community.

Flooding

To minimize the potential for property damage due to flood conditions, the City adopted a comprehensive set of regulations in 1983. The City is in compliance with the requirements of the National Flood Insurance Program (NFIP) which allows its citizens to secure federally backed flood insurance policies. Furthermore, the City participates in the Community Rating System (CRS), which is a program that rewards communities that are doing more than meeting the minimum requirements of the NFIP. The City is presently designated as a “Class 5” CRS community, which entitles its citizens to a 30% discount on flood insurance rates. The goal of the CRS is to reduce the loss of life and property in the event of a flood and to protect the natural and beneficial functions of the floodplain.

The City adopted more stringent standards than the minimum flood elevations required by the Flood Insurance Rate Maps (FIRMs) that require the lowest floor of any new structures to be elevated to at least 13 feet above mean sea level.

Since 2010, the City has completed several large-scale drainage projects between 29th and 57th Avenues to reduce the likelihood of flood damage. The City began a major project in 2022 to improve the outfalls between 30th and 41st Avenues to allow water to flow off the island quicker and to seal the tidal waters out of the system.

In 2021 the City engaged Davis and Floyd Engineering to develop a drainage masterplan to identify the areas of need and create a capital improvement program to allow the City to prioritize future drainage projects.

Beach Erosion

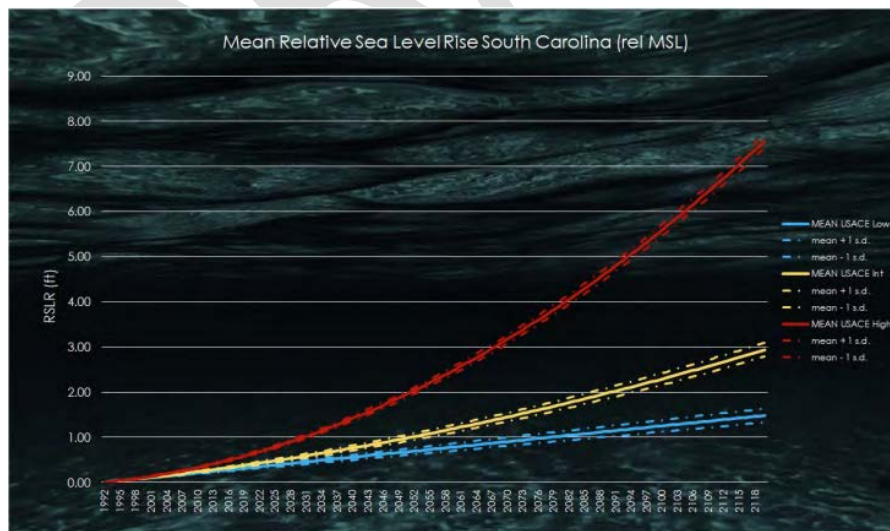
The dune system of the beach creates the first natural barrier against storm surge, flooding, and rising tides. The Isle of Palms shoreline is healthy and

generally accreting, but the shoreline has cyclical erosional episodes particularly around the unstable inlet zones on the two ends of the island.

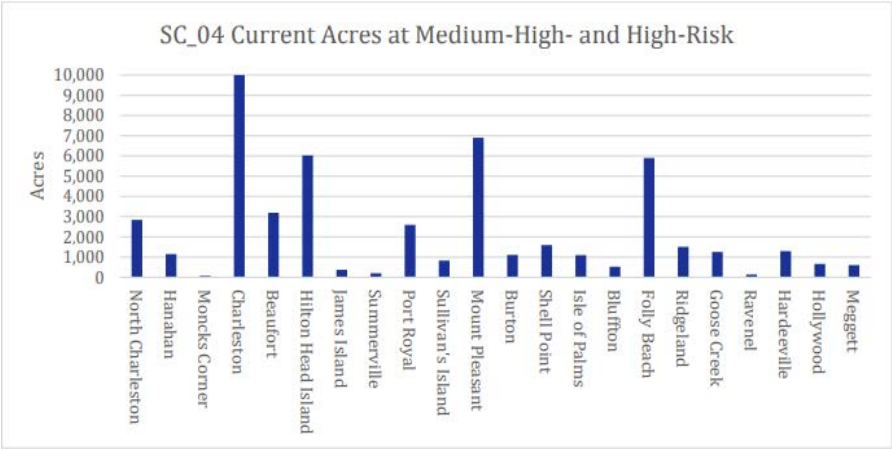
As a result of erosion on the northeastern end of the island near Dewees Inlet, a \$10M beach restoration project was undertaken in 2008 and a \$14M project was undertaken in 2018. These projects consisted of an offshore dredge pumping sand onto the shore and subsequent monitoring. The projects were funded by private and public funds. The City continues to monitor erosion on the entire shoreline and occasionally undertakes projects to address affected areas. It is expected that the City will need to facilitate a major restoration project on a 10-year cycle.

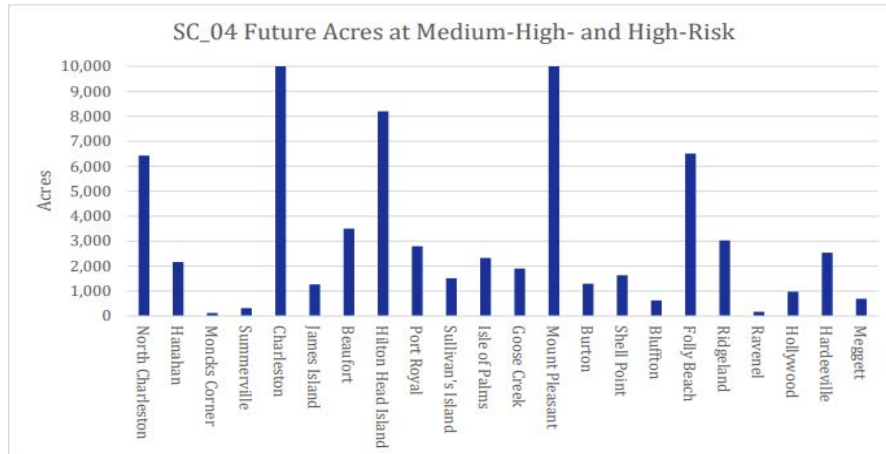
Sea Level Rise

Sea level rise poses a significant threat to homes, private property, public infrastructure and services, natural resources, and ultimately, public safety and welfare. In Charleston, the sea level has risen 10 inches since 1950, and is now accelerating at a rate of 1 inch every 2 years. Further, based on data from three South Carolina three compliant gauges, the Army Corp of Engineers South Atlantic Coastal Study (SASC) estimated that mean relative sea level rise will increase anywhere from 1.39 to 7.47 feet by 2120.



While the extent and severity of the influence sea level rise will have on the island remains relatively under-examined, due to the low-lying nature of the island and the proximity to the ocean and marshlands, the City of Isle of Palms is extremely vulnerable to the impacts of rising seas. In particular, sea level rise will likely continue to exacerbate flooding from storm surge, high tides, and stormwater. According to the Army Corp of Engineers' SACS that identified risks and vulnerabilities of coastal areas to increased hurricane and storm damage as a result of sea level rise, the primary impact to the Isle of Palms will likely be structural and infrastructural damage. Their modeling found that over 2,000 acres of Isle of Palms' total 3,481 acres are at medium-high risk of exposure and probability of hazard occurrence, more than twice the acreage currently at medium-high risk. Many of the City's roads are low and at risk of being damaged by high tides and storm surge. Additionally, utilities are installed below ground within the roadway rights-of-way would be impacted by scouring and storm surge.





In 2022 the City requested grant funding to construct an elevated berm on the backside of the island to prevent minor storm surges from being able to inundate the neighborhoods on the inland side of Waterway Boulevard. These neighborhoods are some of the lowest on the island and most susceptible to the increased sunny day flooding associated with sea level rise.

Key Issues

- Maintain healthy beach and shoreline
- Encourage elevation of low existing structures
- Work with utility providers to improve resilience of infrastructure
- Seal tidal canals
- Support renourishment
- Healthy disaster recovery account
- Budget for large scale drainage improvements identified in the Davis and Floyd masterplan

Goals and Implementation Strategies

Goal 4.1: Continue to manage and promote a healthy beach.

