AGENDA

TOWN OF NAGS HEAD BOARD OF COMMISSIONERS
NAGS HEAD MUNICIPAL COMPLEX - BOARD ROOM

WEDNESDAY, MAY 6, 2020; 9:00 A.M.
REGULAR SESSION

In order to view and listen to the Board meeting remotely, please register here:

https://nagsheadnc.zoom.us/webinar/register/WN_X3rSOv97QACYiHGinxB1Qw

Please email your comments for the Public Comment portion or for the Public Hearings here: publiccomment050620@nagsheadnc.gov

(Emailed comments will also be accepted during the Board meeting until the end of

the Public Comment portion of the meeting or up until each Public Hearing is closed)

Comments should include your name and address and

Should be limited to five minutes when read aloud.

If you would like to participate in any of the Public Hearings, please contact Carolyn F Morris at carolyn.morris@nagsheadnc.gov or at 252-449-2009 until 9 am on May 6, 2020

(The town will provide a means to participate in the meeting remotely using video conferencing software)

If you need special accommodations, please contact Carolyn F Morris

A. CALL TO ORDER / PLEDGE OF ALLEGIANCE

B. ADOPTION OF AGENDA

C. PUBLIC COMMENT

1. Proclamation Declaring May 10 - 16, 2020 Police Week

   Documents:

   5 C POLICE WEEK PROC SUMMARY.PDF
   5 C POLICE WEEK PROC.PDF

D. CONSENT AGENDA

1. Consideration Of Tax Adjustment Report

   Documents:

5 D1 TAX ADJUST REPORT SUMMARY.PDF
5 D1 TAX ADJUSTMENT MSD.PDF
5 D1 TAX ADJUSTMENT TOWN-WIDE.PDF

2. Request For Public Hearing To Consider Citizen Comment
   on the Town Manager's proposed operating budget for July 1, 2020 – June 30, 2021, proposed CIP requests for FY 20/21 through FY 24/25, and updated Consolidated Fee Schedule

   Documents:

   5 D3 RPH BUDGET CITIZEN COMMENT SUMMARY.PDF

3. Request For Public Hearing To Consider A Text Amendment
   to the UDO submitted by Kim Cowen and Megan Dixon to allow "Tutoring Facility/Learning Center" as a permitted use within the C-2, General Commercial Zoning District

   Documents:

   5 D4 RPH LEARNING CENTER TEXT AMEND SUMMARY.PDF

E. PUBLIC HEARINGS

1. Public Hearing To Consider A Text Amendment
   to the Unified Development Ordinance submitted by a property owner to expand the principal sale items from outdoor stands to include reservations and tickets for events/activities

   Documents:

   5 E1 PH OUTDOOR STANDS SUMMARY.PDF
   5 E1 PH OUTDOOR STANDS PN.PDF
   5 E1 PH OUTDOOR STANDS MEMO ORD.PDF

2. Public Hearing To Consider A Text Amendment To The Unified Development Ordinance To Correct Identified Errors

   Documents:

   5 E2 PH UDO CORRECTIONS SUMMARY.PDF
   5 E2 PH UDO CORRECTIONS PN.PDF
   5 E2 PH UDO CORRECTIONS MEMO.PDF
   5 E2 PH UDO CORRECTIONS ORD.PDF

3. Public Hearing To Consider Numerous Text Amendments
   to the Unified Development Ordinance as it pertains to the updated flood maps and update of the Flood Damage Prevention Ordinance

   Documents:

   5 E3 PH FLOOD DAMAGE PREV ORD SUMMARY.PDF
   5 E3 PH FLOOD DAMAGE PREV ORD MEMO.PDF
   5 E3 PH FLOOD DAMAGE PREV ORD PLNG BD MTG PRES.PDF
   5 E3 OBX HOMEBUILDERS COMMENTS ON ORDINANCE.PDF
   5 E3 PH FLOOD DAMAGE PREV ORD.PDF

F. REPORTS AND RECOMMENDATIONS FROM THE PLANNING BOARD AND THE PLANNING AND DEVELOPMENT DIRECTOR

1. Update From Planning Director

   Documents:

   5 F1 PLNG DIRECTOR UPDATE SUMMARY.PDF
   5 F1 PLNG DIRECTOR UPDATE MEMO.PDF

2. Consideration Of A Major Site Plan For Gone Coastal Shopping Center
   7531 S Virginia Dare Trail, submitted by Jim and Stephanie Selckmann
   THE APPLICANT HAS REQUESTED A CONTINUANCE TO THE JUNE 3, 2020 BOC MEETING

3. Continued Consideration Of A Preliminary Plat For A Major Subdivision, Known As Coastal Villas,
   for an approximately 9.86 acre property, zoned R-2, Medium Density Residential, owned by Nags Head Construction (Applicant), located on the west side of US 158, approximately 300 feet south of the intersection of W. Soundside Road and US 158 (Parcel # 006749004; PIN # 989108886987); the revised Preliminary Plat proposes to create 17 lots, along with an associated street and other required improvements
   THE APPLICANT HAS REQUESTED A CONTINUANCE TO THE JUNE 3, 2020 BOC MEETING

G. OLD BUSINESS TABLED FROM PREVIOUS MEETINGS

1. From Mar 4th Board Meeting
   Beach Nourishment Coastal Engineering and Design Services presentation from Moffatt & Nichol

   Documents:

   5 G1 MOFFAT NICHOL PRES SUMMARY.PDF
   5 G1 MOFFAT NICHOL PRES MEMO.PDF
   5 G1 MOFFAT NICHOL PRES.PDF
   5 G1 MOFFAT NICHOL PROPOSAL.PDF
   5 G1 MCKIM CREED BEACH SURVEYING QUALIFICATIONS.PDF

2. From Apr 15th Board Meeting - Discussion Of 2020 Fireworks

   Documents:

   5 G2 FIREWORKS 2020 SUMMARY.PDF

3. From Apr 15th Board Meeting – Discussion Of Status Of Recycling Program

   Documents:

   5 G3 RECYCLING STATUS SUMMARY.PDF
   5 G3 RECYCLING STATUS MEMO.PDF

H. NEW BUSINESS

1. COMMITTEE REPORTS

   Documents:

5 H1 COMMITTEE REPORTS SUMMARY.PDF

2. Consideration Of Board/Committee Appointments

Documents:

5 H2 APPOINTMENTS SUMMARY.PDF
5 H2 CURRENT - PLANNING BD.PDF
5 H2 CANDIDATE - PLANNING BD.PDF
5 H2 CURRENT - BOA.PDF
5 H2 CANDIDATE - BOA.PDF
5 H2 CURRENT - PGP.PDF
5 H2 CURRENT FIREMENS RELIEF.PDF

I. ITEMS REFERRED TO AND PRESENTATIONS FROM TOWN ATTORNEY

J. ITEMS REFERRED TO AND PRESENTATIONS FROM TOWN MANAGER

1. Update On Plans For Summer 2020
   re: tents on the beach, lifeguards, and enforcement of social distancing on the beach

Documents:

5 J1 TM UPDATE ON BEACH PLANS SUMMARY.PDF
5 J1 TM UPDATE ON BEACH PLANS MEMO.PDF
5 J1 TM UPDATE ON BEACH PLANS SOCIAL DISTANCE SIGN.PDF

K. BOARD OF COMMISSIONERS AGENDA

L. MAYOR'S AGENDA

1. Future Town Envision

Documents:

5 L1 MAYOR ENVISION THE TOWN SUMMARY.PDF

M. OTHER BUSINESS

N. ADJOURNMENT

O. FULL AGENDA In .PDF Format With Bookmarks

Agenda Item Summary Sheet

Item No: **C**
Meeting Date: **May 6, 2020**

Item Title: Public Comment Period

Consideration of Proclamation proclaiming May 10 – 16, 2020 Police Week

Item Summary:

The attached proclamation declaring May 10 – 16, 2020 as Police Week is provided for your approval on May 6th. Police Chief Phil Webster presented the proclamation for inclusion on this agenda.

Number of Attachments: 1

Specific Action Requested:

Provided for Board approval/adoption.

Submitted By: Administration Date: April 28, 2020

Finance Officer Comment:

N/A

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

N/A

Signature: Cliff Ogburn Date: April 28, 2020

Proclamation for National Police Week

WHEREAS, The Congress and President of the United States have designated May 15th as Peace Officers' Memorial Day, and the week in which May 15th falls is National Police Week; AND

WHEREAS, The members of the Nags Head Police Department play an essential role in safeguarding the rights and freedoms of the residents and visitors of the Town of Nags Head; AND

WHEREAS, It is important that all citizens know and understand the duties, responsibilities, hazards, and sacrifices of their law enforcement agency, and that members of our law enforcement agency recognize their duty to serve the people by safeguarding life and property, by protecting them against violence and disorder, and by protecting the innocent against deception and the weak against oppression; AND

WHEREAS, The men and women of the Nags Head Police Department unceasingly provide a vital public service; AND

WHEREAS, Let each of us take the time to reflect on the ultimate sacrifice Sgt. Earl Murray, Jr. made for the Town of Nags Head on May 15, 2009 and the rest of the officers that have done so nationwide. And let each of us keep their family, friends, and all fellow officers in our thoughts and prayers.

NOW, THEREFORE, the Nags Head Board of Commissioners calls upon all citizens of the Town of Nags Head and upon all patriotic, civic, and educational organizations to observe the week of May 10 - 16, 2020 as Police Week with appropriate ceremonies and observances in which all our people may join in commemorating law enforcement officers, past and present, who, by their faithful and loyal devotion to their responsibilities, have rendered a dedicated service to their community and, in so doing, have established for themselves an enviable and enduring reputation for preserving the rights and security of all citizens.

THEREFORE, we do hereby proclaim the week of May 10 - 16, 2020, as Police Week and call upon all citizens of Nags Head to observe the 15th day of May 2020, as Peace Officers' Memorial Day in honor of those law enforcement officers who, through their courageous deeds, have made the ultimate sacrifice in service to their community or have become disabled in the performance of duty, and let us recognize and pay respect to the survivors of our fallen heroes.

This the 6th day of May 2020.

_____
Benjamin Cahoon, Mayor
Town of Nags Head

ATTEST

_____
Carolyn F. Morris, Town Clerk

Agenda Item Summary Sheet

Item No: **D-1**
Meeting Date: **May 6, 2020**

Item Title: Consideration of Tax Adjustment Reports

Item Summary:

Attached please find the list of adjustments to the 2019 Tax Levy (per information received from Dare County) for Property and for MSD valuations.

These reports are submitted for your approval at the May 6th Board of Commissioners meeting.

Number of Attachments: 2

Specific Action Requested:

Tax reports provided for Board review and approval.

Submitted By: Linda Bittner, Tax Collector Date: April 28, 2020

Finance Officer Comment:

No unbudgeted fiscal impact.

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

I concur with staff.

Signature: Cliff Ogburn Date: April 28, 2020

Town of Nags Head, North Carolina
ANALYSIS OF CURRENT 2019 MSD TAX LEVY
As of April 30, 2020 for the May 6, 2020 BOC Mtg

	BEACH NOURISHMENT DISTRICT				
	MSD Valuation	Rate	Total Levy	MSD Excluding Registered Motor Vehicles	Registered Motor Vehicles
Original MSD Levy:					
MSD Beach Nourishment at current year's rate	809,869,299	0.00175	1,417,272.90	1,417,272.90	
Registered Motor Vehicles at current year's rate	1,372,061.00	0.00175	2,387.29		2,387.29
Registered Motor Vehicles at 2018 year's rate	754,172.00	0.00175	1,319.80		1,319.80
Registered Motor Vehicles at 2017 year's rate	66,748.00	0.00175	116.81		116.81
Penalties			0.00	0.00	
Total	**812,062,280**		**1,421,096.80**	**1,417,272.90**	**3,823.90**
Discoveries & Adjustments:					
Current year discoveries & adjustments	0.00		0.00	0.00	
Town wide beach nourishment			0.00	0.00	
Penalty Discoveries			0.00	0.00	
Total			**0.00**	**0.00**	
Releases & Adjustments:					
Current year releases & adjustments	0.00		0.00	0.00	
Town wide beach nourishment			0.00	0.00	
Penalty Releases			0.00	0.00	
Total			**0.00**	**0.00**	
Write-offs or Adjustments:			0.00	0.00	
Total MSD Valuation	**812,062,280**				
Net levy		**1,421,096.80**		**1,417,272.90**	**3,823.90**
TOTAL UNCOLLECTED MSD AS OF 04/30/20:		**(3,891.44)**		**(3,891.44)**	**0.00**
CURRENT YEAR MSD COLLECTED:		**1,417,205.36**		**1,413,381.46**	**3,823.90**
CURRENT MSD COLLECTION PERCENTAGE:		**99.726%**		**99.725%**	**100.000%**

Town of Nags Head, North Carolina
ANALYSIS OF CURRENT 2019 TAX LEVY
As of April 30, 2020 for the May 6, 2020 BOC Mtg

	Town-Wide Tax			Total Levy	
	Property Valuation	Rate	Total Levy	Property Excluding Registered Motor Vehicles	Registered Motor Vehicles
Original levy:					
Property taxed at current year's rate	2,383,436,490	0.00317	7,555,496.64	7,555,496.64	
Registered Motor Vehicles at current year's rate	24,945,401.00	0.00317	78,358.14		78,358.14
Registered Motor Vehicles at 2018 year's rate	9,488,179.00	0.00307	29,128.71		29,128.71
Registered Motor Vehicles at 2017 year's rate	69,970.00	0.00297	207.81		207.81
Registered Motor Vehicles at 2015 year's rate	(2,011.00)	0.00267	(5.37)		(5.37)
Penalties			5,460.81	5,460.81	
Total	**2,417,938,029**		**7,668,646.74**	**7,560,957.45**	**107,689.29**
Discoveries & Adjustments:					
Current year discoveries & adjustments tax	1,686,283.00		4,309.89	4,309.89	
Town wide beach nourishment tax			455.29	455.29	
Corporate Utilities discoveries & tax	22,078,064.00		64,026.38	64,026.38	
Corporate Utilities beach nourishment tax			5,961.09	5,961.09	
Penalty Discoveries			2,075.47	2,075.47	
Total	**23,764,347**		**76,828.12**	**76,828.12**	
Releases & Adjustments:					
Current year releases & adjustments	(309,694.00)		(898.12)	(898.12)	
Town wide beach nourishment			(83.60)	(83.60)	
Penalty Releases			(574.94)	(574.94)	
Total	**(309,694)**		**(1,556.66)**	**(1,556.66)**	
Write-offs or Adjustments:			0.00	0.00	
Total Property Valuation	**2,441,392,682**				
Net levy		**7,743,918.20**		**7,636,228.91**	**107,689.29**
Uncollected Taxes		(33,079.57)		(33,079.57)	0.00
Uncollected Town Wide Beach Nourishment		(3,066.39)		(3,066.39)	0.00
TOTAL UNCOLLECTED TAXES AS OF 04/30/20:		**(36,145.96)**		**(36,145.96)**	**0.00**
CURRENT YEAR TAXES COLLECTED:		**7,707,772.24**		**7,600,082.95**	**107,689.29**
CURRENT LEVY COLLECTION PERCENTAGE:		**99.533%**		**99.527%**	**100.000%**

Agenda Item Summary Sheet

Item No: **D-3**
Meeting Date: **May 6, 2020**

Item Title: Request for Public Hearing to consider citizen comment on the Town Manager's proposed operating budget for July 1, 2020 – June 30, 2021, proposed CIP requests for FY 20/21 through FY 24/25, and updated Consolidated Fee Schedule

Item Summary:

Request that a Public Hearing be scheduled for the June 3rd Board of Commissioners meeting to consider citizen comment on the following:

- Town Manager's proposed operating budget for fiscal year July 1, 2020 – June 30, 2021,
- Proposed Capital Improvement Program (CIP) requests for FY 20/21 through FY 24/25, and
- Updated Consolidated Fee Schedule

Number of Attachments: 0

Specific Action Requested:

Schedule Public Hearing for the June 3, 2020 regular Board meeting.