Strategy 4.1.1: Support beach renourishment projects

Strategy 4.1.2: Encourage private dune restoration projects

Goal 4.2: Continue efforts to seal the low areas of the back side of the island, including drainage systems, to reduce tidal intrusion into the highland of the island.

Strategy 4.2.1: Support efforts to build berms along the back side of the island to keep abnormally high tides from entering the highland areas, including elevating the multiuse path adjacent to Waterway Boulevard.

Strategy 4.2.2: Support OCRM in administering measures that protect marshes on the backside of the island.

Goal 4.3: Continue to work closely with state, federal, and local partners and coordinate resiliency efforts.

Goal 4.4 Work with utility providers to ensure infrastructure on the island is constructed to be as resilient as practical.

Goal 4.5 Ensure that the City's code of ordinances allow future construction projects to be constructed to be resilient.

Goal 4.5.1 Review and implement recommendations from the City's consultant working on a drainage masterplan, which includes a task to review and recommend improvements to the City's development standards.

CULTURAL RESOURCES

Historic Sites and Buildings

Although the Isle of Palms served a variety of purposes prior to its development as a residential/resort community, very little remains in the way of historic buildings or archeological sites. Currently, there are no sites on the island listed in the National Register of Historic Places. A marker in the first block of Charleston Boulevard tells of Lord Cornwallis and the British troops who briefly occupied the island during the American Revolution.

The Ocean Boulevard commercial district or “Front Beach” area was once the site of open-air pavilions and amusement rides, although none of these buildings remain. The existing office building at the corner of 10th Avenue and Palm Boulevard was once a hotel, and the existing house located next to City Hall was originally the station for the trolley that connected the island to Sullivan’s Island. Also the building on the northeast side of J.C. Long Boulevard near the intersection with Ocean Boulevard, which has been used recently as a gift shop, was for many years the 2nd U.S. Post Office on the island.

Events

The City hosts a number of cultural events on the island. The City’s Recreation Department organizes several events each year including a Holiday Street Festival, Front Beach Fest, Music in the Park, Sand Sculpting Competition, an Easter Egg Hunt, a Halloween Carnival, a Golf Cart Parade and Doggie Day. In March of 2003, the City commemorated its 50th Anniversary by holding numerous events including a street dance, a play, a nickel carnival, a Ferris wheel on Ocean Boulevard and two historical displays.

The Isle of Palms has become a popular site for sporting events in recent years. Wild Dunes plans to continue hosting a number of amateur golf and tennis tournaments.

Key issues

Awareness of the island's history

Goals and Implementation Strategies

Goal 4.1: Promote awareness of the history of the island

Strategy 4.1.1: Explore the possibility of establishing a commemorative exhibit online and/or in one of the City's buildings including the collection of historic photographs and documents compiled in 2003 for the City's 50th Anniversary celebration. (2008; General Government)

Strategy 4.1.2: Investigate the possibility of permanently marking sites of historical significance on the island and ensuring their preservation. (2008; General Government)

Goal 4.2: Establish a physical and digital archive to serve as repository for resident's historical documents

COMMUNITY FACILITIES

Public Safety

Isle of Palms is currently served by a police force of twenty sworn officers, eleven auxiliary staff, twenty-one patrol cars (five of which are four wheel drive SUVs for patrol supervisors) , one animal control truck, one all-terrain beach patrol truck, and one all-terrain golf cart for parking enforcement. Additionally the police department adds six part-time beach officers for the summer season for parking enforcement and beach patrol. The heavy volume of vehicular traffic, parking, and the safety of bicyclists and pedestrians are currently problems on the island. Also, as the numbers of boats and jet skis on waters around the island increase, regulatory measures may be necessary in the future to ensure that the City's waterways remain safe.

The island has two fire stations which house a total of five apparatus (two fire engines, two ladder trucks and one ladder service vehicle), four pickup trucks and four rescue boats. The Fire Department consists of thirty-five paid firefighters and ten volunteers. The City's current Insurance Service Organization classification is three.

In 2013 the City transitioned from handling emergency calls and dispatching services from within the City to the Charleston County Consolidated 9-1-1 Center (CCCD 9-1-1 Center), which is a a state-of-the-art facility located in North Charleston that handles emergency dispatch services for most of the municipalities in the Charleston area. The City continues to maintain public safety personnel to answer administrative phone lines, transferring emergency calls to the CCCD 9-1-1 Center and monitor radio transmissions

Currently there are no advance care Emergency Medical Service (EMS) vehicles stationed on the island; however, the EMS station is less than four miles away on the Isle of Palms Connector. More than 75 percent of the calls for assistance are medically and/or safety related, and the City has at least four trained first responders on duty each day. First responders are emergency medical technicians who are authorized to provide basic life support services, including the use of an automated defibrillator. In contrast to County EMS paramedics, City first responders do not transport patients or administer drugs.

In an effort to provide immediate emergency medical response to City residents and visitors, the City will need to ensure that training and funding continues to be available to the Fire Department for this purpose. Concurrently, the City must continue to work with the County EMS authorities to facilitate optimum response to medical emergencies.

An emergency preparedness plan was developed following Hurricane Hugo which requires annual review and assessment.

Water Sources

The public water on the island is provided by the Isle of Palms Water and Sewer Commission, which was established as a separate entity by City Council in 1992. Previously the utility was privately owned by The Beach Company; it subsequently was purchased by the City in 1991.

The Isle of Palms has developed a two-pronged approach to meet current and future needs for providing potable water that satisfies the Environmental Protection Agency's (EPA) drinking water standards: ground source water on the island is combined with surface water from the Charleston Commissioners of Public Works (CPW), the largest water and sewer utility in the area. Although abundant on the Isle of Palms, ground source water from wells has high, naturally occurring concentrations of fluoride and minerals. To improve ground source water quality to EPA standards, a reverse osmosis water treatment facility was constructed and placed into service in 1993. However, this facility provides only a portion of the potable water needed for the community. Therefore, in 1994 the Isle of Palms Water and Sewer Commission and the adjacent Town of Sullivan's Island initiated a project to buy potable surface water from the Charleston CPW.

A water main was constructed under Charleston Harbor from Fort Johnson to Sullivan's Island, across Sullivan's Island, and under Breach Inlet to connect with the Isle of Palms Water and Sewer Commission lines. In conjunction with this project, a new water main with fire hydrants was installed across Isle of Palms to enhance fire suppression capabilities and provide a major service connection between the two water systems on Isle of Palms. Also, construction of a new ground storage tank to provide extra water storage capacity for the Wild Dunes area of the island was completed in 1997. The Water and Sewer Commission plans to continue upgrading

older, small diameter lines with new, larger diameter pipes to increase water distribution capabilities for the entire island.

To encourage conservation of water, the Water and Sewer Commission uses a conservation rate structure. The Commission uses 300 gallons per day as the average amount used per household.

Wastewater Treatment

A significant portion of development on the Isle of Palms is served by septic tanks. Although all of the development in the gated section of Wild Dunes is served by a sewer treatment system, which incorporates a 7 day waste water holding pond and uses a portion of the holding pond water for spray irrigation of the golf courses, only some 40 percent of the development outside the boundaries of Wild Dunes is served by a sewer system. Over the years, septic tanks have been permitted in areas where the soils are only marginally suitable for this type of waste treatment.

The City's Planning Commission spent considerable time during 2015-2017 analyzing the feasibility and desirability of expanding the public sewer system to every property not currently served. Ultimately, the Planning Commission concluded that the City needed to plan to expand the sewer system, but that it was cost prohibitive to do the entire project at one time. Therefore, they suggested that triggers be established that would lead to a gradual expansion of the system, when interest or need prompted an expansion.

The City partnered with the Water and Sewer Commission to fund a sewer masterplan in 2018 and entered into a Memorandum of Understanding in 2020 that memorialized the shared goal of ultimately expanding the sewer system to every property.

Installation of public sewers in areas prone to flooding near the beach between 42nd and 53rd Avenues, adjacent to the Recreation Center from 26th to 29th Avenues, and other low areas of the island is supportable from a public health standpoint and should be prioritized. The Forest Trail Wastewater Treatment Plant was replaced in 2014 and was designed to be expanded, when necessary.

To improve the accuracy of water quality monitoring at the Forest Trail wastewater treatment plant, new monitoring equipment was installed in 1994 during a major rehabilitation of the plant. In 2000, a new blower building and new blowers were installed to reduce the amount of noise generated by the facility.