Submitted By: Administration Date: April 28, 2020

Finance Officer Comment:

No unbudgeted fiscal impact.

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

N/A

Signature: Cliff Ogburn Date: April 28, 2020

Agenda Item Summary Sheet

Item No: **D-4**
Meeting Date: **May 6, 2020**

Item Title: Request for Public Hearing to consider a text amendment to the Unified Development Ordinance to allow "Tutoring Facility/Learning Center" as a permitted use within the C-2, General Commercial Zoning District

Item Summary:
Kim Cowen and Megan Dixon have submitted a text amendment request to the Unified Development Ordinance which, if adopted, would permit "Tutoring Facility/Learning Center" as a permitted use within the C-2, General Commercial Zoning District. The applicants would like to offer tutoring, both part- and full-time, to registered homeschooled children, ages 6 and up.

Staff Recommendation/Planning Board Recommendation
Planning staff finds that the proposal is consistent with the 2017 Comprehensive Land Use Plan and the desire to encourage land uses that serve the needs of both year-round and seasonal residents in support of the town's overall vision for the community. Staff would recommend that the use be listed under the *Service* category in the Table of Uses and Activities and be defined as follows:

Tutoring Facility/Learning Center means a private, for profit or non-profit, use for the instruction of students in subjects and materials commonly taught in primary and secondary schools, for test preparation, or the teaching music and visual arts.

Staff recommends adoption of the proposed amendment as presented. At their April 21, 2020 meeting the Planning Board voted unanimously to recommend adoption of the text amendment as presented.

Number of Attachments: 1

Specific Action Requested:

Schedule the Public Hearing.

Submitted By: Planning and Development Date: April 23, 2020

Finance Officer Comment:

N/A

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

N/A

Signature: Cliff Ogburn Date: April 28, 2020

(DRAFT)
AN ORDINANCE AMENDING THE CODE OF ORDINANCES
OF THE TOWN OF NAGS HEAD, NORTH CAROLINA PERTAINING TO PROPOSED NEW USE
"TUTORING FACILITY/LEARNING CENTER"

ARTICLE I. Purpose(s) and Authority.

WHEREAS, pursuant to N.C.G.S. § 160A-381, the Town of Nags Head (the "Town") may enact and amend ordinances regulating the zoning and development of land within its jurisdiction and specifically the location and use of buildings, structures and land; pursuant to this authority and the additional authority granted by N.C.G.S. Chap. 160A, Art. 19 et. seq, the Town has adopted comprehensive zoning regulations and has codified the same within the Unified Development Ordinance, Part II of the Town Code, adopted pursuant to N.C.G.S. § 160A-363, which allows the Town to combine certain land development ordinances into a unified ordinance; and

WHEREAS, a text amendment application has been submitted requesting consideration be given to permitting "tutoring facility/learning center" within the C-2, General Commercial Zoning District' and

WHEREAS, the Town of Nags Head 2017 Comprehensive Plan includes policies supporting land uses that serve the needs of both year-round and seasonal residents in support of the town's overall vision for the community and to support and foster small, local businesses that preserve and uphold the vision and legacy of the town.

ARTICLE II. Construction.

For purposes of this ordinance amendment, underlined words (underline) shall be considered as additions to existing Town Code language and strikethrough words (~~strikethrough~~) shall be considered deletions to existing language. Any portions of the adopted Town Code which are not repeated herein but are instead replaced by an ellipsis ("...") shall remain as they currently exist within the Town Code.

ARTICLE III. Amendment of the Unified Development Ordinance.

PART I. That **Section 6.6 Table of Uses and Activities** be amended as follows:

		Residential Districts			Commercial Districts				
Use Category/Class	**Use Type**	**R-1**	**R-2**	**R-3**	**CR**	**C-1***	**C-2**	**C-3**	**C-4**
Service	Tutoring Facility/Learning Center						P		

PART II. That **Section 10.16 Required Parking by Use** be amended as follows:

Use Category/Class	Use Type	Required Parking
Service	Tutoring Facilities/Learning Center	One parking space for each 300 square feet of gross floor area.

PART III. That Appendix A Definitions, be amended as follows:

Section A.4 – Definitions

Tutoring Facility/Learning Center means a private, for profit or non-profit, use for the instruction of students in subjects and materials commonly taught in primary and secondary schools, for test-preparation, or the teaching of music and visual arts.

PART IV. All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed. This ordinance shall be in full force and effect from and after the ___ day of ____ 2020.

_____
Benjamin Cahoon, Mayor

ATTEST:

_____
Town Clerk

APPROVED AS TO FORM:

_____
Town Attorney

Date adopted: _____

Motion to adopt by Commissioner _____

Motion seconded by Commissioner _____

Vote: _____ AYES _____ NAYS

Agenda Item Summary Sheet

Item No: **E-1**
Meeting Date: **May 6, 2020**

Item Title: Public Hearing to consider proposed a text amendment to the Unified Development Ordinance submitted by a property owner to expand the principal sale items from outdoor stands to include reservations and tickets for events/activities

Item Summary:
The proposed text amendment (the applicant for the amendment is Kate Creef, Assistant General Manager, on behalf of Outlets Nags Head) is seeking to amend Section 7.76.1 to expand the principal sale items allowed to be sold from outdoor stands to include "reservations or ticket sales," and to amend Section 7.76.2. to increase the number of outdoor stands allowed per site from one (1) to two (2). The original proposal sought to amend the UDO to allow "outdoor kiosks" for the sale of tickets and reservations for on-site and off-site recreational facilities; the applicant had explained that a vendor had approached the Outlets about the idea of having a kiosk located on the property to allow patrons to book charter fishing excursions, a concept which was believed would enhance the customers' shopping experience. Based upon input from the Planning Board, the original proposal was revised to the current version. The attached adoption ordinance and markup are as prepared by the applicant, with Staff's recommendations incorporated and highlighted.

Planning Board/Staff Recommendation
Staff recommended to the Planning Board that the amendment be adopted with modifications to the standards to require that the sale and advertisement of items be confined to stands and to allow a maximum of two (2) stands, with no more than one (1) stand selling fresh produce, hot dogs, coffee, ice cream or Italian ice, and/or fudge. Additionally, it is suggested that Sections 7.76.3 and 7.76.4. also be amended to provide for a maximum stand area and any time limitations, respectively, for the sale of tickets and reservations; a limitation of 150 square feet and a time limitation consistent with produce stands are likely sufficient. Finally, Staff recommended that the definition of Outdoor Stand be amended consistent with the amendment of Section 7.76.1.

The Planning Board, at their February 18, 2020 meeting, voted 6-0 to recommend amendments to the UDO as recommended by Staff. In making their recommendation, the Planning Board acknowledged their opinion that the proposed amendments were consistent with the relevant policies contained in the Comprehensive Plan.

Number of Attachments: 3

Specific Action Requested:
Conduct Public Hearing / Adoption of text amendment.

Submitted By: Planning and Development Date: April 27, 2020

Finance Officer Comment:

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

I will participate in the discussion at the Board meeting as necessary.

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

I will participate in the discussion at the Board meeting as necessary.

Signature: Cliff Ogburn Date: April 28, 2020

Town of Nags Head
Post Office Box 99
Nags Head, North Carolina 27959
Telephone 252-441-5508
Fax 252-441-0776
www.nagsheadnc.gov

NOTICE OF PUBLIC HEARINGS
TOWN OF NAGS HEAD BOARD OF COMMISSIONERS

NOTICE IS HEREBY GIVEN that the Nags Head Board of Commissioners will conduct public hearings on **Wednesday, May 6, 2020** beginning at 9:00 am in the Board Room of the Municipal Complex, 5401 S. Croatan Highway, Nags Head, NC to consider and take action upon the following requests:

Public Hearing to consider a text amendment to the Unified Development Ordinance submitted by a property owner to expand the principal sale items from outdoor stands to include reservations and tickets for events/activities

Public Hearing to consider a text amendment to the Unified Development Ordinance to correct identified errors

Public Hearing to consider numerous text amendments to the Unified Development Ordinance as it pertains to the updated flood maps and update of the Flood Damage Prevention Ordinance

A copy of the application requests are available for public inspection at the Office of the Town Clerk, Town Municipal Complex, 5401 S. Croatan Hwy, Nags Head, NC 27959, telephone (252) 441-5508 during normal business hours.

As a result of these hearings substantial changes may be made in the proposals as advertised to reflect objections, debate and discussion at the hearings. Any person desiring to be heard on the proposals as stated above should appear at the time and place specified above.

This the 23rd day of April 2020.

Carolyn F. Morris
Town Clerk

MEMORANDUM
Town of Nags Head
Planning & Development Department

To: Board of Commissioners

From: Michael Zehner, Director of Planning & Development

Kelly Wyatt, Deputy Director of Planning & Development

Date: April 27, 2020

Subject: Public Hearing to consider a text amendment to the Unified Development Ordinance submitted by a property owner to expand the principal sale items from outdoor stands to include reservations and tickets for events/activities (E-1)

OVERVIEW

The proposed text amendment (the applicant for the amendment is Kate Creef, Assistant General Manager, on behalf of Outlets Nags Head) is seeking to amend Section 7.76.1 to expand the principal sale items allowed to be sold from outdoor stands to include “reservations or ticket sales,” and to amend Section 7.76.2. to increase the number of outdoor stands allowed per site from one (1) to two (2). Initially, as discussed with the Planning Board on January 21, 2020, the proposal sought to amend the UDO to allow “outdoor kiosks” for the sale of tickets and reservations for on-site and off-site recreational facilities. Mrs. Creef had explained to the Board that a vendor had approached the Outlets about the idea of having a kiosk located on the property to allow patrons to book charter fishing excursions, a concept which was believed would enhance the customers’ shopping experience. Mrs. Creef indicated that there would be a preference to allow two outdoor stands (where the regulations only allow for one) and confirmed for the Board that the plan was to locate the kiosk in the terrace area.

Based upon the discussion and feedback provided by the Planning Board, the applicant modified the original proposal (consistent with the version before the Board) and returned to the Planning Board meeting on February 18, 2020. The Planning Board recommended approval, with changes recommended by Staff, detailed below.

BACKGROUND

The current version of the allowances and standards for *Outdoor Stands, Accessory to Shopping Center & Group Development* are the result of numerous changes over the course of the last ten (10) years; actions of note are as follows:

- The allowance of outdoor fresh produce stands as an accessory use to shopping centers was first established in mid-2009;
- In late-2009, an amendment was adopted to allow hotdog vending stands as an accessory use to shopping centers;
- In early-2010, an amendment was adopted to allow coffee vending stands as an accessory use to shopping centers;

- In mid-2010, recognizing that one of each of the aforementioned stands could be permitted at any given shopping center, an amendment was adopted to limit the number of accessory outdoor stands at any shopping center site to one (1); additionally, the various stand uses were consolidated under a single use (Outdoor Stands);
- In late-2010, the Ordinance was amended to allow Italian ice and fudge sales;
- In early-2013 ice cream was added as an allowed sale item; additionally, in 2013, a request to expand the allowable number of stands from one (1) to (2) was denied; and
- The provisions were last amended in 2014 when the allowed locations for outdoor stands were expanded to allow as accessory to Group Development (aka Office/Retail Group Development).

POLICY CONSIDERATIONS

There are no direct policies concerning outdoor stands. However, certainly economic development objectives and policies encouraging and supporting small businesses and the viability of existing commercial properties are applicable, and need to be balanced with objectives and policies focused on maintaining the Town's character.

Generally, Staff believes that the request to allow the sale of tickets and reservations is consistent with applicable policies; however, Staff would suggest that the standards be clarified to require that the sale and advertisement of items be confined to stands. With respect to the number of allowed stands on any particular site, Staff would support a maximum of two (2) stands, with no more than one (1) stand selling fresh produce, hot dogs, coffee, ice cream or Italian ice, and/or fudge.

PLANNING BOARD RECOMMENDATION

The Planning Board, at their February 18, 2020 meeting, voted 6-0 to recommend amendments to the UDO as recommended by Staff. In making their recommendation, the Planning Board acknowledged their opinion that the proposed amendments were consistent with the relevant policies contained in the Comprehensive Plan.

STAFF RECOMMENDATION

Staff recommends that the amendments be adopted with modifications to the standards to require that the sale and advertisement of items be confined to stands and to allow a maximum of two (2) stands, with no more than one (1) stand selling fresh produce, hot dogs, coffee, ice cream or Italian ice, and/or fudge. Additionally, it is suggested that Sections 7.76.3 and 7.76.4. also be amended to provide for a maximum stand area and any time limitations, respectively, for the sale of tickets and reservations; a limitation of 150 square feet and a time limitation consistent with produce stands are likely sufficient. Finally, Staff would recommend that the current definition of Outdoor Stand, as follows, be amended consistent with the amendment of Section 7.76.1.:

> *Outdoor stand means an approved area where the sale of produce, hot dogs, coffee, ice cream or Italian ice, and fudge occurs from a cart or structure.*

Staff's recommendations have been incorporated into the attached adoption ordinance and markup of Section 7.76, highlighted to differentiate from the applicant's proposal.

With regard to the Board of Commissioners' review and action, Staff recommends consideration of the following UDO provisions:

> *3.5.3. Action by the Planning Board.*
>
> > *3.5.3.1. Every proposed amendment, UDO text amendment or zoning map amendment, shall be referred to the Planning Board for its recommendation and report. The Board of Commissioners is not bound by the recommendations, if any, of the Planning Board.*
> >
> > *3.5.3.2. Prior to the consideration by the Board of Commissioners of a proposed UDO text amendment or zoning map amendment, the Planning Board shall advise and comment on whether the proposed amendment is consistent with the Comprehensive Plan. The Planning Board shall provide a written recommendation, certified by the UDO Administrator, to the Board of Commissioners that addresses plan consistency and other matters as deemed appropriate by the Planning Board, but a comment by the Planning Board that a proposed amendment is inconsistent with the Comprehensive Plan shall not preclude consideration or approval of the proposed amendment by the Board of Commissioners.*
> >
> > *3.5.3.3. Members of the Planning Board shall not vote on recommendations regarding any UDO text amendment or zoning map amendment where the outcome of the mater being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the member.*

3.5.4. Action by the Board of Commissioners.
Action upon an UDO text amendment or zoning map amendment, including the scheduling of a public hearing, will be at the discretion of the Board of Commissioners.