Electrical/ Telephone

Like most jurisdictions, the City is provided with satisfactory electrical power and telephone service by professional and responsive public utility companies. As with many older communities, the majority of these distribution systems are above ground and aging. Wild Dunes has successfully undertaken a project to place all of the utility lines within their community underground. In an effort to reduce outages due to storms and to provide for a more pleasing appearance for the City, those utility providers should be encouraged to replace above ground systems with underground distribution. The City should encourage other utility providers (cable, internet, etc.) to provide a full array of options to City residents.

In 2013, SCE&G installed a second transmission line from the mainland of Mount Pleasant to the Isle of Palms to increase reliability of service in inclement weather and times of high demand. The line was installed by burrowing under the marshes and waterways on the back side of the island.

Stormwater Drainage

During the spring of 1995, an engineering firm hired by the City conducted a comprehensive study of drainage problem areas and recommended how to best drain the areas in question. Cost estimates were also provided in anticipation of a bond referendum to fund these capital improvements. The areas studied included:

53rd Avenue
23rd Avenue and Waterway Boulevard
Sparrow and Waterway Boulevard
41st Avenue and Hartnett Boulevard
3rd Avenue and Charleston Boulevard
56th Avenue and Palm Boulevard

The drainage improvement project was estimated to cost in the vicinity of \$7 million. On November 7, 1995 the referendum to fund this project was soundly defeated by a margin of 9 to 1. Without the authorization of funding, these major drainage improvements are not contemplated for the foreseeable future.

During 2001 Wild Dunes undertook a major drainage project to accommodate the run-off of an upcoming project. The City was able to work in conjunction with Wild Dunes and agreed to pay to upgrade the size of the drainage pipe to accommodate additional drainage from an abutting neighborhood.

In the fall of 2011, the City collaborated with Wild Dunes and completed a \$1.1M drainage project that alleviated many of the drainage problems between 53rd Avenue and 57th Avenue.

In 2018, the City completed a \$2.4M second phase of drainage improvements that provided relief to the areas between 45th Avenue and 52nd Avenue.

In 2020, the City's engineering consultant developed plans for a third phase of drainage improvements that will seal the back side of the island off from tidal inundation between 41st Avenue and 30th Avenue and improve the outfalls to allow stormwater to discharge quickly.

In addition to the routine maintenance of existing drainage facilities, which is done with the assistance of the Charleston County Public Works Department and the SC Department of Transportation (SCDOT), the City has been employing an innovative rehabilitation technique that utilizes a water jet and sewer vacuum truck to re-grade and re-sculpt ditches while simultaneously removing spoil material and vegetation. This process has been successful in shaping ditches that were previously difficult to access with heavy equipment. The City plans to continue funding for future maintenance using this same technique.

In 2007 the City developed a stormwater management program to satisfy the requirements of the federal Clean Water Act and participate in the National Pollutant Discharge Elimination System (NPDES). The program includes a series of regulations aimed at controlling stormwater runoff in an effort to reduce pollution and sedimentation. Charleston County is handling the

compliance and administration of the program through an inter-governmental agreement with the City.

Parks and Recreation

In addition to the seven-mile-long public beach, Isle of Palms is served by a centrally located, 9.8-acre Recreation Center bounded by 27th and 29th Avenues, just north of Hartnett Boulevard. The site includes softball, baseball and soccer fields, tennis and basketball courts, a children's playground, a dog park and a recreation building that was constructed in 2003, housing offices, large multipurpose rooms and a gymnasium.

The Charleston County Parks and Recreation Commission (PRC) owns and operates a regional park on a nine-acre tract located between 14th Avenue and the Beachside residential community along the Atlantic Ocean. Like other PRC parks on Folly Beach and Kiawah Island, the Isle of Palms Park has 350 parking spaces with restroom, shower, changing, picnic and volleyball facilities, life guard services, children's play area and beach access for the handicapped. Limited food and beverages are available for sale and chairs and umbrellas can be rented. The Park site is buffered from the Beachside neighborhood by a landscaped berm and is accessible by car only from 14th Avenue. There is a parking fee.

Two 18-hole championship golf courses and a ~~first-class~~~~world-class~~ tennis facility, which are available to the public for a fee, are located on the island within the Wild Dunes gated community.

In 2013, the City acquired a one acre tract of land at Palm Boulevard and 18th Avenue. The property is a passive park and has been named Carmen R. Bunch Park. A portion of the funding used to purchase the land came from the Charleston County Greenbelt Program, which dictates that the land always be used as a park.

Public Properties

In January 1999 as a result of a referendum, the City purchased the 5.5 acre marina site and facilities at the north end of 41st Avenue for \$4.25M. The City arranged financing for the purchase through a 20-year bond. The site is bordered by the Intracoastal Waterway and Morgan Creek, providing a premier location for marina, entertainment, and recreational activities. This

complex offers a full-service marina and overnight berthing, a convenience store, restaurant, boat storage area, a boat launching ramp and other privately operated water-sport businesses.

Prior to purchase, the City contracted for a complete inventory and facilities baseline assessment to ensure that the condition of the facilities was known. In general, the facilities include the marina proper with docks, piers, headwalls, and boat refueling equipment; the convenience store that includes restrooms, offices, and gasoline pumps; the boat launching ramp with a small utility building/restroom abreast of the ramp; and a large two-story restaurant with some built-in food service equipment. In recent years, the City has undertaken major maintenance projects on the marina site including bulkhead replacement, dredging and dock replacement and improvement.

Because of the timing and conditions of the purchase, leases to various businesses vary in length and circumstance. In general, turnover in the marina tenants is extremely rare and vacancies have been filled quickly. In fact, in 2022, the marina changed tenants and the current tenant is in the process of improving the facilities and working with the City in reconfigure the parking to be more conducive to island residents. The restaurant also changed tenants who have recently concluded a major renovation and are back open serving the public.

While lease revenue is stable, it is not sufficient to fund 100% of the marina cash needs including debt service on both the bond issued to purchase the marina and the subsequent bond issued to replace the bulkhead. The funding gap between marina revenues and expenditures has historically been filled using tourism revenues such as Municipal Accommodations Taxes, Hospitality Taxes and/or State Accommodations Taxes. ~~Once the bonds are satisfied in 2019 and 2016, respectively, the marina is expected to be financially self sustaining.~~

~~The marina is expected to provide the desired level of marina services to the population and operate on a fiscally sound basis from year to year. Moving forth, services will continue but not without close attention to modernization, on-going maintenance, and monitoring of the site's impact on neighboring residential areas. Future capital improvements and some major maintenance costs will surface in future years. These expected costs~~

~~will be mitigated to a significant extent as the balance owed on the purchase bond decreases and is satisfied in 2019.~~

In addition to the Marina and recreation facilities, the City owns various buildings on the island. City Hall at 1207 Palm Boulevard is a two story-6,800 square foot building completed in December of 1991. At the base of the connector, a 3,500 square-foot Public Works building was finished in April of 1991, which replaced the original building that did not survive Hurricane Hugo. The City owns two vacant parcels behind the Public Works property. The City's two fire stations, #44-41st Avenue and 30 J.C. Long Boulevard, were built in 2007 and 2008 respectively, with the latter undergoing structural repairs in 2018. These stations replaced structures that were built in 1991, but had to be demolished because of extensive mold infestation. The Water and Sewer Commission's facilities at 1300 Palm Boulevard were owned by the City until 2014, when the City transferred ownership of this and other properties with a contingency clause that the property would come back to the City if it ceased to be used for the provision of public water and sewer service. The City constructed a public restroom facility at 1118 Ocean Boulevard in 1991 along with a walkway to the beach to ensure that the physically challenged have access to public restrooms and the beach. Any renovation or replacement of this facility be contemplated as the need arises.

Water access

Public beach access is provided at 56 points between Breach Inlet and 53rd Avenue. Fifteen additional beach access points are provided within Wild Dunes community for residents and guests of Wild Dunes.

Public access to tidal creeks and marsh on the northwest side of the island is limited. At several locations, streets were originally platted to extend to the edge of the marsh but never constructed. The City has formally accepted The Beach Company's dedication of several of these streets to the public.

Five marinas are located on the island: two are located at Breach Inlet, and the remainder are on 41st Avenue- the Isle of Palms Marina, Wild Dunes Yacht Harbor and Dewees Island Marina. The Isle of Palms Marina has

received approval by the Board of Zoning Appeals to construct a boat storage building with a 192 dry-stack storage capacity but no action on this approval is imminent.