3.5.4.1. Before an item is placed on the consent agenda to schedule a public hearing, the Planning Board's recommendation on each proposed amendment must be received by the Board of Commissioners. If no recommendation is received from the Planning Board within 30 days from the date when submitted to the Planning Board, the petitioner may take the proposal to the Board of Commissioners without a recommendation from the Planning Board. However, the Planning Board may request the Board of Commissioners to delay final action on the amendment until such time as the Planning Board can present its recommendations. No such limitations shall apply to applications or requests submitted by Town staff or any Town Board.

3.5.4.2. After receiving a recommendation from the Planning Board on a proposed amendment, the Board of Commissioners may proceed to vote on the proposed ordinance, refer it to a committee for further study, or take any other action consistent with its usual rules of procedure.

3.5.4.3. The Board of Commissioners is not required to take final action on a proposed amendment within any specific period of time. Final action on an UDO text amendment or zoning map amendment submitted by third parties will be taken within a reasonable time. Final action taken within 90 days of the public hearing before the Board of Commissioners shall be presumptively reasonable.

3.5.4.4. No member of the Board of Commissioners shall vote on any zoning map amendment or UDO text amendment where the outcome of the matter being considered is reasonably likely to have a direct, substantial and readily identifiable financial impact.

3.5.4.5. Prior to adopting or rejecting any UDO text and/or map amendment, the Board of Commissioners shall adopt one of the following statements which shall not be subject to judicial review.

3.5.4.5.1. A statement approving the amendment and describing its consistency with the adopted Comprehensive Plan and explaining why the action taken is reasonable and in the public interest.

3.5.4.5.2. A statement rejecting the amendment and describing its inconsistency with the adopted Comprehensive Plan and explaining why the action taken is reasonable and in the public interest.

3.5.4.5.3. A statement approving the amendment and containing at least all of the following:

3.5.4.5.3.1. A declaration that the approval is also deemed an amendment to the Comprehensive Plan. The Board of Commissioners shall not require any additional request or application for amendment to the Comprehensive Plan.

3.5.4.5.3.2. An explanation of the change in conditions the Board of Commissioners took into account in amending the UDO to meet the development needs of the community.

3.5.4.5.3.3. Why the action was reasonable and in the public interest.

3.5.4.6. In deciding whether to adopt a proposed amendment to this UDO, the central issue before the Board of Commissioners is whether the proposed amendment advances the public health, safety, or welfare. When considering proposed map amendments:

3.5.4.6.1. The Board of Commissioners shall consider the entire range of permitted uses in the requested classification.

Attachments:

1. Zoning Amendment Application;
2. Proposed Ordinance; and
3. Markup of Section 7.76, Outdoor Stands, Accessory to Shopping Centers & Group Development

AN ORDINANCE AMENDING THE CODE OF ORDINANCES OF THE TOWN OF NAGS HEAD, NORTH CAROLINA PERTAINING TO THE REGULATION OF OUTDOOR STANDS, ACCESSORY TO SHOPPING CENTERS & GROUP DEVELOPMENT

ARTICLE I. Purpose(s) and Authority.

WHEREAS, pursuant to N.C.G.S. § 160A-381, the Town of Nags Head (the "Town") may enact and amend ordinances regulating the zoning and development of land within its jurisdiction and specifically the location and use of buildings, structures and land; pursuant to this authority and the additional authority granted by N.C.G.S. Chap. 160A, Art. 19 et. seq, the Town has adopted comprehensive zoning regulations and has codified the same within the Unified Development Ordinance, Part II of the Town Code, adopted pursuant to N.C.G.S. § 160A-363, which allows the Town to combine certain land development ordinances into a unified ordinance; and

WHEREAS, an owner of the property within the Town of nags Head proposed the amendment of the Unified Development Ordinance to alter regulations for outdoor stands, accessory to shopping centers and group development; and

WHEREAS, the Board of Commissioners finds that these text amendments are consistent with the goals, objectives and policies of the Town's adopted Comprehensive Plan, and that this action is reasonable and in the public interest, and is in the interest of and not contrary to the public's health, safety, morals and general welfare for the Town to amend the Town's Unified Development Ordinance as stated below.

ARTICLE II. Construction.

For purposes of this ordinance amendment, underlined words (<u>underline</u>) shall be considered as additions to existing Town Code language and strikethrough words (~~strikethrough~~) shall be considered deletions to existing language. Any portions of the adopted Town Code which are not repeated herein, but are instead replaced by an ellipsis ("...") shall remain as they currently exist within the Town Code.

ARTICLE III. Amendment of the Unified Development Ordinance.

NOW, THEREFORE, BE IT ORDAINED by the Board of Commissioners of the Town of Nags Head, North Carolina, that the Unified Development Ordinance of the Town Code shall be amended as follows:

PART I. That **Section 7.76.1 ~~and~~, 7.76.2, 7.76.3, and 7.76.4** be amended as follows:

7.76.1 The principle sale of items at an outdoor stand shall be limited to either fresh produce, hot dogs, coffee, ice cream or Italian ice, ~~and~~ fudge, and reservations or ticket sales.

7.76.2 ~~Only one~~ Two outdoor stands shall be allowed per site, with no more than one (1) stand selling fresh produce, hot dogs, coffee, ice cream or Italian ice, and/or fudge. The stands shall not be required to be a permanent structure and may, with the exception of stands for reservations or ticket sales, be located upon a trailer. When located upon a trailer, skirting shall be installed around the perimeter to screen the wheels, axles and towing hitch from view.

7.76.3. The stand area, inclusive of display counters and awnings, shall not exceed four hundred (400) square feet for produce stands and shall not exceed one hundred fifty (150) square feet for hot dog, coffee, ice cream and Italian ice, ~~and~~ fudge, and reservations or ticket sales stands. Refrigeration units may be utilized within the stand area. The location of the stand on the site shall comply with minimum district yard regulations for principal use structures.

7.76.4. Produce and reservations or ticket sales stands shall be temporary and may be operated for a period of time not to exceed 180 days annually~~.~~; the ~~The~~ dates of operation shall be limited to between May 1 and November 1 each year. Hot dog, coffee, ice cream and Italian ice and fudge stands may be operated year round but shall not be left on the property overnight and must be removed daily.

PART II. That the definition of **Outdoor Stand, as contained in Section A.4, Definitions, of Appendix A, Definitions, of the UDO,** be amended as follows:

Outdoor stand means an approved area where the sale of produce, hot dogs, coffee, ice cream or Italian ice, ~~and~~ fudge, or reservations or ticket sales occurs from a cart or structure.

ARTICLE IV. Severability.

All Town ordinances or parts of ordinances in conflict with this ordinance amendment are hereby repealed. Should a court of competent jurisdiction declare this ordinance amendment or any part thereof to be invalid, such decision shall not affect the remaining provisions of this ordinance amendment nor the Unified Development Ordinance or Town Code of the Town of Nags Head, North Carolina which shall remain in full force and effect.

ARTICLE V. Effective Date.

This ordinance amendment shall be in full force and effect upon the date of adoption by the Board of Commissioners.

_____

Benjamin Cahoon, Mayor
Town of Nags Head

ATTEST: _____
Carolyn F. Morris, Town Clerk

APPROVED AS TO FORM:
Town Attorney Date
adopted: _____
Motion to adopt by Commissioner _____
Motion seconded by Commissioner _____
Vote: _____ AYES _____ NAYS

SECTION 7.76 OUTDOOR STANDS, ACCESSORY TO SHOPPING CENTERS & GROUP DEVELOPMENT.

Outdoor stands, accessory to shopping centers and group development, are permitted in accordance with Section 6.6, Table of Uses and Activities, subject to other requirements of this UDO and provided that the following conditions are met:

7.76.1. The principal sale of items at an outdoor stand shall be limited to either fresh produce, hot dogs, coffee, ice cream or Italian ice, ~~and~~ fudge and reservations or ticket sales. The sale of any other items shall be incidental and limited to no more than ten percent of the display area or ten percent of sales.

7.76.2. ~~Only one~~ Two outdoor stands shall be allowed per site, with no more than one (1) stand selling fresh produce, hot dogs, coffee, ice cream or Italian ice, and/or fudge. The stands shall not be required to be a permanent structure and may, with the exception of stands for reservations or ticket sales, be located upon a trailer. When located upon a trailer, skirting shall be installed around the perimeter to screen the wheels, axles and towing hitch from view.

7.76.3. The stand area, inclusive of display counters and awnings, shall not exceed four hundred (400) square feet for produce stands and shall not exceed one hundred fifty (150) square feet for hot dog, coffee, ice cream and Italian ice, ~~and~~ fudge, and reservations or ticket sales stands. Refrigeration units may be utilized within the stand area. The location of the stand on the site shall comply with minimum district yard regulations for principal use structures.

7.76.4. Produce and reservations or ticket sales stands shall be temporary and may be operated for a period of time not to exceed 180 days annually~~.~~; the ~~The~~ dates of operation shall be limited to between May 1 and November 1 each year. Hot dog, coffee, ice cream and Italian ice and fudge stands may be operated year round but shall not be left on the property overnight and must be removed daily.

7.76.5. All stands shall comply with applicable Dare County Health Department regulations and permitting requirements.

7.76.6. When located on a site with fifty (50) or more existing parking spaces, no additional parking spaces will be required. When located on a site with less than fifty (50) parking spaces a minimum of three (3) off-street parking spaces in accordance with parking regulations of this UDO shall be provided.

7.76.7. When the regulations contained in the subsection are in conflict with the general regulations of Town Code Section 12 Article III, Peddlers and Itinerant Merchants, the provisions of this UDO shall prevail.

Agenda Item Summary Sheet

Item No: **E-2**
Meeting Date: **May 6, 2020**

Item Title: Public Hearing to consider a text amendment to the Unified Development Ordinance to correct identified errors

Item Summary:
Since the adoption of the Unified Development Ordinance (UDO) on August 7, 2019, Staff has located minor numbering, punctuation, grammatical, consistency and contextual errors within the document; this amendment is intended to correct these identified errors. It is anticipated that Staff will periodically propose similar amendments in the future to correct any further errors identified through the administration of the UDO.

Planning Board/Staff Recommendation
Staff recommends that the amendments be adopted as outlined in the attached adoption ordinance, and the Planning Board agreed at their February 18th, 2020 meeting.

Number of Attachments: 3

Specific Action Requested:

Consider adoption of amendments to the UDO.

Submitted By: Planning and Development Date: April 27, 2020

Finance Officer Comment:

Signature: Amy Miller Date: April 27, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 27, 2020

Town Manager Comment and/or Recommendation:

I will participate in the discussion at the Board meeting as necessary.

Signature: Cliff Ogburn Date: April 27, 2020

Town of Nags Head
Post Office Box 99
Nags Head, North Carolina 27959
Telephone 252-441-5508
Fax 252-441-0776
www.nagsheadnc.gov

NOTICE OF PUBLIC HEARINGS
TOWN OF NAGS HEAD BOARD OF COMMISSIONERS

NOTICE IS HEREBY GIVEN that the Nags Head Board of Commissioners will conduct public hearings on **Wednesday, May 6, 2020** beginning at 9:00 am in the Board Room of the Municipal Complex, 5401 S. Croatan Highway, Nags Head, NC to consider and take action upon the following requests:

Public Hearing to consider a text amendment to the Unified Development Ordinance submitted by a property owner to expand the principal sale items from outdoor stands to include reservations and tickets for events/activities

Public Hearing to consider a text amendment to the Unified Development Ordinance to correct identified errors

Public Hearing to consider numerous text amendments to the Unified Development Ordinance as it pertains to the updated flood maps and update of the Flood Damage Prevention Ordinance

A copy of the application requests are available for public inspection at the Office of the Town Clerk, Town Municipal Complex, 5401 S. Croatan Hwy, Nags Head, NC 27959, telephone (252) 441-5508 during normal business hours.

As a result of these hearings substantial changes may be made in the proposals as advertised to reflect objections, debate and discussion at the hearings. Any person desiring to be heard on the proposals as stated above should appear at the time and place specified above.

This the 23rd day of April 2020.

Carolyn F. Morris
Town Clerk

MEMORANDUM
Town of Nags Head
Planning & Development Department

To: Board of Commissioners

From: Holly B. White, Principal Planner
Michael Zehner, Director of Planning & Development
Kelly Wyatt, Deputy Director of Planning & Development

Date: April 27, 2020

Subject: Consideration of a text amendment to the Unified Development Ordinance to correct identified typographical errors

OVERVIEW

Since the adoption of the Unified Development Ordinance (UDO) on August 7, 2019, staff has located minor typographical errors throughout the document. This amendment will address minor numbering, punctuation, grammar, and contextual issues. Additional similar amendments will be necessary to address any other outstanding issues in the future.

PLANNING BOARD RECOMMENDATION

The Planning Board recommended unanimous approval of this text amendment at their February 18, 2020 meeting.

STAFF RECOMMENDATION

Staff recommends that the amendments be adopted as proposed.

With regard to the Board of Commissioners' review and action, Staff recommends consideration of the following UDO provisions:

3.5.3. Action by the Planning Board.

3.5.3.1. Every proposed amendment, UDO text amendment or zoning map amendment, shall be referred to the Planning Board for its recommendation and report. The Board of Commissioners is not bound by the recommendations, if any, of the Planning Board.

3.5.3.2. Prior to the consideration by the Board of Commissioners of a proposed UDO text amendment or zoning map amendment, the Planning Board shall advise and comment on whether the proposed amendment is consistent with the Comprehensive Plan. The Planning Board shall provide a written recommendation, certified by the UDO Administrator, to the Board of Commissioners that addresses plan consistency and other

matters as deemed appropriate by the Planning Board, but a comment by the Planning Board that a proposed amendment is inconsistent with the Comprehensive Plan shall not preclude consideration or approval of the proposed amendment by the Board of Commissioners.

3.5.3.3. Members of the Planning Board shall not vote on recommendations regarding any UDO text amendment or zoning map amendment where the outcome of the matter being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the member.

3.5.4. Action by the Board of Commissioners.
Action upon an UDO text amendment or zoning map amendment, including the scheduling of a public hearing, will be at the discretion of the Board of Commissioners.

3.5.4.1. Before an item is placed on the consent agenda to schedule a public hearing, the Planning Board's recommendation on each proposed amendment must be received by the Board of Commissioners. If no recommendation is received from the Planning Board within 30 days from the date when submitted to the Planning Board, the petitioner may take the proposal to the Board of Commissioners without a recommendation from the Planning Board. However, the Planning Board may request the Board of Commissioners to delay final action on the amendment until such time as the Planning Board can present its recommendations. No such limitations shall apply to applications or requests submitted by Town staff or any Town Board.

3.5.4.2. After receiving a recommendation from the Planning Board on a proposed amendment, the Board of Commissioners may proceed to vote on the proposed ordinance, refer it to a committee for further study, or take any other action consistent with its usual rules of procedure.

3.5.4.3. The Board of Commissioners is not required to take final action on a proposed amendment within any specific period of time. Final action on an UDO text amendment or zoning map amendment submitted by third parties will be taken within a reasonable time. Final action taken within 90 days of the public hearing before the Board of Commissioners shall be presumptively reasonable.

3.5.4.4. No member of the Board of Commissioners shall vote on any zoning map amendment or UDO text amendment where the outcome of the matter being considered is reasonably likely to have a direct, substantial and readily identifiable financial impact.

3.5.4.5. Prior to adopting or rejecting any UDO text and/or map amendment, the Board of Commissioners shall adopt one of the following statements which shall not be subject to judicial review.

3.5.4.5.1. A statement approving the amendment and describing its consistency with the adopted Comprehensive Plan and explaining why the action taken is reasonable and in the public interest.

3.5.4.5.2. A statement rejecting the amendment and describing its inconsistency with the adopted Comprehensive Plan and explaining why the action taken is reasonable and in the public interest.

3.5.4.5.3. A statement approving the amendment and containing at least all of the following:

3.5.4.5.3.1. A declaration that the approval is also deemed an amendment to the Comprehensive Plan. The Board of Commissioners shall not require any additional request or application for amendment to the Comprehensive Plan.

3.5.4.5.3.2. An explanation of the change in conditions the Board of Commissioners took into account in amending the UDO to meet the development needs of the community.

3.5.4.5.3.3. Why the action was reasonable and in the public interest.

3.5.4.6. In deciding whether to adopt a proposed amendment to this UDO, the central issue before the Board of Commissioners is whether the proposed amendment advances the public health, safety, or welfare. When considering proposed map amendments:

3.5.4.6.1. The Board of Commissioners shall consider the entire range of permitted uses in the requested classification.

Attachments:

1. An Ordinance Amending the Code of Ordinances of the Town of Nags Head, North Carolina Pertaining to Correct Identified Typographical Errors

AN ORDINANCE AMENDING THE CODE OF ORDINANCES OF THE TOWN OF NAGS HEAD, NORTH CAROLINA TO CORRECT IDENTIFIED ERRORS

ARTICLE I. Purpose(s) and Authority.

WHEREAS, pursuant to N.C.G.S. § 160A-381, the Town of Nags Head (the "Town") may enact and amend ordinances regulating the zoning and development of land within its jurisdiction and specifically the location and use of buildings, structures and land; pursuant to this authority and the additional authority granted by N.C.G.S. Chap. 160A, Art. 19 et. seq, the Town has adopted comprehensive zoning regulations and has codified the same within the Unified Development Ordinance, Part II of the Town Code, adopted pursuant to N.C.G.S. § 160A-363, which allows the Town to combine certain land development ordinances into a unified ordinance; and

WHEREAS, following adoption of the Unified Development Ordinance, Planning Staff has identified several unintended errors within the text of the Ordinance, necessitating amendment to correct; and

WHEREAS, the Town of Nags Head 2017 Comprehensive Plan includes goals and policies aimed at maintaining a well-run and efficient government that provides high quality and cost-effective services through good governance in order to advance the Town's vision; and

WHEREAS, the Board of Commissioners finds that these text amendments are consistent with the goals, objectives and policies of the Town's adopted Comprehensive Plan, and that this action is reasonable and in the public interest, and is in the interest of and not contrary to the public's health, safety, morals and general welfare for the Town to amend the Towns Unified Development Ordinance as stated below.

ARTICLE II. Construction.

For purposes of this ordinance amendment, underlined words (<u>underline</u>) shall be considered as additions to existing Town Code language and strikethrough words (~~strikethrough~~) shall be considered deletions to existing language. Any portions of the adopted Town Code which are not repeated herein but are instead replaced by an ellipses ("...") shall remain as they currently exist within the Town Code.

ARTICLE III. Amendment of the Unified Development Ordinance.

NOW, THEREFORE, BE IT ORDAINED by the Board of Commissioners of the Town of Nags Head, North Carolina, that the Unified Development Ordinance of the Town Code shall be amended as follows:

PART I. That **Article 2, Administrative, Legislative, & Quasi-Judicial Authority, Section 2.4 Planning Board**, be amended as follows:

2.4.4. Powers and Duties.

2.4.4.1. It shall be the duty of the Planning Board to prepare plans and to coordinate the plans of the Town and those of others to bring about a coordinated and harmonious development of the area. The Planning Board is hereby designated as the planning agency for the preparation of a zoning plan

for the Town under the authority of NCGS 160A-387. In addition, the Planning Board is empowered to:

2.4.4.1.1. Acquire and maintain in current form such basic information and materials as are necessary to understand past trends, present conditions and forces at work to cause changes in these conditions.

2.4.4.1.2. Prepare and, from time to time, amend and revise a comprehensive and coordinated plan for the physical development of the area. The Comprehensive Plan shall be the Planning Board's recommendations to the Board of Commissioners for the development of the Town including, among other things, the general location, character and extent of streets, bridges, parkways, playgrounds, parks and other public ways, grounds and open spaces; the general location and extent of public utilities and terminals, whether publicly or privately owned or operated, for water, light, sanitation, transportation, communication, power and other purposes; the removal, relocation, widening, narrowing, vacating, abandonment, change of use or extension of any of the foregoing ways, buildings, grounds, open spaces, property, utilities or terminals; and the most desirable pattern of land use within the area.

~~***2.4.4.1.4.***~~ ***2.4.4.1.3.*** Prepare and recommend ordinances promoting orderly development of the Town as recommended by the Comprehensive Plan including the ordinances contained within the UDO. The Planning Board may initiate proposals for amendment of the UDO based upon its studies and Comprehensive Plan. In addition, the Planning Board shall review and make recommendations to the Board of Commissioners concerning all proposed amendments to the UDO and zoning map.

~~***2.4.4.1.5.***~~ ***2.4.4.1.4.*** Determine whether specific proposed developments referred to it by governmental or private agencies in the area conform to the principles and requirements of the Comprehensive Plan for the area and to make recommendations concerning them.

~~***2.4.4.1.6.***~~ ***2.4.4.1.5.*** Keep the Board of Commissioners and the public informed and advised as to these matters.

~~***2.4.4.1.7.***~~ ***2.4.4.1.6.*** Make any other recommendations which it sees fit for improving the development of the area.

~~***2.4.4.1.8.***~~ ***2.4.4.1.7.*** Perform any other duties which may lawfully be assigned to it.

PART II. That **Article 2 Administrative, Legislative, & Quasi-Judicial Authority, Section 2.6 Board of Commissioners** be amended as follows:

SECTION 2.6 BOARD OF COMMISSIONERS.

2.6.1. The Board of Commissioners has the authority to initiate, review, and decide applications for the following: UDO text amendments, zoning map amendments, and conditional use permits in accordance with Article 3, Legislative/Quasi-Judicial

Procedures, as well as major site plans, major subdivision preliminary plats, and subdivision waivers in accordance with Article 4, Development Review Process.

2.6.2. The Board of Commissioners, in considering conditional use permit applications, acts in a quasi-judicial capacity and, accordingly, is required to observe the procedural requirements set forth in Section 3.13, Procedures for Quasi-Judicial Hearings.

~~*2.6.2.*~~ *2.6.3.* In considering proposed changes in the text of this UDO or in the zoning map, the Board of Commissioners acts in its legislative capacity and must proceed in accordance with the requirements of Section 3.5, UDO Text Amendments/Zoning Map Amendments.

~~*2.6.3.*~~ *2.6.4.* Unless otherwise specifically provided in this Article, in acting upon conditional use permit requests or in considering amendments to this Ordinance or the zoning map, the Board of Commissioners shall follow the regular voting and other requirements as set forth in other provisions of the Town ~~c~~Code, the Town ~~c~~Charter, Rules of Procedure, or general law as applicable.

~~*2.6.4.*~~ *2.6.5.* The Board of Commissioners, in considering the approval of a site-specific development plan (as defined in Section 3.6, Establishment of Vested Rights), shall follow the procedural requirements set forth in Section 3.8, Conditional Use Permits for the issuance of a conditional use permit.

~~*2.6.5.*~~ *2.6.6.* A failure to vote by a Board member who is physically present in the Commissioners chamber, or who has withdrawn without being excused by a majority vote of the remaining members present, shall be recorded as an abstention, not an affirmative vote.

PART III. That **Article 3 Legislative/Quasi-Judicial Procedures, Section 3.13 Procedures for Quasi-Judicial Hearings**, be amended as follows:

3.13.3. Modification of Application at Hearing.

~~*3.13.2.1.*~~ *3.13.3.1.* In response to questions or comments made in sworn testimony at the hearing, the applicant may agree to modify the application, including the plans and specifications submitted.

~~*3.13.2.2.*~~ *3.13.3.2.* Unless such modifications are so substantial or extensive that the decision-making board cannot reasonably be expected to perceive the nature and impact of the proposed changes without revised plans before it, the decision-making board may approve the application with the stipulation that the permit will not be issued until plans reflecting the agreed upon changes are submitted to the UDO Administrator.

PART IV. That **Article 4 Development Review Process, Part II. Development Review Process**, **Section 4.2 Purpose and Intent**, be amended as follows:

PART II. DEVELOPMENT REVIEW PROCESS~~.~~

SECTION 4.2 PURPOSE AND INTENT.

The formal development review process is designed for non-residential development (i.e., projects other than one- and two-family dwellings) applications that require review by the Planning Board and Board of Commissioners. The permitting process for one- and two-family dwellings is provided in Part III, Development Permitting ~~Process~~ Requirements.

PART V. That **Article 4 Development Review Process, Section 4.10 Permits Required**, be amended as follows:

SECTION 4.10 PERMITS REQUIRED.

4.10.1. No use of land shall be initiated or modified and no building or other structure shall be erected, moved, added to or structurally altered without having either a conditional use permit approved by the Board of Commissioners as provided for under Section 3.8, Conditional Use Permits, or the necessary permits identified in Section 4.11, Permit Types, approved and issued by the UDO Administrator.

4.10.2. Furthermore, no building permit shall be issued except in conformity with the provisions of this UDO, the state building code, and applicable federal, state and local regulations.

~~*4.10.4.*~~ *4.10.3.* A fee for conditional use permits, zoning permits and building permits is required, which shall be in accordance with a regularly adopted fee schedule of the Town.

PART VI. That **Article 4 Development Review Process, Section 4.13 Certificate of Compliance Required**, be amended as follows:

SECTION 4.13 CERTIFICATE OF COMPLIANCE REQUIRED.

4.13.1. No land shall be used or occupied, and no building hereafter structurally altered, erected, moved, be used or have its use changed, until a certificate of compliance shall have been issued by the UDO Administrator stating that the building and/or the proposed use thereof complies with the provisions of this UDO.

4.13.2. A certificate of compliance shall be applied for coincident with the application for a building permit and shall be issued within ten days after the erection or structural alterations of such building, or part, shall have been completed in conformity with the provisions of this UDO.

4.13.3. A record of all certificates shall be kept on file in the office of the building inspector, and copies shall be furnished on request to any person wishing to review such records.

~~*4.13.5.*~~ *4.13.4.* In instances where a change of use or other development is proposed that triggers permits or approvals under this UDO, but no building permit is required, then only those UDO permits or approvals required to verify that the proposed use and requirements pertaining thereto comply with the provisions of this UDO.

~~*4.13.6.*~~ *4.13.5.* Prior to issuance of a certificate of compliance for any new construction project or for any non-residential project which involves an increase in lot coverage, the UDO Administrator shall inspect the entire site to determine if the development complies

with the Town approved site plan. The applicant shall also furnish the Town with a final, original, sealed and signed as-built survey of the entire site. In cases where the proposed building is within six inches of the height limit for the district in which it is located, the UDO Administrator may require a height certificate prepared by a licensed surveyor.

~~*4.13.7.*~~ *4.13.6.* Prior to issuance of a certificate of compliance for any remodel, addition, or accessory structure, the UDO Administrator shall inspect the entire site to determine if the development complies with the Town approved site plan. If the UDO Administrator finds that the site or a structure on the site has deviated from the approved site plan, or in cases where the project is close to exceeding lot coverage, height, or directly adjacent to a setback, the UDO Administrator may require a final, original, sealed and signed as-built survey and/or height certificate.

PART VII. That **Article 6 Zoning Districts, Section 6.2 Zoning District**, **Special Districts** be amended as follows:

6.2.5.4. O&S Ocean and Sound Waters District. The Ocean and Sound Waters District encompasses the ocean and sound waters and is established to provide for the proper use of these waters, including islands that adjoin the Town, to ensure the continued scenic, conservation and recreational value that these waters provide to the Town, its residents, visitors and the surrounding area. Regulations in this district shall not prohibit or regulate commercial fishing and navigation. The Ocean and Sound Waters District shall encompass and be applied to the area defined as the extraterritorial zoning area as referenced in Town Code ~~Article~~ Section 2-1 Zoning; boundary extension; establishment; application.

PART VIII. That **Article 6. Zoning Districts, Section 6.6, Table of Uses and Activities**, be amended as follows:

		Residential Districts			**Commercial Districts**				
Use Category/Class	**Use Type**	**R-1**	**R-2**	**R-3**	**CR**	**C-1***	**C-2**	**C-3**	**C-4**
Residential	Dwelling, Large Residential	PS	PS	PS	PS		PS		
Residential	Dwelling, Multi-Family				~~CS~~	CS	CS		

PART IX. That **Article 7. Supplemental Regulations, Section 7.21 Massage and Bodywork Therapy**, be amended as follows:

SECTION 7.21 MASSAGE AND BODYWORK THERAPY.

Massage therapy centers, are permitted in accordance with Section 6.6, Table of Uses and Activities, subject to other requirements of this UDO and provided that the following conditions are met:

7.21.1. General Requirements.
These requirements apply to massage therapists and massage and bodywork therapy business operators. No person permitted under this article shall allow or permit any

person to massage or treat any person unless the person giving such massage or treatment has complied with all requirements of this article.

7.21.1.1. Permits required.

7.21.1.1.1. All massage and bodywork therapists and owner/operators of massage and bodywork therapy establishments shall possess and provide proof of a North Carolina license to practice massage and bodywork therapy in accordance with NCGS Chapter 90, Article 36 Massage and Bodywork Therapy Practice.

7.21.1.1.2. A zoning permit is required, in accordance with Article 4, Development Review Process of this UDO, for both the practice of massage and bodywork therapy and owner/operators of massage and bodywork therapy establishments.

~~*7.21.1.2.3.*~~ *7.21.1.1.3.* An annual Town of Nags Head Business Registration shall be completed by massage and bodywork therapists and/or owner/operators of massage and bodywork therapy establishments. At the time of registration, any fees associated with the registration shall be paid.

7.21.1.2. The following information shall be submitted and considered as part of the application for a permit from the Town:

7.21.1.2.1. The name of the business and location of the business.

7.21.1.2.2. List of North Carolina certified massage therapists and contact information for massage therapists working in massage therapy and bodywork establishments.

7.21.1.2.3. A certificate of insurance indicating that the applicant has professional liability insurance for the practice of massage therapy/bodywork.

7.21.1.2.4. A description of the services to be provided and any other business to be operated on the same premises or on adjoining premises owned or controlled by the applicant.

7.21.1.2.5. If an applicant is to work under the supervision of a licensed physician, applicant must show scope of services from the licensed physician.