Two City-owned boat ramps are located on the island: a boat ramp near Breach Inlet is available for an annual fee, and a boat ramp at the Isle of Palms Marina is available for either an annual fee or a fee per launch.

Key issues

- Maintenance and improvement of public safety
- Maintenance and improvement of water and sewer facilities
- Expansion of recreational opportunities for island residents
- Improvements of storm water management
- Continued operation and overall stewardship of the City marina facilities

Goals and Implementation Strategies

Goal 5.1: Improve public safety.

Strategy 5.1.1: The City should continue to work with County officials to ensure optimum EMS services on the island and maintain basic medical emergency

services through the Fire Department. *(Ongoing; Fire Department)*

Strategy 5.1.2: Develop and implement a method of distribution for the Disaster Preparedness Plan. *(Ongoing; General Government and Fire Department)*

Goal 5.2: Support the installation of sewer services where these services do not currently exist.

Strategy 5.2.1: The City should meet periodically with the Water and Sewer Commission and strive for a “team approach” to addressing waste water and water issues that will arise in future years. *(Ongoing; General Government and City Council)*

Strategy 5.2.2: In conjunction with the Water and Sewer Commission, the City should take those steps appropriate to facilitate additional sewer service on the island. *(Ongoing; General Government and City Council)*

Goal 5.3: Improve recreational opportunities for all island residents.

Strategy 5.3.1: Develop a plan to improve alternate modes of transportation on the island including bikeways and sidewalks with an emphasis on installing sidewalks and improving pedestrian safety (see also Strategy 8.1.3). *(2008; Building Department and Recreation Department)*

Strategy 5.3.2: Inventory unimproved rights-of-way extending to the creeks or marsh for possible use as passive recreational sites not unlike the street ends in the Old Village of Mount Pleasant along the Harbor. *(2008; Building Department and Recreation Department)*

Strategy 5.3.3: Consider additional improvements to the Recreation Center to offer a wider spectrum of leisure activities for pre-school children to senior adults (see also Strategy 1.1.2). *(Ongoing; Recreation Department)*

Goal 5.4: Improve the appearance of the island.

- Strategy 5.4.1: The City should continue to support tree-planting programs along streets and develop a long-term plan which prioritizes streets and identifies the types of trees to be used. *(Ongoing; General Government and Building Department)*
- Strategy 5.4.2: Consider additional ways of reducing littering on the island. *(Ongoing; Police Department and City Council)*
- Strategy 5.4.3: Consider ways of restricting the construction of structures at the ends of docks working in conjunction with the OCRM and the U.S. Corps of Engineers. *(Ongoing; Building Department, General Government and City Council)*
- Strategy 5.4.4: Encourage new or replacement electrical distributing systems to be constructed underground. *(Ongoing)*
- Strategy 5.4.5: Seek funding sources to place electrical distributing systems underground. *(Ongoing)*

Goal 5.5: The City should take initiatives to address drainage and storm water runoff on the island.

- Strategy 5.5.1: Continue to work closely with County and State agencies to properly maintain existing storm water and drainage systems. Clearly delineate the City's areas of responsibility and take appropriate action where feasible. *(Ongoing; General Government and City Council)*

~~Strategy 5.5.2: Consider funding for a comprehensive drainage study that would isolate the highest priority areas and provide engineering options and costs.~~
~~*(Ongoing; General Government, Public Works and City Council)*~~

- | Strategy 5.5.~~23~~³⁴: Consider funding options, including grants and NPDES fees to address drainage problems. *(Ongoing; General Government and City Council)*
- | Strategy 5.5.³⁴: The City should continue to work to remain in compliance with the National Pollution Discharge Elimination System Phase II as a small MS4 community. *(Ongoing; Building Department, General Government and City Council)*

Goal 5.6: Protect and enhance the City's investment in real property.

- Strategy 5.6.1: Periodically review and update the Baseline Facilities Assessment of the Marina complex to ensure the conditions of the facilities are monitored for safety, physical condition, and utility. *(Ongoing; General Government and City Council)*
- Strategy 5.6.2: Set aside funds for future year maintenance and capital improvements that will be required to protect and maximize the City's investment in all real properties. *(Ongoing; General Government and City Council)*
- Strategy 5.6.3: Aggressively pursue grants or other external funding sources that will enhance the safety, environmental conditions, facilities, or other features of all real properties. *(Ongoing; General Government and City Council)*
- Strategy 5.6.4: Develop plans for continuous maintenance/repair of various City buildings such as City Hall, the Public Safety building, Fire Station 2, the Recreation Center and the Public Works building. *(2008; General Government and City Council)*

Goal 5.7: Optimize financial return on all real properties.

Strategy 5.7.1: Encourage imaginative proposals using City properties that will enhance revenues to the City.
(Ongoing)

Strategy 5.7.2: Constantly monitor compliance with existing lease terms to ensure revenues are consistent . *(Ongoing; General Government and City Council)*

DRAFT

HOUSING

Characteristics

Over the years the island has attracted those seeking a permanent residence, a vacation home, an investment opportunity or a retirement home. At the present time, approximately 36% of the housing units on the island are owner-occupied, year-round residential units.

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Homes original to the island are being replaced with more expansive and updated dwellings consistent with current market trends and in compliance with current building codes. Because of many factors including the current growth and cost of materials, residents are seeing a significant increase in insurance costs.

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Many homes on the island are on a septic system. Some of these septic systems have no problems and would pass all present requirements for a new system. However, some septic systems that pre-date health regulations do not meet the current requirements. The Community Facilities element of this plan includes information on the need to expand public sewer services on the island.

Key issues

- Maintain a high quality of life for the island residents.
- Balance the increasing property values with community livability

Goals and Implementation Strategies

Goal 6.1: Continuously monitor the effect of development upon the quality of life of the existing permanent residents.

Strategy 6.1.1: Continue to track construction trends including: the number of houses demolished each year and the number of square feet, bedrooms and bathrooms of new houses. *(2008; Building Department)*

Strategy 6.1.2: Continually assess ordinances which limit the size and width of houses and the amount of impervious surface on the island. *(Ongoing; Building Department)*

Goal 6.2: Improve water quality associated with residential properties (see also Goal 3.2).

Strategy 6.2.1: Amend the zoning ordinance to limit the density of development allowed on property not serviced by a public wastewater system. *(2008; Building Department and City Council)*

Strategy 6.2.2: Educate the owners of septic systems in the proper maintenance and encourage owners to have their septic systems checked and serviced according to established standards. *(Ongoing; Building Department)*

Strategy 6.2.3: Monitor the amount of impervious surface on residential lots. The City defines impervious material as any material through which water cannot penetrate, including buildings, roads, and parking lots. *(Ongoing; Building Department)*

LAND USE

Characteristics

The island has a long history of being a residential bedroom community of greater Charleston while still maintaining its charm, natural beauty, and desirability as a summertime getaway destination. In addition to its residential elements, it has also been used for recreational and resort activities. ~~used for recreational and resort activities.~~ Residential construction has continued, and today it is estimated that 4,420 dwelling units are located on the island. The majority of commercial development is located in the center of the island, generally fronting on Palm and Ocean Boulevards in the vicinity of 10th and 14th Avenues. Additional commercial activities are located in Wild Dunes, at Breach Inlet and the City marina.

Commented [S2]: Refer back to the numbers you get got input in HOUSING: Characteristics

Planning and Zoning- Historical Perspective

From the early development of the Isle of Palms, there have been quasi-planning/zoning attempts. Generally, these attempts designated some areas for commercial use, for apartment use and for residences. Until recent years the only controls were plat and deed restrictions. Charleston County provided planning and inspection services for the island.

The City of Isle of Palms was incorporated in 1953 and zoning was established on October 25, 1956. Among other elements, the 1956 zoning ordinance addressed non-conforming uses and provided for the lawful continuation of these uses. The 1956 version of zoning was codified along with other City ordinances in 1970. The entire zoning code was subsequently repealed and readopted in April 1975, due to questions about the legal validity of the adoption of the 1956 zoning code.

Repeal and re-adoption, or substantial amendment, occurred again in 1981, 1989 and 1992-1993. The Planning and Zoning Commission was created on December 10, 1986. The City also adopted an ordinance in 1981 creating a

Board of Adjustment, which has since been renamed the Board of Zoning Appeals.