7.21.1.2.6. Verification of criminal history through investigative report by the Nags Head Police Department. Submission of the following information is necessary to complete this investigative report:

7.21.1.2.6.1. A complete statement of all convictions of any person involved in the operation of the business for any felony, or prostitution or any violation of any law relative to prostitution;

7.21.1.2.6.2. A complete statement of any revocation, by any governmental unit, of any license to operate a massage business or to engage in the business or profession of massage by the applicant or any persons associated with or employed by the operation of the massage therapy business.;

7.21.1.2.6.3. A complete statement of any conviction for violation of any statute, law, ordinance or regulation of any government concerning the operation of a massage business or the business or profession of massage by the applicant or anyone employed with the business.

7.2.1.1.2.7 The Town reserves the right to request submission of any additional information deemed necessary to process the permit application.

7.21.1.3. The applicant or any person having a legal or beneficial ownership interest in the applicant shall not, for the three-year period preceding the application, have a previously issued license revoked for engaging in the business or profession of massage.

7.21.1.4. The applicant or any person having any legal or beneficial ownership interest in the applicant, shall not in the last ten (10) years have been convicted of any crime involving sexual misconduct including but not limited to, NCGS 14-177 – 14-202.1 and NCGS 14-203 – 14-208, any federal statutes relating to prostitution, or of any violation of any law or ordinance of any governmental unit related to the business or profession of massage.

7.21.1.5. It shall be unlawful for any person, corporation, partnership, or association to employ any person under the age of eighteen (18) years in the operation of a massage business.

7.21.1.6. Hours of operation:

7.21.1.6.1. No person shall massage or treat any person, or engage in the business or profession of massage, before 8:00 a.m. or after 12:00 midnight, prevailing time.

7.21.1.6.2. No person shall admit customers or prospective customers, or remain open for business, or allow, permit or condone any massage or treatment of any person before 8:00 a.m. or after 12:00 midnight, prevailing time.

7.21.1.6.3. No person in charge of managing a massage business shall allow, permit or condone any massage or treatment of any person before 8:00 a.m. or after 12:00 midnight, prevailing time.

7.21.1.7. Posting of license:

7.21.1.7.1. Every massage therapist shall post a copy of their North Carolina license to operate in their work area or on their person.

7.21.1.7.2. Every person, corporation, partnership, or association licensed under this article hereof shall display their business registration and their North Carolina license to operate in a prominent place or on their person.

7.21.1.8. A permit issued pursuant to this article is void if the licensee moves or ceases operating a massage business.

7.21.2. Massage of Private Parts for Hire.

It shall be unlawful for any person to massage or to offer to massage the private parts of another for hire. The term "massage," as used in this section, means the manipulation of body muscle or tissue by rubbing, stroking, kneading or tapping, by hand or mechanical device. The term "private parts" means the penis, scrotum, mons veneris, vulva, or vaginal area. The provisions of this section shall not apply to licensed medical practitioners, osteopaths or chiropractors, or persons operating at their direction, in connection with the practice of medicine, chiropractic or osteopathy.

7.21.3. Revocation of Permit.

7.21.3.1. Violation of any part of this article shall be grounds for revocation of the permit.

7.21.3.2. A permit issued pursuant to this section shall be revoked by the UDO Administrator or designee upon the determination that:

7.21.3.2.1. The permit holder violates any building or fire prevention ordinances or any provision of this UDO.

7.21.3.2.2. The permit holder, or the legal or beneficial owner of any interest in the permit holder is convicted of any crime involving sexual misconduct including, but not limited to, NCGS 14-177 – 14-202.4, and NCGS 14-203 – 14-208 in the last ten years.

7.21.3.2.3. Any employee of the permit holder is convicted of any felony in connection with his employment, or is convicted of any crime involving sexual misconduct including, but not limited to, NCGS 14-177 – 14.202.4 and NCGS 14-203 – 14-208 or of this article.

PART X. That **Article 7. Supplemental Regulations, Section 7.30 Restaurant, Neighborhood**, be amended as follows:

SECTION 7.30 RESTAURANT, NEIGHBORHOOD.
Restaurant, neighborhood, is permitted in accordance with Section 6.6, Table of Uses and Activities, subject to other requirements of this UDO and provided that the following conditions are met:

7.30.1. To be classified as a neighborhood restaurant, the indoor customer service area shall be less than 1,000 square feet.

7.30.2. An on-site outdoor customer service area in an amount up to 50% of the indoor customer service area is also permitted.

7.30.3. A restaurant site may contain more than one principal restaurant building, or one principal restaurant building in combination with another principal drive-in restaurant, drive-through restaurant, or takeout restaurant building.

7.30.4. Uses qualifying as a restaurant shall meet the following criteria:

~~*7.30.2.1.*~~ *7.30.4.1.* A food preparation area that is at least twenty (20) percent of the gross building square footage of the principal building. The square footage of food preparation area located in an on-site accessory restaurant use building or a second on-site drive-in, drive-through, or takeout restaurant may be applied when calculating this minimum 20% requirement. But when calculated together (principal and accessory or second principal buildings), in no event shall the food preparation area of the principal building be permitted to be less than ten (10) percent of the principal building gross square footage; and~~,~~

~~*7.30.2.2.*~~ *7.30.4.2.* At least seventy-five (75) percent of all customer seats shall be designated for full-service, full-menu dining; and~~,~~

~~*7.30.2.3.*~~ *7.30.4.3.* No more than fifteen (15) percent of the total building square footage shall be devoted to accessory entertainment uses including but not limited~~,~~ to dance floor, lounges, bars, stages, live performance, and disc jockey areas. Accessory entertainment uses referenced in this section shall be permitted in a restaurant establishment provided these uses are clearly subordinated in area, extent, hours of operation, and purpose to areas designated for food and/or beverage preparation, service, and consumption.

PART XI. That **Article 7. Supplemental Regulations, Section 7.33 Commercial with Accessory Residential (Attached or Detached),** be amended as follows:

SECTION 7.33 COMMERCIAL WITH ACCESSORY RESIDENTIAL (ATTACHED OR DETACHED).

Accessory residential units are single-family attached or detached units that may be allowed on the same property and in conjunction with a commercial use. These are distinctly different than accessory dwelling units, which are accessory uses designed to be subordinate to and located on the same property as a single-family dwelling. Commercial with Accessory Residential, is permitted in accordance with Section 6.6, Table of Uses and Activities, subject to other requirements of this UDO and provided that the following conditions are met:

7.33.1. Commercial uses may have up to two (2) accessory residential units that are attached or detached.

7.33.2. Accessory residential uses must be located above or to the rear of the primary commercial use and must meet the setbacks for the principal structure within the zoning district.

7.33.3. Individual accessory residential units may not exceed 1,500 square feet in area.

~~*7.33.4.* Parking shall be provided for the accessory residential units using the same parking standard applicable to single family dwellings.~~

PART XII. That **Article 7. Supplemental Regulations**, **Section 7.39 Fire Stations/Public Works Facilities**, be amended as follows:

SECTION 7.39 FIRE STATIONS/PUBLIC WORKS FACILITIES.
Fire stations and public works facilities are permitted in accordance with Section 6.6, Table of Uses and Activities, subject to other requirements of this UDO and provided that the following conditions are met:

7.39.1. Fire Stations.
Fire stations are permitted in accordance with Section 6.6, Table of Use and Activities, subject to other requirements of this UDO and provided that the following conditions are met:

7.39.1.1. No open storage is allowed.

~~*7.39.2.*~~ *7.39.1.2.* Lighting shall be prohibited except for minimum lighting that may be required for security purposes.

PART XIII. That **Article 7. Supplemental Regulations, Section 7.50 Fishing Piers,** be amended as follows:

SECTION 7.50 FISHING PIERS.
Fishing Piers are permitted in accordance with Section 6.6, Table of Uses and Activities, subject to other requirements of this UDO and provided that the following conditions are met:

7.50.1. Fishing piers, which may include accessory restaurant or retail uses, are permitted in the R-2 and CR districts in accordance with Section 6.6, Table of Uses and Activities, subject to other requirements of this UDO and provided the following conditions are met:

7.50.1.1. Parking lot lighting shall be prohibited except for minimum lighting which may be required for security purposes.

7.50.1.2. The maximum total height of the pier house structure shall be thirty-five (35) feet.

7.50.1.3. Lot coverage shall not exceed fifty (50) percent. Coverage may be increased to a maximum of sixty (60) percent if open-space paving blocks are used in place of surfaces such as concrete or asphalt. The use and installation of open-face paving blocks shall be in accordance with the requirements of Section 8.6.6.6., Special Requirements for the Use of Permeable Pavement.

7.50.1.4. Restaurants associated with a fishing pier shall not exceed 1,500 square feet of combined indoor and outdoor customer service area.

7.50.1.5. In the CR district only, if the pier house contains multiple accessory or principal uses, including but not limited to, retail sales, arcade, restaurant, wind turbines, educational and recreational programming, and indoor public assembly uses, with a parking requirement greater than one parking space per 200 square feet of gross floor area, the overall parking requirement may be reduced by

fifteen (15) percent. In utilizing this provision, at no time shall the total number of parking spaces provided be less than 100.

~~7.50.1.5.~~ 7.50.1.6. In the CR district only, the location and installation of wastewater treatment facilities and required repair areas to serve the principal use may be located off-site provided that all off-site properties are undeveloped and are zoned for commercial use. Off-site wastewater treatment facilities shall be exempt from the requirements of Section 7.47, Wastewater Treatment Plants (Accessory to Pier). Above ground structures of the treatment facility shall be deemed principal use structures and shall comply with the dimensional height and yard requirements of the zoning district in which they are located. When off-site wastewater treatment facilities are utilized in conjunction with a fishing pier, restaurants are not permitted as a principal or accessory use to the fishing pier.

~~7.50.1.6.~~ 7.50.1.7. In the CR district only, up to fifty (50) percent of the required parking for the site may be located at an off-site location. Off-site parking must be located in the C-2 zoning district.

PART XIV. That **Article 7. Supplemental Regulations, Section 7.55 Municipal Parks,** be amended as follows:

SECTION 7.55 MUNICIPAL PARKS.

Municipal parks are permitted in accordance with Section 6.6, Table of Uses and Activities, subject to the following limitations and conditions:

7.55.1. Municipal Parks in the R-2 Zoning District.

Municipal parks which may include, but not be limited to, tennis courts, multi-purpose recreation fields, concession areas, and picnic areas, are permitted in accordance with Section 6.6, Table of Uses and Activities, subject to the other requirements of this UDO and provided the following conditions are met:

~~7.55.1.~~ 7.55.1.1. All multi-purpose recreation fields or tennis courts shall be located no closer than one hundred (100) feet from the property line of any adjacent residential property within the R-2 district.

~~7.55.2.~~ 7.55.1.2. All buildings or parking lots shall be located no closer than fifty (50) feet from the property line of any adjacent residential property within the R-2 district.

~~7.55.3.~~ 7.55.1.3. All multi-purpose recreation fields, tennis courts, parking lots, or buildings shall be located no closer than thirty (30) feet from the adjacent residential property line of any property within the SED-80 district.

~~7.55.4.~~ 7.55.1.4. A 50-foot wide buffer shall separate all multi-purpose recreation fields and tennis courts from the property line of any property within the R-2 district. This buffer shall be bermed or planted to a minimum height of five (5) feet and that will reach a height of ten (10) feet within five (5) years. There shall be a minimum of six (6) rows of plants in the buffer placed on 10-foot centers. Eighty (80) percent of all plants must be locally adaptive live evergreen species, or the equivalent of these standards that incorporate existing vegetation and topography or other landscape architecture designs that

demonstrate compliance with these standards. Ornamental grass/herbaceous plants shall not be required to be included in this buffer.

~~*7.55.5.*~~ *7.55.1.5.* All buildings and parking areas shall be buffered from the property line of any property within the R-2 district utilizing a 10-foot wide Commercial Transitional Protective Yard as prescribed in Section 10.93, Landscaping, Buffering, and Vegetation Preservation.

~~*7.55.7.*~~ *7.55.1.6.* Light fixtures for multi-purpose recreation fields shall be turned off no later than 9:00 pm.

PART XV. That **Article 7. Supplemental Regulations, Section 7.58 Designated Public Events Site**, be amended as follows:

SECTION 7.58 DESIGNATED PUBLIC EVENTS SITE.
Designated public event sites are permitted in accordance with Section 6.6, Table of Uses and Activities, subject to the following regulations:

7.58.1. A special events permit is required for events held at a designated public events site for events that expect more than 100 attendees. Applications, including a site and management plan for events, must be made to the Town Manager's office no less than fourteen (14) days prior to the initiation of any event or temporary use to take place on the site in order for the Town to:

7.58.1.1. Evaluate requests for Town assistance and costs to be charged as associated with the event;

7.58.1.2. Determine and schedule what types of site inspections may be needed;

7.58.1.3. Evaluate parking, site access and traffic controls;

7.58.1.4. Evaluate crowd controls and flow, and site requirements for bathroom, water and other facilities that may be required to protect the health and welfare of the participants;

7.58.1.5. Confirm that NC Alcohol Law Enforcement (ALE) and Dare County Health Department requirements have been met;

7.58.1.6. To assign and charge any fees associated with use of Town personnel;

7.58.1.7. Schedule repeating events~~; and~~.

7.58.2. Events site and management plan shall include:

~~*7.58.8.1.*~~ *7.58.2.1.* Contact information and cell phone for the person in charge of the event.

~~*7.58.8.2.*~~ *7.58.2.2.* A brief description of the event with an estimated number of expected participants. Ticketed events should indicate the maximum number of tickets that will be sold.

~~*7.58.8.3.*~~ *7.58.2.3.* A site plan map showing:

~~*7.58.8.3.1.*~~ *7.58.2.3.1.* The location of all temporary structures, including tents, stages, concessions, bathroom facilities, or rides.

~~*7.58.8.3.2.*~~ *7.58.2.3.2.* A traffic and parking plan indicating site ingress/egress, traffic flow direction, designated parking areas, and the number of parking spaces. Ticketed events must have one space for every three tickets sold. If off-site parking is anticipated, plan must indicate where off-site parking will be located and document approval from those property owners.

~~*7.58.8.3.3.*~~ *7.58.2.3.3.* The amount, type, and location of temporary signage, subject to the provision of Article 10, Part III, Sign Regulations of this UDO, and the following:

~~*7.58.8.3.3.1.*~~ *7.58.2.3.3.1.* Directional signage less than twelve (12) square feet may be located at strategic locations to direct pedestrians and motorists.

~~*7.58.8.3.3.2.*~~ *7.58.2.3.3.2.* Temporary advertisement, sponsorship, or commercial signage shall be directed internally to the event itself and shall not be located adjacent to or addressing adjacent properties, the US 158 right-of-way or the beach or sound.

~~*7.58.8.3.3.3.*~~ *7.58.2.3.3.3.* Temporary signs shall be displayed only during the actual time period of the event and shall be promptly removed at the close of such event.

~~*7.58.8.3.4.*~~ *7.58.2.3.4.* Notes or attachments related to any additional documentation pertinent to the planned event, including but not limited to:

~~*7.58.8.3.4.1.*~~ *7.58.2.3.4.1.* Approvals required from other agencies (ALE, NCDHHS).

~~*7.58.8.3.4.2.*~~ *7.58.2.3.4.2.* Off-site parking arrangements.

~~*7.58.8.3.4.3.*~~ *7.58.2.3.4.3.* Proof of insurance related to the event.

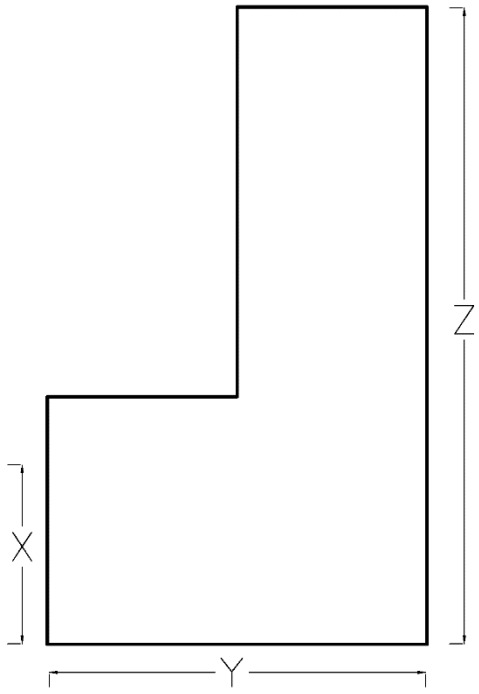
7.58.3. Failure to comply with inspection and code requirements can result in fines and/or suspension of the use of the site in accordance with Section 1.10, Violation of UDO Regulations, of this UDO and other applicable local and state regulations.

PART XVI. That **Article 8. District Development Standards, Section 8.6 Standards/Application of Dimensional Requirements**, be amended as follows:

8.6.2. Length and Width Requirements for Principal Buildings.

The following provision apply both to residential and commercial buildings, except that building erected in the C-3 commercial services district shall be exempt from these minimum dimensional requirements.

8.6.2.1. The length of a principal building shall not exceed three times the width of the building. The length shall be considered the longest dimension of the structure to include porches and open decks. The width shall be considered to be the widest consistent dimension through at least forty percent (40%) of the length of the building, which may be interrupted; for example, if a building has a width of twenty-two (22) feet for 20% of its length, reduces to a width of 18' for 60% of its length, and then widens to a width of 20' for 20% of its length, the building shall be determined to have a width of 20' and shall have a length of no more than 60'.



Dimensions—Principal Buildings
(To use Y as the width, X must equal at least 40 percent of the length (Z) of the building.)

~~***8.6.2.3.***~~ ***8.6.2.2.*** The minimum width of the enclosed habitable space of a principal building shall be eighteen (18) feet measured at the first-floor level.

~~***8.6.2.4.***~~ ***8.6.2.3.*** A building shall be at least eighteen (18) feet wide along at least forty (40) percent of its length.

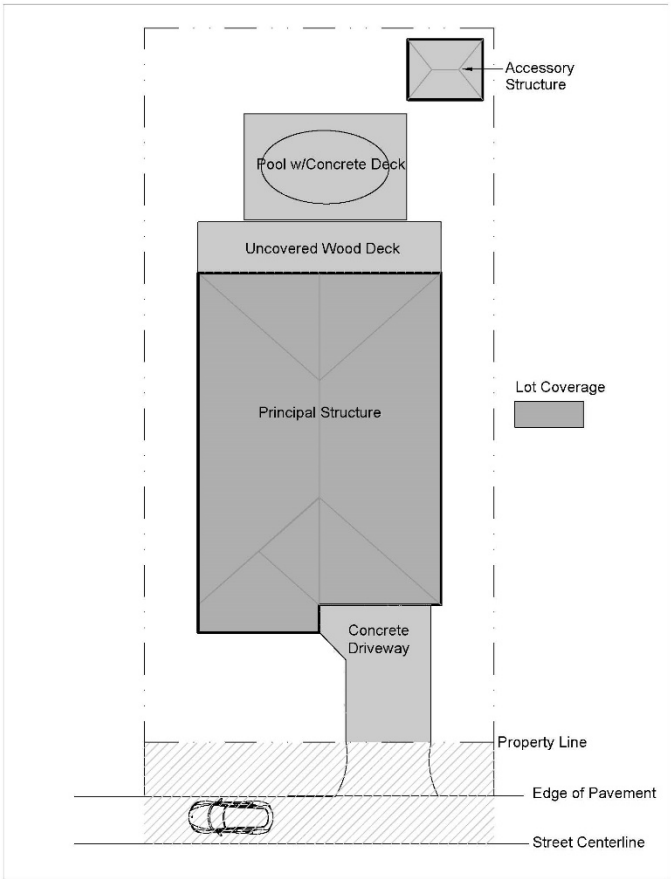
~~***8.6.2.5.***~~ ***8.6.2.4.*** Outside dimensions shall be used in determining length and width. This is defined as the exterior façade covering on the outside of the building (see graphic above).

8.6.3.6. Exclusions from Yard Requirements.

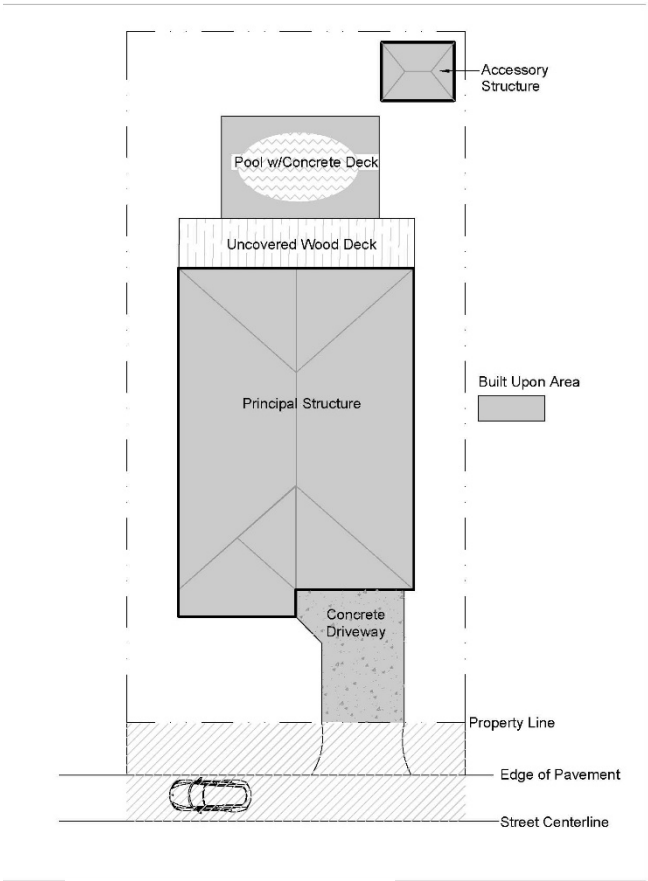
8.6.3.6.1. The inner edge of the front, rear, or side yard shall be measured from the building foundation and may exclude the outermost three feet of eaves, gutters, uncovered handicapped ramps, or uncovered steps. This exclusion may also apply to cargo lifts for single-family or duplex dwellings only, and built-in railing benches constructed

in accordance with Appendix B, "Town of Nags Head Residential Design Guidelines".

PART XVII. That **Article 8. District Development Standards, Section 8.6 Standards/Application of Dimensional Requirements, 8.6.6. Lot Coverage, 8.6.6.1 Purpose and Intent,** be amended by deleting existing example images and inserting the following therefor:



Lot Coverage



Built Upon Area

PART XVIII. That **Article 9., SPD-C Zoning Ordinance**, **Section 9.23 Institutional District**, be amended as follows:

9.23.5.3. Building Setback Requirements.

9.23.5.3.1. A minimum of forty (40) feet from the US 158 right-of-way.

9.23.5.3.2. A minimum of twenty (20) feet from the Seachase Drive right-of-way.

9.23.5.3.3. A minimum of fifty (50) feet from residential uses.

~~*9.23.5.2.4.*~~ *9.23.5.3.4.* ***Building-to-Building Separation.*** A minimum of twenty-five (25) feet.

~~*9.23.5.2.5.*~~ *9.23.5.3.5.* ***Building Height Limitation.*** Thirty-five (35) feet; however, for every foot above thirty-five (35) feet, there shall be an additional setback of two (2) feet from Seachase Drive, US 158, and any residential district. The maximum building height shall be forty-five (45) feet.

~~*9.23.5.2.6.*~~ *9.23.5.3.6.* ***Parking Required.*** Refer to Section 10.16, Required Parking by Use of this UDO.

PART XIX. That **Article 9., SPD-C Zoning Ordinance**, **Section 9.26 Attached Single Family District**, be amended as follows:

9.26.5. Single-Family Four (SF#4) District Standards.
Single-family four district standards in the attached single-family district are as follows:

9.26.5.1. Maximum Density. Twelve (12) dwellings per acre.

9.26.5.2. Minimum Building Front Yard and Side Yard Setback Requirements.

Fronting On:	Front Yard	Side Yard
Public right-of-way	15 feet	Minimum separation between buildings 10 feet

9.26.5.3. Minimum Rear Yard. Thirty (30) feet to existing residential outside the Village at Nags Head, plus a 25-foot natural or landscaped buffer. Only a minimum 15-foot rear yard is required when adjacent to interior open space area.

~~*9.26.5.3.*~~ *9.26.5.4.* ***Minimum Lot Size.*** 2,400 square feet.

9.26.6. Single-Family Five (SF#5) District Standards.
Single-family five district standards in the attached single-family district are as follows:

9.26.6.1. Maximum Density. Three (3) dwellings per acre.

9.26.6.2. Minimum Building Front Yard and Side Yard Setback Requirements.

Fronting On:	Front Yard	Side Yard
Public right-of-way	15 feet	Minimum separation between buildings 10 feet

9.26.6.3. Minimum Rear Yard. Thirty (30) feet to existing residential outside the Village at Nags Head, plus a 25-foot natural or landscaped buffer. Only a minimum 15-foot rear yard is required when adjacent to interior open space area.

~~*9.26.6.3.*~~ *9.26.6.4.* ***Minimum Lot Size.*** 2,400 square feet.

PART XX. That **Article 9., SPD-C Zoning Ordinance**, **Section 9.27 Multifamily District**, be amended as follows:

9.27.6. Multifamily Two (MR#2) District Standards.
Multifamily two (MF #2) district standards in the multifamily district are as follows:

~~*9.27.5.1.*~~ *9.27.6.1.* ***Maximum Density.*** Eighteen (18) units per acre.

~~*9.27.5.2.*~~ *9.27.6.2.* ***Coverage.***

Maximum Building	Maximum Parking	Minimum Landscaped	Minimum Common Area
50 percent (low-rise)	N/A	20 percent	N/A

~~*9.27.5.3.*~~ *9.27.6.3.* ***Minimum Building Front Yard and Side Yard Setback Requirements.***

Fronting On:	Front Yard	Side Yard
Public right-of-way	10 feet	20 feet

Side yard setbacks for developments taller than two stories between South Virginia Dare Trail and the Atlantic Ocean shall follow the "visual window" concept as prescribed in subsection 9.24.11.

~~*9.27.5.4.*~~ *9.27.6.4.* ***Rear Yard.*** Twenty (20) feet. The rear yard may be reduced to fifteen (15) feet if adjacent to dedicated open space.

~~*9.27.5.5.*~~ *9.27.6.5.* ***Building Cluster Separation.*** There shall be a minimum ten (10) feet building separation for each twelve (12) feet of building height or portion thereof.

~~*9.27.5.6.*~~ *9.27.6.6.* ***Maximum Height.*** Forty-five (45) feet.

PART XXI. That **Article 10. Performance Standards, Section 10.24 Signs Permitted in Commercial Districts and the Commercial/Residential Distric**t, shall be amended as follows:

10.24.2.5. Window signs shall be permitted to be placed only inside a commercial building and shall not exceed twenty-five (25) percent of the glass area of the pane upon which the sign is displayed. Window signs of exposed neon, argon, krypton or similar gas tube lighting shall be permittable, provided that such signs shall not exceed twenty-five (25) percent of glass pane area, and shall not exceed singly, or in combination 0.15-square-foot per lineal foot of store frontage, not to exceed twenty (20) square feet of sign area for any one store.

PART XXII. That **Article 10., Performance Standards**, **Small Wireless Facilities**, be amended as follows:

SECTION 10.103 SMALL WIRELESS FACILITIES.

10.103.1. Standards.
Small wireless facilities and utility poles installed to support small wireless facilities shall comply with the following requirements:

10.103.1.1. Small wireless facilities shall be a permitted use in all rights-of-way and on properties containing uses other than single-family dwellings. Small wireless facilities shall be a conditional use on properties developed as single-family dwellings.

10.103.1.2. Height of New Small Wireless Facilities. New small wireless facilities in the ROW may not extend (i) more than ten feet (10') above an existing utility pole in place as of the effective date of this UDO; or (ii) for small wireless facilities on a new utility pole, more than ten feet (10') above the height permitted for a new utility pole under this UDO. A new small wireless facility on private property may not exceed the applicable height limit for the district in which it is located.

ARTICLE IV. Severability.
All Town ordinances or parts of ordinances in conflict with this ordinance amendment are hereby repealed. Should a court of competent jurisdiction declare this ordinance amendment or any part thereof to be invalid, such decision shall not affect the remaining provisions of this ordinance amendment nor the Unified Development Ordinance or Town Code of the Town of Nags Head, North Carolina which shall remain in full force and effect.

ARTICLE V. Effective Date.

This ordinance amendment shall be in full force and effect upon the date of adoption by the Board of Commissioners.

_____
Benjamin Cahoon, Mayor
Town of Nags Head

ATTEST:

_____
Carolyn F. Morris, Town Clerk

APPROVED AS TO FORM:

_____
Town Attorney

Date adopted: _____

Motion to adopt by Commissioner _____
Motion seconded by Commissioner _____
Vote: ____ AYES ____ NAYS

Agenda Item Summary Sheet

Item No: **E-3**
Meeting Date: **May 6, 2020**

Item Title: Public Hearing to consider numerous text amendments to the Unified Development Ordinance as it pertains to the updated flood maps and update of the Flood Damage Prevention Ordinance

Item Summary:
The proposed text amendments serve to adopt the updated Flood Insurance Rate Maps and Flood Insurance Study by amendment of the Flood Damage Prevention Ordinance; additionally, amendments are included to Article 4, Development Review Process, Section 8.6.4., Building Height, Section 11.5.3. Standard for Depth or Elevation of Fill, and Appendix A. Definitions. In addition to the Ordinance, also attached is the PowerPoint presentation made to the Planning Board at the meeting on April 1, 2020 and a letter from the Outer Banks Home Builders Association providing comments on the draft ordinance that was submitted during the Planning Board's meeting.

Planning Board/Staff Recommendation
Staff recommended to the Planning Board that the text amendments be adopted as proposed, with changes requested by the State's NFIP Office. The Planning Board recommended unanimous approval at their meeting on April 1, 2020, with the incorporation of those requested changes. The attached draft of the Ordinance includes these changes. The Planning Board meeting materials and a recording of the meeting are available at www.nagsheadnc.gov/floodmaps.