In 1975 City Council approved a Planned Residential Development (PRD) zoning district for the eastern, then undeveloped, end of the island. Today this area includes the gated resort community of Wild Dunes and several adjacent residential areas. The PRD was the first zoning agreement of its type in the State of South Carolina. Under the PRD zoning, the eastern end of the island was developed to include a wide variety of housing types: low to high density single-family detached units, townhouses, and low-rise and high-rise condominium multi-family units. Within the gated section of Wild Dunes many of the approximately 2,067 residential units (have Wild Dunes ARC verify new number) are used as seasonal rental properties. Wild Dunes also includes offices and conference facilities and various resort amenities.

In the PRD zoning district, the use, subdivision, and development of property is governed through deed restrictions enforced by the Wild Dunes Community Association. Several residential areas outside the gated Wild Dunes community, such as 57th Avenue and certain properties on 43rd through 45th Avenues, that are also zoned PRD and also governed by the Wild Dunes Community Association. In 2016 the area between 53rd and 56th was rezoned from PRD to SR3 and P-3, to account for the expiration of deed restrictions in this area and provide land use controls.

In 2000 the name of the zoning district for planned developments changed from Planned Residential District (PRD) to Planned Development District (PDD). The new designation more accurately describes the land use activities.

By 2022, the City created a Conservation- Recreation District (CR). The goal of this new district focuses on the future protection of current recreational land, preserve vital resources, scenic easements, and lessen any potential hazards to loss of property, life and public safety from flooding. This CR district now overlays parcels located in the northern most part of the island vulnerable to the effects of erosion and flooding.

Land Use Activity – Overview

Detached residential dwelling units represent the principal land use on the island. Medium and low-density dwellings are the most predominate form of housing. In 2023, 36% are owner-occupied with the remaining 64% being either second homes or rental units. While there are properties scattered throughout the island that contain two or three residential units, the major multiple unit complexes are located within either the “Front Beach” area or Wild Dunes.

Commercial development is limited in terms of the total island acreage. Less than 2% of the island is zoned commercial, excluding the resort amenities within the gated section of Wild Dunes. Commercial uses are primarily oriented to providing for the immediate needs of the local population and the resort/seasonal activities. Only a small portion of commercially zoned land remains undeveloped. Major shopping facilities are located off the island.

Public uses include those normally associated with a small community. City Hall houses the City Council, administration and the Building Department.

The Fire Department, Police Department, Recreation Department, and the Public Works Department are located in separate facilities. The Isle of Palms Water and Sewer Commission (separate from City Government) maintains an office building, a sewage treatment plant and various water storage/distribution facilities.

Municipal recreational uses include a City Recreation Center, a City Marina, a beachfront County Park, and two boat landings. Within the Wild Dunes complex are golf, tennis, and swimming facilities with publicly controlled access to the latter two amenities. Additionally, a private marina is located at Breach Inlet. The island is surrounded by water access opportunities inclusive of the ocean, beach and back creeks. Part of the island borders directly on the Intracoastal Waterway.

The island does not have any presence of industrial, agricultural, and mining activities. Due to a limited transportation system, the high demand for residential property, increasing land values, and the risks inherent on a barrier island, it is unlikely that these uses will occur in the future.

Plan Concept

In accord with the Vision Statement, the primary planning concept is that of “enhance the existing character of the island as a quality place to live and protect the environment both on and around the island” The existing development pattern, both in terms of the land use types and the geographic allocation of these uses, is viewed as being the desired future pattern. The objective of the plan is to preserve the existing land use relationships.

In order to preserve the island character, it is important to identify some of the underlying considerations:

1. The Comprehensive Plan is a statement defining a desired future. Zoning and other municipal regulations provide the implementation tools that allow the Plan to be achieved. The color-coded map in Appendix A is the Land Use Plan and the color-coded map in Appendix B is the current Zoning District Map. Both can be amended through procedures prescribed by law. The maps must always remain compatible and not in conflict.
2. The primary land use activity has been and should continue to be low and medium density residential uses.
3. The scale and density of new development and the expansion of existing development should not disrupt the neighborhood "family" atmosphere of the island.
4. The design of structures and the placement of these structures should maintain a sense of open space and utilize vegetation to soften the effects of impervious surfaces.
5. Dwelling units are rented to guests visiting the island and, within reason, this is an accepted practice. Each dwelling has a maximum occupancy level that is intended to limit activity to a level that is not disruptive to the neighborhood.
6. Commercial uses provide important services to the community. Some characteristics associated with commercial activity, such as traffic, parking, noise and light, can cause conflict with adjoining residential uses. Potential conflicts can be minimized through the use of good site design and buffers where appropriate. Parking for commercial uses should be accommodated on-site or in designated areas in close proximity to the business. On-street parking in areas not designated for parking is not a satisfactory solution.

7. The core of the City is generally defined as being the intersection of the IOP Connector and Palm Boulevard encompassing the major commercial, governmental and “Front Beach” areas. The most significant visual impression of the island occurs when one enters on the IOP Connector. It is important that the appearance of this core area continues to convey both civic image and commercial viability. Efforts to coordinate the continuity of design of both structures and the streetscape are deemed important to promote island identity.
8. It is recognized that the beach and other recreational opportunities on the island are of exceptional quality and draw many non-residents during peak periods. The City is responsible for their basic care and protection during their visit. As such, it is necessary to ensure that the public safety and other basic services are maintained commensurate with the increased demands.
9. Portions of the island are served by septic tank disposal systems. In some instances, these systems operate marginally and at certain times may be dysfunctional. It is important that these areas be identified and action taken to educate the owners about properly maintaining the septic systems or to provide public sewer. Areas with poor drainage should be considered as the first priority for the installation of public sewer.
10. The protection of the natural resources both on and around the island is of critical importance especially with respect to water quality. The preservation and enhancement of this asset requires increased sensitivity to the amount and nature of runoff that moves from the island into the water.
11. Periodic natural disasters occasionally occur. Local government will be faced with immediate demands for recovery and reconstruction. The Land Use Plan provides the guide for reconstruction. While temporary regulatory procedures may be required, the Plan and the underlying zoning codes should not be compromised during the reconstruction period.
12. The island fronts to the Atlantic Ocean, backs to the estuaries, and is subject to the forces of wind and wave. Much of the island is in flood zones established by the

federal government. The availability of flood insurance is directly tied to compliance with federally required building standards. It is important that strict compliance be maintained.

Key Issues

- Protection of the Public Health, Safety and Welfare.
- Ensure compatibility between the Comprehensive Plan and the regulatory ordinances.
- Appearance of the commercial and “Front Beach” areas.
- Ensure the adequacy of the infrastructure to support continued development, expanded uses and demands created by seasonal peaks.
- Preservation and protection of natural resources.

Goals and Implementation Strategies

Goal 7.1: Improve zoning regulations to protect the established character of the island.

Strategy 7.1.1: Make appropriate amendments to the zoning ordinance which reflect the goals and strategies of the Comprehensive Plan. (2008; Building Department and City Council)

Goal 7.2: Protect residential areas from adverse impacts of commercial development.

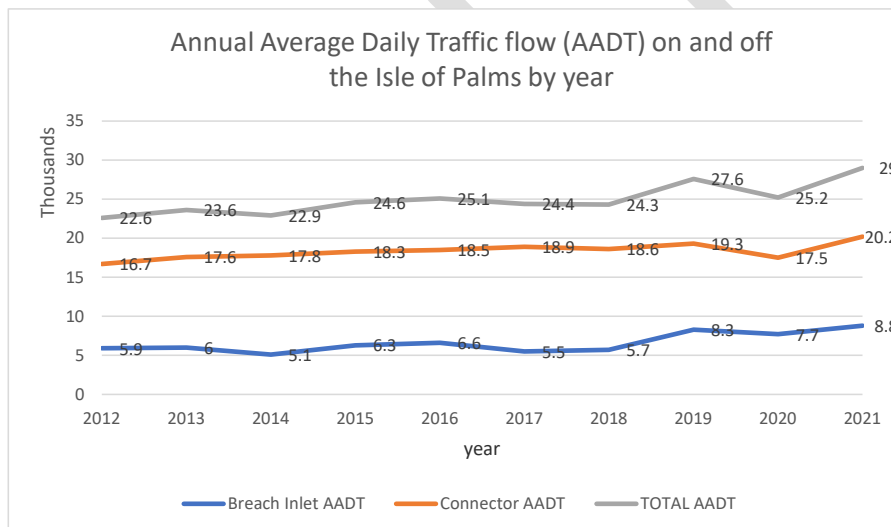
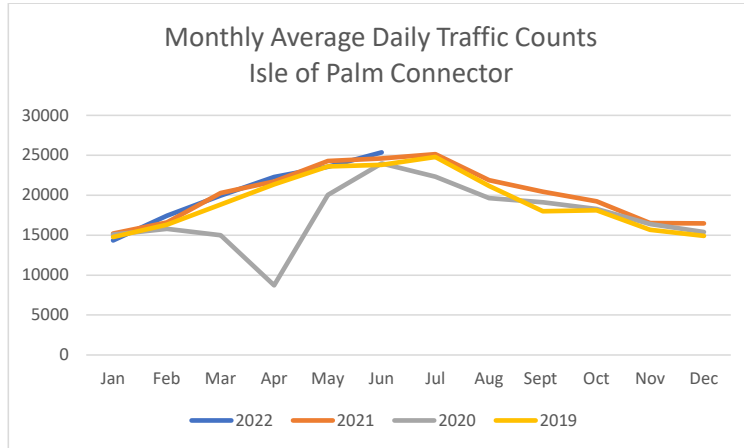
Strategy 7.2.1: Develop plans and policies which use public improvements to prevent or mitigate adverse impacts of commercial development upon residential properties. *(2008; Building Department and City Council)*

Goal 7.4: Ensure the adequacy of the infrastructure to support continued development and expanded uses.

Strategy 7.4.1: Evaluate and continue to improve the drainage system to alleviate the problems in those areas that drain poorly. *(Ongoing; Building Department and Public Works Department)*

TRANSPORTATION

The Isle of Palms is accessible by two routes. First, SC 703 connects the island to Sullivan's Island by way of the Breach Inlet bridge as well as Sullivan's Island to Mount Pleasant by way of the Ben Sawyer Intracoastal Waterway bridge. Second the Clyde M. Dangerfield Highway SC 517 (Isle of Palms Connector) provides a fixed span, direct connection to Mount Pleasant. The illustration below is based on the traffic counts coming on and off the island on the Connector from the years of 2019 to 2022. As expected, the traffic increases dramatically in the summer months as a result of seasonal visitors (additional traffic counts are available in Appendix C-1).



The total length of roads on the island is estimated to be 35 miles. Most roads outside Wild Dunes are under the jurisdiction of the SCDOT. The total miles of state roads on the island is estimated to be 21.75 miles. A few roads or sections of roads have been accepted by the City. Some roads, however, have never been formally accepted by any government jurisdiction. Roads within the Wild Dunes gates total 12 miles and are privately owned and maintained.

Maintenance for roads within the State system is provided through an agreement between Charleston County and the SCDOT. The City is responsible for Ocean Boulevard between 10th and 14th Avenues, 18th Avenue, part of Hartnett Boulevard, most of Forest Trail, the cul-de-sac on Pavilion Boulevard, and 27th, 28th, and 29th Avenues between Hartnett and Waterway Boulevards.

Currently, bikeways and sidewalks are provided in only a few areas outside Wild Dunes. These existing bikeway/sidewalk facilities are not interconnected and some are in need of repair. There is a recognized need to fund bikeways and sidewalks to facilitate non-vehicular traffic on the island to reduce vehicular/pedestrian/bike conflicts. Various projects have recently been undertaken in the Charleston area including the Battery-to-Beach bike route that connects the Isle of Palms to downtown Charleston and ultimately Folly Beach.

In the summer months, traffic on the island increases significantly and causes congestion. Rainstorms on a weekend afternoon can cause hours of gridlock and raises concerns about response time for Emergency Medical Services and other essential public safety needs. While this is a longstanding issue for the community, the problem has become more acute with the increased population of the Charleston area. The problems are predictable, measurable, and should be able to be lessened with proper adjustments to the roadways.

In June of 2015, the SCDOT approved a beach parking management plan that the City developed through a collaborative effort between the City Council, the Isle of Palms community, traffic engineers, City staff, and SCDOT. The goal of the plan was to strike a balance between the concerns of residents and the needs of beach visitors. Modifications to the island's parking facilities were made pursuant to the plan including the creation of beach parking areas close to the beach and resident only parking areas in the remaining areas of the island.

The City and SCDOT agreed in 2022 to initiate studies of the Isle of Palms Connector bridge and the Connector's corridor to identify alternatives, including lane configurations, that would allow traffic to flow more efficiently and provide safer facilities for cyclist and pedestrians.

In 2022 the Planning Commission held a series of meetings with a traffic consultant for the purpose of studying traffic related issues and identifying key projects or programs that could improve traffic flow on the island. The final presentation of that effort is included in Appendix D of this plan and several Goals and Implementation Strategies below were identified during these meetings.

Key Issues

- Improvements in transportation facilities.
- Planning for a parking system that would balance the needs of visitors and residents.

Goals and Implementation Strategies

Goal 8.1: Improve traffic flow and reduce congestion on the roadways of the island.

Strategy 8.1.1: Include funding in the 2023-2024 budget to initiate a comprehensive traffic study for the island to improve traffic flow and reduce congestion. This study should be done in close collaboration with the SCDOT staff to ensure the solutions that are developed can be implemented within their network. *(2023; Public Safety)*

Strategy 8.1.2: Evaluate the lane configuration of the Isle of Palms Connector to identify more efficient and safer alternatives (See consideration 1 in Appendix D). *(Ongoing; Public Safety)*

Strategy 8.1.3: Evaluate the intersection of the Isle of Palms Connector and Palm Boulevard to determine an alternative design

and/or phasing could increase operational efficiency (See consideration 2 in Appendix D). (2023; *Public Safety*)

Strategy 8.1.4: Evaluate the Charleston County Park and municipal parking lots traffic routing, payment, and ticketing to identify more efficient methods for ingress and egress (See consideration 3 in Appendix D). (2023; *Public Safety*)

Strategy 8.1.5: Evaluate providing real-time beach parking space availability data to the public to improve efficiency for ingress and egress for beach visitors (See consideration 6 in Appendix D). (2023?; *Public Safety*)

Strategy 8.1.6: Continually assess stop sign locations on the island to determine proper and legal placement. (*Ongoing; Public Works*)

Strategy 8.1.7: Ensure an adequate number of speed limit signs on all streets to encourage compliance and improve safety. (*Ongoing; General Government and Police Department*)

Strategy 8.1.8: Develop a plan to improve alternate modes of transportation on the island including bikeways, golf carts and low speed vehicle facilities and sidewalks while improving pedestrian safety. (2008; *Building Department and Recreation Department*)

Goal 8.2: Discourage non-resident parking and traffic in residential neighborhoods.

Strategy 8.2.1: Encourage appropriate measures including signs, traffic restrictions and parking restrictions. (*Ongoing; Police Department and City Council*)

Goal 8.3: Improve accuracy of data collection related to traffic patterns.

Strategy 8.3.1: Encourage appropriate measures to collect accurate traffic counts including the installation of new hardware at the key points of ingress and egress of the island. (*Ongoing; Police Department and City Council*)

PRIORITY INVESTMENT

As required by the Priority Investment Act of 2007, an analysis of upcoming projects and likely federal, state and local funds available for these projects was conducted. Projects can include roads, parks, government facilities, pathways, drainage and stormwater infrastructure improvements, or beach renourishment.

Overview

In creating this element of the Comprehensive Plan, the Planning Commission began by assembling a list of all capital improvement projects listed or referenced throughout all elements of this plan.

The Commission also reviewed the current practice of developing the 10-Year Capital Improvement Plan (Ten-Year CIP) and identified that Plan as the key document to tie to this element.

The current process for creating the Ten-Year CIP involves the City staff and Committees of Council reviewing initiatives and prioritizing expenditures based on need, anticipated funds, staff to manage projects, funding sources, project seasonality, and organizational prioritization. The Ten-Year CIP is reviewed and modified on an annual basis and approved as

part of the fiscal planning cycle. This process is well-established and has been successful for the City.

In the goals and strategies section of this plan, there are suggestions on how this process might be improved by having the Planning Commission review the status of projects identified in this element and compared against the draft Ten-Year CIP to ensure the two are aligned.