Number of Attachments: 3

Specific Action Requested:
Consideration of adoption of text amendments.

Submitted By: Principal Planner Holly White Date: April 27, 2020

Finance Officer Comment:
No budgetary impact to the Town of Nags Head.

Signature: Amy Miller Date: April 27, 2020

Town Attorney Comment:

I will participate in the discussion at the Board meeting as necessary.

Signature: John Leidy Date: April 27, 2020

Town Manager Comment and/or Recommendation:

I will participate in the discussion at the Board meeting as necessary.

Signature: Cliff Ogburn Date: April 27, 2020

MEMORANDUM
Town of Nags Head
Planning & Development Department

To: Board of Commissioners

From: Holly White, Principal Planner

Michael Zehner, Director of Planning & Development

Date: April 27, 2020

Subject: Public Hearing to consider numerous text amendments to the Unified Development Ordinance as it pertains to the updated flood maps and update of the Flood Damage Prevention Ordinance

OVERVIEW

As the Board of Commissioners is aware, the Town received the Letter of Final Determination concerning the updated FEMA Flood Insurance Rate Map (F.I.R.M.) as of December 19, 2019. As previously relayed, the updated F.I.R.M. becomes effective no later than 6 months after receipt of the letter (June 19, 2020), requiring local adoption by the Town prior to this date.

The schedule for adoption is as follows:

- ~~Early March 2020 - Community Information Meeting; information materials made available online~~
- ~~April 1, 2020 - Planning Board Meeting; consider recommendation~~
- ~~April 15, 2020 - Board of Commissioners Consent Agenda; request to schedule public hearing~~
- May 6, 2020 - Board of Commissions Public Hearing; Final Action (or continued consideration to June 3, 2020 meeting)
- June 19, 2020 - Effective Date (no later than)

BACKGROUND

The Board of Commissioners and Planning Board met jointly at the Planning Board's meeting on February 18, 2020 to review and discuss an initial draft of the updated Flood Damage Prevention Ordinance, along with updated building height measurement and fill provisions, to be considered in concert with the updated F.I.R.M. covering the Town. Additionally, a Community Informational Meeting was held on Monday, March 9, 2020. The Planning Board considered the proposed text amendments at a meeting on April 1, 2020; the Planning Board recommended unanimous approval of the draft flood maps and flood damage prevention ordinance with the incorporation of requested changes from the State's NFIP Office (which have been incorporated in the version of the ordinance before the Board). Meeting materials presented to the Planning Board and a draft of the ordinance are available at www.nagsheadnc.gov/floodmaps.

SUMMARY OF MAP CHANGES

The preliminary F.I.R.M., released in June of 2016, revealed that many areas of the Town will be removed from the Special Flood Hazard Area. There is an overall reduction of properties located in flood zones in the Town on the preliminary F.I.R.M. This includes fewer properties in AE and VE flood zones and an overall increase in properties located in X flood zones, even on the oceanfront. Further, mapped base flood elevations (BFE's) are being reduced from a current BFE of 8-10' in the AE flood zone to 4-5' on the preliminary F.I.R.M. In addition, a new AO flood zone has been added to the area west of the primary frontal dune. Staff does not believe that the F.I.R.M. accurately represents the overall risk of flooding in the Town.

SUMMARY OF ORDINANCE CHANGES

In conjunction with the updated F.I.R.M. and flood insurance study, the Town is required to update its Flood Damage Prevention Ordinance consistent with the most recent version of the State Model Ordinance for Coastal Areas. There are changes in the State Model Ordinance that the Town must adopted in order to remain in the National Flood Insurance Program (NFIP). These changes are reflected in the attached Adoption Ordinance for the Flood Damage Prevention Ordinance. In conjunction with amendment of the Flood Damage Prevention Ordinance, it will also be necessary to update relevant portions of Article 4. *Development Review Process*, concerning Floodplain Development Permits; Article 8. *District Development Standards*, concerning the measurement of height; and Article 11. *Environmental Provisions*, Part 1 *Stormwater, Fill, and Runoff Management,* concerning the regulation of fill. These changes are also represented in the Attached Adoption Ordinance for the Flood Damage Prevention Ordinance.

Due to a significant number of properties with known flooding histories becoming X or Shaded X on the preliminary maps, a local elevation standard ("LES") is proposed as part of the Flood Damage Prevention Ordinance adoption. The development of the local elevation standard has been a joint effort between Dare County and the Towns of Manteo, Nags Head, Kill Devil Hills, Kitty Hawk, Southern Shores, and Duck. The LES is a locally adopted elevation level used as the Regulatory Flood Protection Elevation (RFPE) to mitigate flood hazards in the Shaded X, X, AE, AO, VE, as depicted on the FIRMs for Nags Head. For properties east of NC 12 and SR 1243, the LES is 12' and development in this coastal high hazard area would have to comply with the standards for VE construction. For properties west of NC 12 or SR 1243, the LES is 10' and the standards that apply to development in this area would be like those that apply in the AE flood zone now.

Since currently there are no regulations that apply to properties in X flood zones, a key part of the ordinance development and new LES language had to be written that applies to properties in Shaded X and X flood zones. There are a set of new, additional standards developed to specifically apply to areas mapped as Shaded X or X. In these areas:

- Substantial improvement/damage definitions (the 50% rule) does not apply;

- Remodeling/renovations of existing habitable area are allowed as long as footprint of the structure does not increase;
- Areas within existing structures cannot be converted for use as conditioned, temperature-controlled space unless the reference level is located to or above the RFPE; and
- Lateral additions - structures located west of NC 12 and SR 1243 (where the reference level of existing conditioned, temperature-controlled space is located below the RFPE)-may be increased by 25% at the same level, without having to be elevated to or above the RFPE.

These standards would apply in addition to other specific standards.

ADDITIONAL CONSIDERATIONS

The Outer Banks Home Builders Association submitted a letter to the Planning Board, dated April 1, 2020, which has been provided to the Board of Commissioners. The Association raised the following points, with Staff responses for consideration:

A. OBHA:
OBHBA members began working in early 2017 with the surveying and engineering community to assist local planning staff in designing new flood prevention measures to address an anticipated reduction in the 2006 FIRM's flood zone elevations in Dare County. Extensive consideration of historical flooding, previous FIRMs, and topographical data informed a consensus among county and municipal planning staff that administration of eight-foot standards to a revised reference level, the bottom of the lowest floor or utility, would ensure adequate flood protection in X and Shaded X zones.

Staff Response:
Town Staff participated in meetings beginning in 2017 with Dare County, other municipalities, and OBHBA representatives. However, during this process, Nags Head Staff did not commit that administration of an eight-foot standard would ensure adequate flood protection in X and Shaded X zones within the Town.

The Town has been documenting rainfall-based flood occurrences for the past 20-years. Staff has observed an increase in the frequency and intensity of rainfall events, whether it be a series of events or a single event. Significant rainfall-based flood events have been documented in the Town 11 out of the past 20 years and more importantly, every year for the last 4 years.

In addition to documenting areas of flooding throughout Town, we have also documented flood depths, relative to mean sea level (msl). Hurricane Matthew was documented at a maximum flood elevation of 10'msl. Areas of flooding in the Vista Colony Subdivision were measured as much as 11.25' msl in 2012 from a series of rainfall events. Other smaller scale rainfall-based events have resulted in flood depths exceeding 8' msl.

Noting Commissioners' previous concerns that the maps are flawed, Staff has attempted to address this concern by proposing an LES of 10' west of NC 12 and SR 1234. In Staff's opinion, an LES of 8' would not be responsive to these concerns; based upon analysis, an LES of 8' would result in approximately 36% (1,916) of the properties in Town being regulated to a lesser standard than they are presently. In contrast, an LES of 10' west of NC 12 and SR 1234, would result in approximately 2% (133) of the properties being regulated less stringently than under current regulations

B. OBHA:
Section 11.42.3.1.2. of Nags Head's draft ordinance proposes a 10 foot RFPE for properties west of NC HWY 12. While we recognize that each jurisdiction must determine RFPEs and other important planning objectives on localized bases, the OBHBA urges planning board members' attention to the potential consequences Nags Head's proposed ten foot RFPE poses in light of additional proposed restrictions on lateral additions. Section 11.44.2.7.9.2. would require that lateral additions to nonconforming structures in X and Shaded X zones be elevated to the proposed ten foot RFPE if they would increase the square footage of the adjacent floor by 25% or more. This presents a problem for homeowners interested both in usably enlarging a floor that falls below the proposed RFPE and in maintaining a level floor.

Staff Response:
Based upon analysis completed by Staff, there are currently an estimated 1,004 (19%) structures that are FEMA non-compliant with respect to elevation. If a proposed LES of 10' is adopted, the number of FEMA non-compliant structures would increase by 174 (3%). Of the proposed FEMA non-compliant structures with an LES of 10', seventy-eight percent (78%) will be located in a flood zone X, all having ground elevations of less than 11'. In contrast, Staff's analysis indicates that 4,514 (85%) of the 5,277 structures in Nags Head have estimated first floor elevations of 10' or greater.

Given the significant number of existing FEMA non-compliant structures that will now be located within an X flood zone, coupled with the effect of establishing an LES of 8' versus 10' (and vice versa), staff believes that a 10' LES results in better protection of existing and proposed development, and is more consistent with current regulation.

C. OBHA:
The OBHBA respectfully requests that you allow existing maximum lot coverage restrictions to regulate additions and remove the arbitrary 25% threshold.

Staff Response:
Staff believes that allowing maximum lot coverage restrictions to regulate additions will not comprehensively address additions below RFPE in the town. Based upon analysis by staff, there are existing structures with floor area below the current RFPE, but which would now be in an X flood zone, where as much as 1,800 square feet (16%) of lot coverage is still available. The 25% percent

threshold was intended to allow small additions at the same level for homes that have heated area below the RFPE in the X flood zone.

D. OBHA:
We believe that the category of possible lateral additions that would expand properties with a demonstrated flood history, that would conform to maximum lot coverage, and that would be large enough to constitute a compelling regulatory interest is almost vanishingly narrow.

Staff Response:
Assuming an LES of 10' (areas west of NC 12 and SR 1243), and without a limit on lateral additions, approximately 622 of existing non-compliant structures would be eligible to maximize lot coverage, where they are currently precluded from doing so under current regulations.

E. OBHA:
We believe that the size of lateral additions to the many moderately sized homes in Nags Head should not be rigorously constrained by a regulation with such a limited intended function.

Staff Response:
The goal of the National Flood Insurance Program and the Flood Damage Prevention Ordinance is to protect human life, safety, and health as well as to minimize damage to private and public property due to flooding. The regulations proposed are consistent with these goals. The proposed regulations do not preclude lateral additions, rather, they would limit additions below the 10' LES in a shaded X or X flood zone to 25% of the existing floor area below the LES; lateral additions in excess of this limit could maximize allowable lot coverage if elevated to meet the LES.

POLICY CONSIDERATIONS

The most direct policies and actions in the Comprehensive Plan pertaining to floodplain management are contained in Section 3.3.2 Hazard Mitigation as follows:

NR-11 Ensure that the town is a disaster resilient community that can survive, recover from, and thrive after a natural or man-made disaster event.

NR-11i: Explore resilient construction techniques and higher regulatory standards to protect existing and future development from frequent localized flooding events.

NR-13 Support the town's continued participation in the National Flood Insurance Program (NFIP) and Community Rating System (CRS). Participation in the NFIP is key in making federally backed flood insurance available within the town and to improve the town's CRS rating.

PLANNING BOARD RECOMMENDATION

At their meeting on April 1, 2020, the Planning Board recommended unanimous approval of the text amendments as proposed, with incorporation of changes recommended by Staff as requested by the State's NFIP Office.

STAFF RECOMMENDATION

Staff recommends adoption of the text amendments as proposed.

With regard to the Board of Commissioners' review and action, Staff recommends consideration of the following UDO provisions:

3.5.3. Action by the Planning Board.

3.5.3.1. Every proposed amendment, UDO text amendment or zoning map amendment, shall be referred to the Planning Board for its recommendation and report. The Board of Commissioners is not bound by the recommendations, if any, of the Planning Board.

3.5.3.2. Prior to the consideration by the Board of Commissioners of a proposed UDO text amendment or zoning map amendment, the Planning Board shall advise and comment on whether the proposed amendment is consistent with the Comprehensive Plan. The Planning Board shall provide a written recommendation, certified by the UDO Administrator, to the Board of Commissioners that addresses plan consistency and other matters as deemed appropriate by the Planning Board, but a comment by the Planning Board that a proposed amendment is inconsistent with the Comprehensive Plan shall not preclude consideration or approval of the proposed amendment by the Board of Commissioners.

3.5.3.3. Members of the Planning Board shall not vote on recommendations regarding any UDO text amendment or zoning map amendment where the outcome of the mater being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the member.

3.5.4. Action by the Board of Commissioners.
Action upon an UDO text amendment or zoning map amendment, including the scheduling of a public hearing, will be at the discretion of the Board of Commissioners.

3.5.4.1. Before an item is placed on the consent agenda to schedule a public hearing, the Planning Board's recommendation on each proposed amendment must be received by the Board of Commissioners. If no recommendation is received from the Planning Board within 30 days from the date when submitted to the Planning Board, the petitioner may take the proposal to the Board of

Commissioners without a recommendation from the Planning Board. However, the Planning Board may request the Board of Commissioners to delay final action on the amendment until such time as the Planning Board can present its recommendations. No such limitations shall apply to applications or requests submitted by Town staff or any Town Board.

3.5.4.2. After receiving a recommendation from the Planning Board on a proposed amendment, the Board of Commissioners may proceed to vote on the proposed ordinance, refer it to a committee for further study, or take any other action consistent with its usual rules of procedure.

3.5.4.3. The Board of Commissioners is not required to take final action on a proposed amendment within any specific period of time. Final action on an UDO text amendment or zoning map amendment submitted by third parties will be taken within a reasonable time. Final action taken within 90 days of the public hearing before the Board of Commissioners shall be presumptively reasonable.

3.5.4.4. No member of the Board of Commissioners shall vote on any zoning map amendment or UDO text amendment where the outcome of the matter being considered is reasonably likely to have a direct, substantial and readily identifiable financial impact.

3.5.4.5. Prior to adopting or rejecting any UDO text and/or map amendment, the Board of Commissioners shall adopt one of the following statements which shall not be subject to judicial review.

3.5.4.5.1. A statement approving the amendment and describing its consistency with the adopted Comprehensive Plan and explaining why the action taken is reasonable and in the public interest.

3.5.4.5.2. A statement rejecting the amendment and describing its inconsistency with the adopted Comprehensive Plan and explaining why the action taken is reasonable and in the public interest.

3.5.4.5.3. A statement approving the amendment and containing at least all of the following:

3.5.4.5.3.1. A declaration that the approval is also deemed an amendment to the Comprehensive Plan. The Board of Commissioners shall not require any additional request or application for amendment to the Comprehensive Plan.