Funding

A summary of the traditional revenue sources are shown in the chart below. Most of the revenue for the City comes from property taxes (25%), building permits and business/ rental licenses (22%) and accommodations taxes (19%).

In addition to these three major sources of funding, the following are other common revenue sources for the City:

Beach Preservation Fee....

Bond Proceeds....

Hospitality Tax....

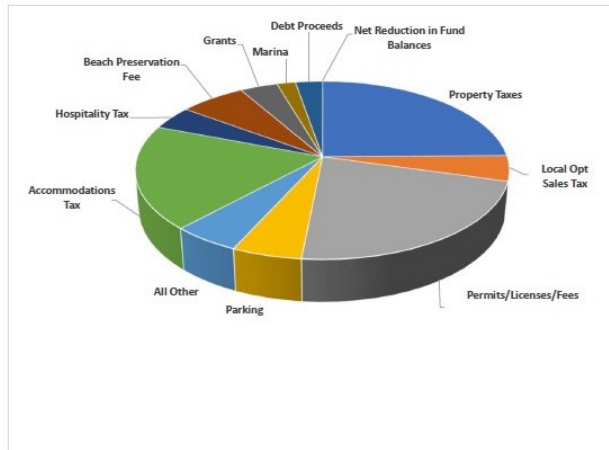
Fund Balance....

Local Option Sales Tax....

Parking Fees....

Marina....

Debt Proceeds....



FY 2022 Revenue Summary - All Funds		
Property Taxes	4,806,000	25%
Local Opt Sales Tax	895,000	5%
Permits/Licenses/Fees	4,307,000	22%
Parking	1,019,250	5%
All Other	992,484	5%
Accommodations Tax	3,672,663	19%
Hospitality Tax	835,800	4%
Beach Preservation Fee	1,274,663	7%
Grants	726,000	4%
Marina	360,081	2%
Debt Proceeds	525,000	3%
Net Reduction in Fund Balances	-	0%
Total Revenues + Use of Fund Bal	19,413,940	100%

Outside of these common revenue sources, the City will need to look at less traditional funding sources to accomplish the goals established in this plan. It is expected more grants funds could become available than have traditionally been and the City should position itself to take advantage of those funds. Specific funds that could be targeted include:

U.S. Department of Commerce, Economic Development Administration (EDA)- In April of 2018, a notice of funding opportunity was issued by EDA for Disaster Supplemental Funds related to the many disasters that occurred in recent years. This funding is for **\$587M** in grants to assist communities in TX, LA, FL, GA, SC, PR, & VI. These funds are available until they are all spent. Regionally, the Atlanta office, which serves SC, was allocated **\$147,362,000** of the \$587M.

Federal Emergency Management Agency (FEMA), Pre-Disaster Mitigation Program (FEMA PDM)- On August 21, 2018, FEMA released the Notice of Funding Opportunity for the 2018 Pre-Disaster Mitigation Program (PDM). This funding is a national competition, so any project submitted must successfully compete against other projects submitted from

all over the United States. (Note: The City of Isle of Palms and the Isle of Palms Water and Sewer Commission successfully received funding under this program several years after Hurricane Hugo.) The funding is for \$150M in grants spread among all 50 states and territories. PDM grants are awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

FEMA- Building Resilient Infrastructure and Communities (BRIC)

Building Resilient Infrastructure and Communities (BRIC) will support states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC is a new FEMA pre-disaster hazard mitigation program that replaces the existing Pre-Disaster Mitigation (PDM) program.

Department of Housing and Urban Development (HUD) Urban Entitlement, Funding Grant Administered by Charleston County- In approximately December or early January each year, Charleston County publicly notices the availability of funds under this program. These are funds appropriated by Congress and then allocated to the States and administered by Charleston County.

South Carolina Rural Infrastructure Authority (RIA)- The South Carolina Rural Infrastructure Authority operates both grant and loan programs which may be used for water, wastewater and drainage. Grants are for basic infrastructure or Economic Development Infrastructure and information disseminated for FY18 showed \$25,000,000 in funds available.

Place holder for other grants- County road grants are missing here including the Charleston Area Transportation Study (CHATS) and Transportation Sales Tax (TST)

Priority Investment list and potential funding sources

Install new and repair existing stormwater infrastructure

Because the island is relatively low in elevation and prone to drainage problems, the City will need to identify the most problematic drainage areas and find solutions to move stormwater to the appropriate outfalls. In the Public Facilities element of this plan, several drainage projects are

identified. In addition to these projects, many other areas drain poorly, which should be addressed by future drainage projects.

Synopsis of issue and potential funding source- to be added.

Install sewer lines to every property not currently served

Installation of public sewers in areas served by septic systems and having marginal soils should be considered a priority for future projects. Specifically, septic tank systems in the areas near the beach between 42nd 53rd Avenues, adjacent to the Recreation Center from 26th to 29th Avenues and in low areas of the Forest Trail subdivision are affected by flooding and seasonal high water and would benefit from public sewer service.

Synopsis of issue and potential funding source- to be added.

Renourish beach

Synopsis of issue and potential funding source- to be added.

Underground electrical lines

Synopsis of issue and potential funding source- to be added.

Because many of the projects included in this element are roadway and drainage improvements, they could be funded by the Charleston County RoadWise program. Other infrastructure projects will probably need to be funded in a traditional manner because the Isle of Palms does not qualify as low-income, making grant money unlikely.

A large portion of the City's electrical distribution service, which is provided by South Carolina Electric and Gas, is provided through lines running above ground. It would be desirable from a maintenance and appearance standpoint to have all of the lines transferred to an underground distribution system.

Providing a safe and efficient system for cyclists, pedestrians, golf carts and low speed vehicles to circulate the island will reduce roadway congestion and parking problems and should be a priority.

Key Issues

- Improve transportation and drainage facilities
- Improve public health by extending the public sewer system to areas service by septic systems in marginal soils

Goals and Implementation Strategies

Goal 9.1: Improve drainage in those areas that drain poorly.

Strategy 9.1.1: Identify problem areas and appropriate funding sources.

Goal 9.2: Improve traffic flow and reduce congestion on the roadways of the island.

Strategy 9.2.1: Expand the system of bike lanes and walking paths.

Goal 9.3: Improve public health by extending the public sewer system to areas service by septic systems in marginal soils.

Strategy 9.3.1: Identify problem areas and appropriate funding sources.

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APPENDIX A: Summary of Meetings

1998 Update

- | | |
|----------|--|
| 8/2/93 | Discussed idea of updating the island's Comprehensive Plan. |
| 9/20/93 | Discussed outline of plan and types of information needed. |
| 11/22/93 | Discussed land use, transportation, parking, recreation, and public safety issues. |
| 12/8/93 | Discussed land use and other issues and made recommendations. |

- 7/13/94 Revisited the issue of updating the island's Comprehensive Plan with the Commission which included four new members.
- 9/28/94 Work session to discuss each of the seven elements of a comprehensive plan as listed in the new state enabling legislation.
- 10/26/94 Work session including presentations by Police Department and Water and Sewer Commission.
- 12/1/94 Work session including presentation by IOP Public Works Department, Chief Building Official and City Administrator.
- 12/14/94 Work session by County Public Works Department on road and drainage maintenance.
- 2/2/95 Work session including presentation by Charleston County Parks and Recreation Commission on proposed park.
- 5/24/95 Work session including presentations by the Recreation Department and Councilmember Allen, and the Charleston Area Convention and Visitors Bureau.
- 6/28/95 Work session with Earl Hewlette of Destination Wild Dunes, Janice Ashley and Lori Bennett, the incoming and outgoing presidents of the Commerce Association, respectively, and John Darby, Vice President of the Beach Company.
- 7/26/95 Work session with Debra Hernandez of the Office of Ocean and Coastal Resource Management and Ed Haselden, Chief Building Official and Zoning Administrator for the Isle of Palms.
- 8/23/95 Work session with Robert Clark of the SC Department of Transportation and Police Chief Tommy Buckannon.
- 9/27/95 Work session to discuss the Wild Dunes PRD and other aspects of the current Zoning Ordinance.

- 10/25/95 Work session with attorney Roy Bates to get a legal overview of the “planned residential district” type of zoning and the island’s PRD zoning district in particular.
- 11/26/95 Work session to continue discussions of the PRD district and other aspects of the Zoning Ordinance and land use map.
- 1/31/96 Work session to review the January 28, 1996 draft of the Comprehensive Plan.
- 2/28/96 Work session to review the February 24, 1996 draft of the Comprehensive Plan.
- 3/13/96 Review of the March 4, 1996 draft of the Comprehensive Plan following the regular meeting.
- 3/27/96 Review of March 21, 1996 draft of the Comprehensive Plan and future land use map referenced in Strategy 1.4 of the Land Use section. The Commission agreed to give final review to the revisions to this draft and the recommended future land use map at their April 10, 1996 regular meeting.
- 4/10/96 Review of the April 2, 1996 draft and future land use map changes. The Commission agreed to refer this draft and future land use map to City Council with request for a joint meeting of the City Council and Commission at which the Commission would present the plan to Council.
- 7/10/96 Public hearing on April 19, 1996 draft of plan before the Planning Commission.
- 7/30/96 The Planning Commission reviewed all comments received in writing and at the July 10, public hearing and agreed upon all changes to the April 19, 1996 draft.
- 8/14/96 The Planning Commission reviewed the final copy of the Comprehensive Plan and referred it to the City Council for adoption.

- 9/11/96 The Planning Commission agreed upon revisions to the plan concerning changes to the PRD zoning district.
- 12/11/97 The Planning Commission agreed upon revisions to the plan concerning the sewerage of the island.
- 2/20/97 The Planning Commission agreed upon revisions to water quality section and the goals and implementation strategies concerning water quality.
- 3/3/97 A special meeting of City Council and the Planning Commission was held to introduce the Council to the Plan and explain the process of preparing and adopting the plan.
- 3/20/97 A special meeting of City Council and the Planning Commission was held to begin a page-by-page review of the plan.
- 5/14/97 A special meeting of City Council and the Planning Commission was held to continue the review of the plan.
- 6/11/97 The Planning Commission reviewed revision suggested during the Commission's work session with City Council and adopted a resolution recommending the Comprehensive Plan and Future Land Use Plan to City Council for adoption.
- 10/28/97 Public hearing on the June 11, 1997 draft of plan before City Council.
- 12/ /97 City Council adopts the June 11, 1997 Comprehensive Plan and Future Land Use Plan with the exception of implementation time frames which are to be recommended to the Council by the Planning Commission for their adoption.
- 3/11/98 The Planning Commission reviewed the proposed time frames for implementing strategies contained in the plan and approved a resolution recommending the Comprehensive Plan and Future Land Use Plan, as revised by the addition of implementation time frames, to City Council for final adoption.

2004 Update

- 6/13/01 The Planning Commission discussed the 1994 Planning Legislation's requirement to review the plan every five years and agreed to begin the review.
- 7/18/01 The Planning Commission discussed the confusion of the Wild Dunes PDD; as well as the need for new statistics for review (Census, SCDOT traffic counts and County Assessor's Office data).
- 9/12/01 Commission member Dick Cronin reported on findings of the PDD issues.
- 11/14/01 The Commission reviewed and discussed the statistics relating to the Population Element.
- 1/23/02 The Commission held a workshop with the BCD Council of Government to discuss their possible involvement in the review or drafting of the plan.
- 2/13/02 The Commission held a workshop with the Director of the Recreation Department, Norma Jean Page, to discuss the Cultural Resources Element. They also reviewed a draft of the Community Facilities Element.
- 3/13/02 The Commission reviewed public safety issues and the Community Facilities and Cultural Resources Elements of the plan.
- 4/10/02 The Commission discussed statistics relating to the Housing Element and general trends noticed in the housing market.
- 5/8/02 The Commission discussed amendments to the Housing and Natural Resources Elements of the plan.
- 11/11/02 The Commission discussed amendments to the Land Use Element of the plan.

- 1/8/03 The Commission discussed amendments to the Land Use Element of the plan.
- 2/12/03 The Commission held a brainstorming session on the Economic Element of the plan.
- 3/12/03 The Commission held a work session with Fire Chief Ann Graham to discuss EMS needs on the island and related public safety issues.
- 4/16/03 The Commission agreed to send the draft plan to the Council of Governments for their review and asked for a legal opinion on whether or not the amount of re-drafting constituted a review of the plan or an update.
- 7/9/03 The Commission discussed the revisions to the plan suggested by the Council of Governments.
- 10/15/03 The Commission held a workshop with City Council to explain the changes that the Commission was recommending and gather feedback from Council members.
- 11/19/03 The Commission reviewed comments, written and oral, made by City Council members during and after the workshop.
- 1/14/04 The Commission reviewed the draft changes to the plan with particular attention given to the repetition of issues.
- 2/11/04 The Commission reviewed the draft plan and agreed to advertise a public hearing for the plan in April 2004.
- 3/10/04 The Commission reviewed the revised Land Use Map prepared by Charleston County Planning Department.
- 4/14/04 The Commission reviewed the final draft of the plan and passed a resolution to recommend the adoption of the plan by City Council.

2008 Review

- 4/9/08 The Planning Commission discussed the 1994 Planning Legislation's requirement to review the plan every five years and agreed to begin the review.
- 5/14/08 The Planning Commission went through each element and agreed that the plan should be reviewed and did not need to have a full update. 8/13/08 The Planning Commission met and discussed the newly required Priority Investment Element.
- 9/10/08 The Planning Commission met and reviewed the plan in its entirety and discussed the newly required Priority Investment Element.
- 10/8/08 The Planning Commission met and agreed to add the development of a parking management plan as a strategy in the Community Facilities Element.
- 11/12/08 The Planning Commission met discussed EMS response and how to improve the description of this in the Plan.
- 1/21/09 The Planning Commission recommended the amended document be adopted by City Council.
- 8/12/09 The Planning Commission recommended that the title of the document be changed to the "Amended Comprehensive Plan".
- 2015 Update*
- 3/20/13 The Planning Commission discussed the fact that a new census had been completed since the last review of the plan. The census showed that the population had decreased slightly and the number of housing units had increased slightly. The Commission reviewed the Vision Statement and the Population Element of the Plan.
- 4/10/13 The Planning Commission reviewed and edited the Population and Economic Elements.
- 5/8/13 The Natural Resources Element was discussed. Information regarding erosion and loggerhead turtles was added.

- 6/12/13 The Planning Commission discussed the Cultural Resources Element of the plan and agreed that the Plan should better describe the events and services offered by the City's Recreation Department.
- 7/10/13 The Community Facilities Element was discussed and the Commission agreed to elaborate on the electrical distribution system and the additional transmission line that is being added and highlight efforts to place lines underground.
- 8/14/13 The Planning Commission discussed the Housing Element of the Plan. Particular attention was paid to the effects of the Biggert-Waters Act.
- 9/11/13 The Land Use Element of the Plan was discussed. It was noted that the Plan had excessive information about the areas that are controlled by Wild Dunes, but outside of the gate and edits were suggested. The Commission also agreed to eliminate strategies dealing developing a GIS system as Charleston County was providing this service.
- 10/9/13 The Planning Commission discussed the Transportation Element of the Plan and agreed to expand the strategies involving alternate modes of transportation to include golf carts and low speed electric vehicle. Particular attention was paid to the traffic count graphs included in the plan.
- 11/13/13 The Transportation Element and the Priority Investment Elements of the Plan were discussed. It became apparent that the traffic counts being collected were inaccurate and therefore the data included in the plan should be deleted as it would be outdated and not useful.
- 4/30/15 A joint workshop was held with the Planning Commission and the City Council to discuss the proposed amendments to the Plan.

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**APPENDIX B:
List of Sources**

Clemson Study, May 1987

1989 & 1993 Isle of Palms Comprehensive Plan

U.S. Census

1990 Housing Atlas, Berkeley- Charleston- Dorchester Council of Governments

Metropolitan Charleston 1990-2015, Planning for Change, BCD Council of Governments, Spring 1995

Stormwater management System, Isle of Palms Flood Plain Management Study, U.S. Soil Conservation Service, June 1990

Isle of Palms Local Comprehensive Beach Management Plan, 1993

OCRM non-point source pollution study, 1994

Charleston Convention and Visitors Bureau

Wild Dunes Community Association Residential Status Report

Comprehensive Planning Guide for Local Governments, Municipal Association of South Carolina, August 2001