3.5.4.5.3.2. An explanation of the change in conditions the Board of Commissioners took into account in amending the UDO to meet the development needs of the community.

3.5.4.5.3.3. Why the action was reasonable and in the public interest.

3.5.4.6. In deciding whether to adopt a proposed amendment to this UDO, the central issue before the Board of Commissioners is whether the proposed amendment advances the public health, safety, or welfare. When considering proposed map amendments:

3.5.4.6.1. The Board of Commissioners shall consider the entire range of permitted uses in the requested classification.

Attachments:

1. Adoption Ordinance
2. Powerpoint for Planning Board Meeting- April 1, 2020

Flood Map & Flood Damage Prevention Ordinance

Planning Board

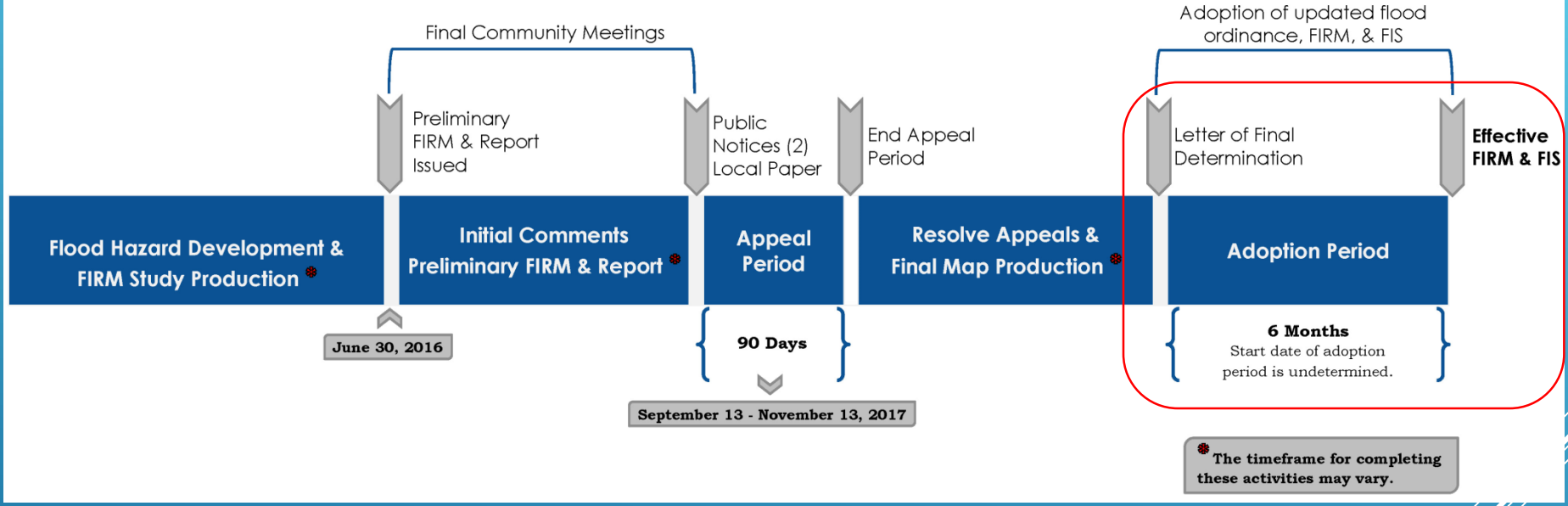
April 1, 2020

FLOOD MAP REVISIONS

- New preliminary flood maps released for Dare County – June 30, 2016
- Last update September 20, 2006
- NC Floodplain Mapping- Digital FIRMs

  http://fris.nc.gov/fris/
- Must adopt the maps, study, and ordinance by June 19, 2020

TIMELINE


Final Community Meetings
Adoption of updated flood ordinance, FIRM, & FIS
Preliminary FIRM & Report Issued
Public Notices (2) Local Paper
End Appeal Period
Letter of Final Determination
Effective FIRM & FIS
Flood Hazard Development & FIRM Study Production *
Initial Comments Preliminary FIRM & Report *
Appeal Period
Resolve Appeals & Final Map Production *
Adoption Period
June 30, 2016
90 Days
September 13 - November 13, 2017
6 Months
Start date of adoption period is undetermined.
* The timeframe for completing these activities may vary.

MAJOR CHANGES TO PRELIMINARY FIRMS

- Fewer VE zone properties
- Fewer AE zone properties, particularly west of NC 12
- Removal of causeway properties from VE zone
- Increase in X zone properties town wide
- Base flood elevations reduced in AE zone; most new BFE's are 4 or 5, formerly 8-10.
- Base flood elevations modified in VE zone; range from 10' – 12'; formerly 11' through entire town
- Addition of AO zones west of primary frontal dune

FLOOD DAMAGE PREVENTION ORDINANCE

The standards for AE and VE Flood Zones largely remain the same.

- State Model Ordinance updates
- Local LES language

Draft ordinance available:

www.nagsheadnc.gov/floodmaps

STATE REVIEW & COMMENT

- 11.41.1. Statutory Authorization- update with new 160D references
- 11.43.5.5.3.- strike template language of "Insert Cost of Structure)
- 11.43.7.7. Add word "be".

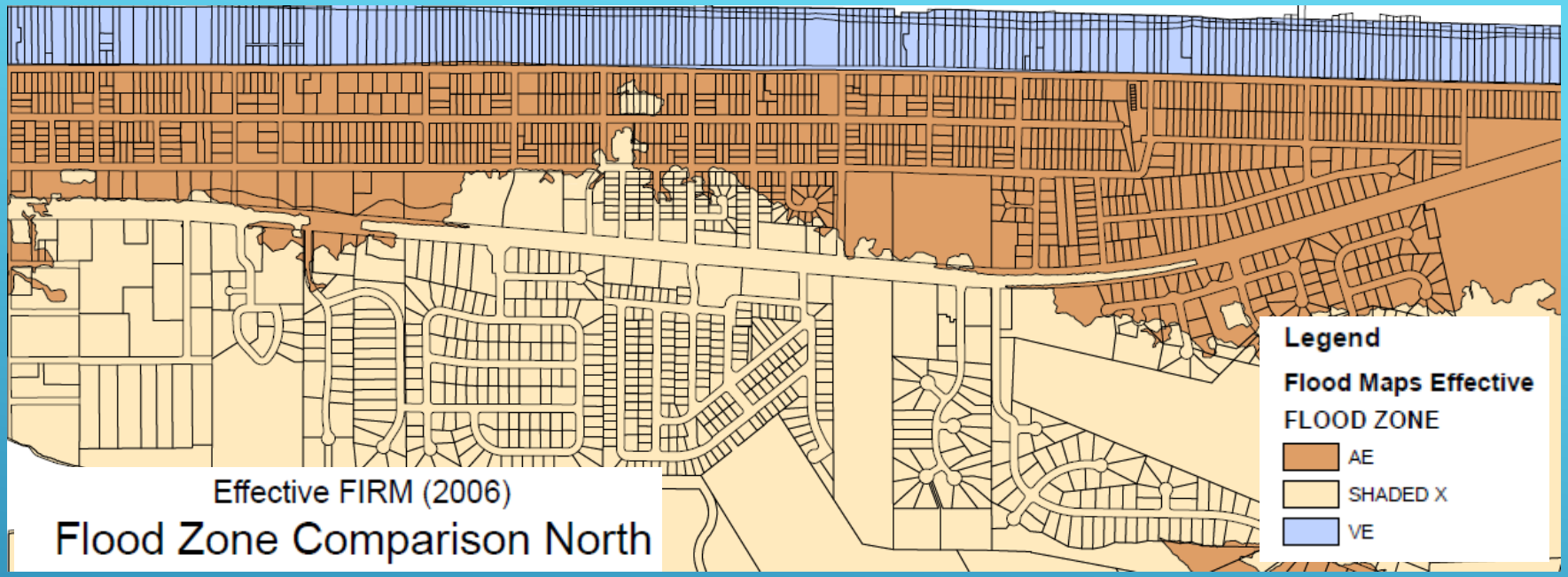
Any applicant to whom a variance is granted shall be given written notice specifying the difference between the RFPE and the elevation to which the structure is to be built

STATE REVIEW & COMMENT

- 11.44.3.2.- Add the following:

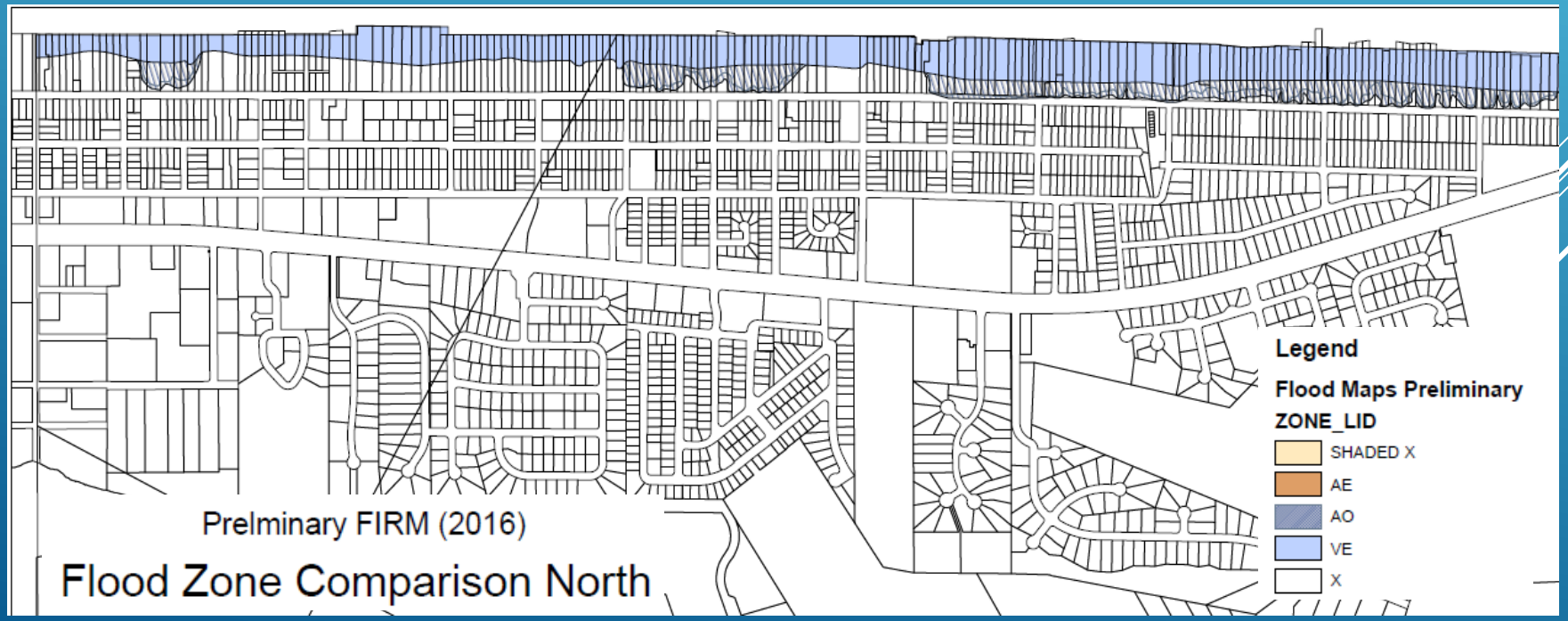
"Floodproofing shall not be utilized on any structures in VE zones to satisfy the regulatory flood protection elevation requirements."

- Modify the date utilized in the definition of "Existing manufactured home park" to reflect Insert the date of the community's initial floodplain regulations- *February 3, 1975*.
- Amend the definition of "Pre-Firm" to reflect the initial FIRM date of *November 10, 1972*.



Effective FIRM (2006)

Flood Zone Comparison North

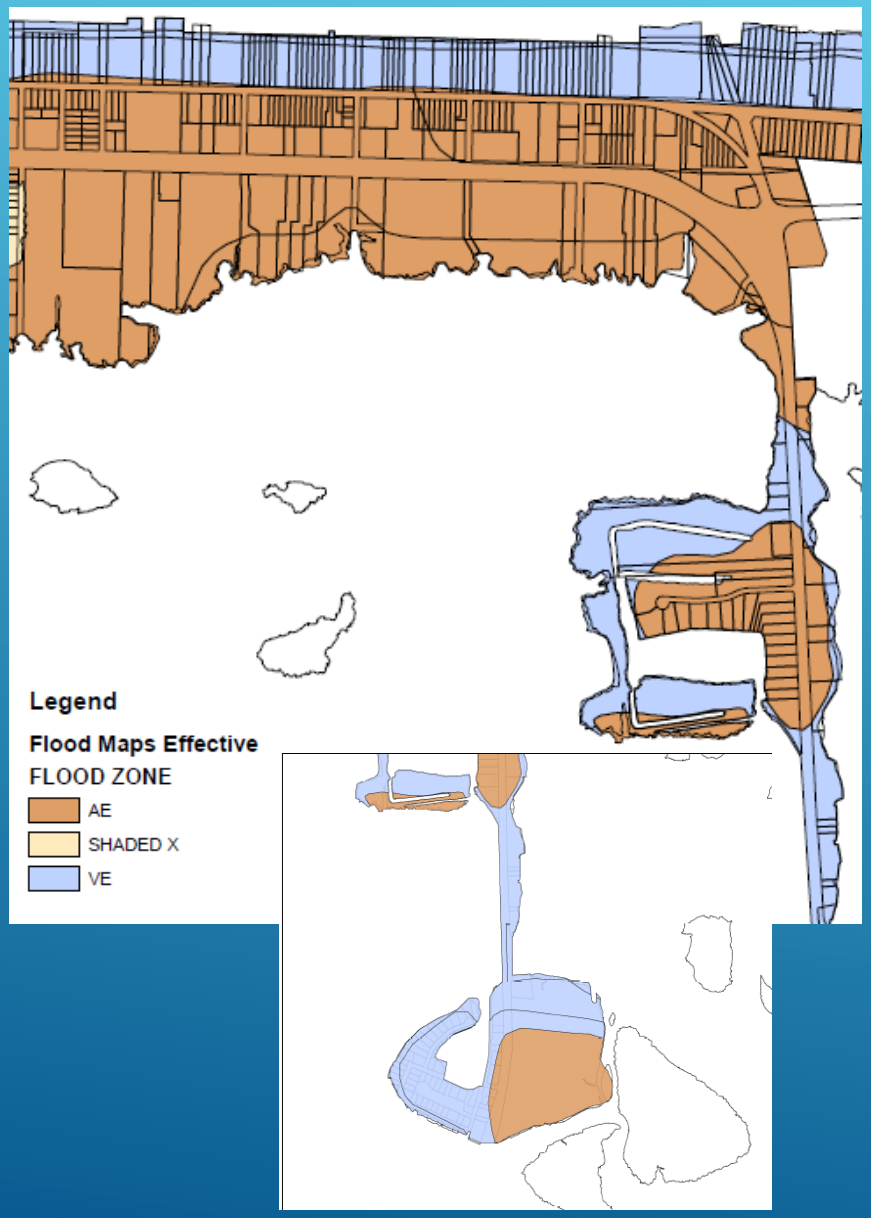


Prelminary FIRM (2016)

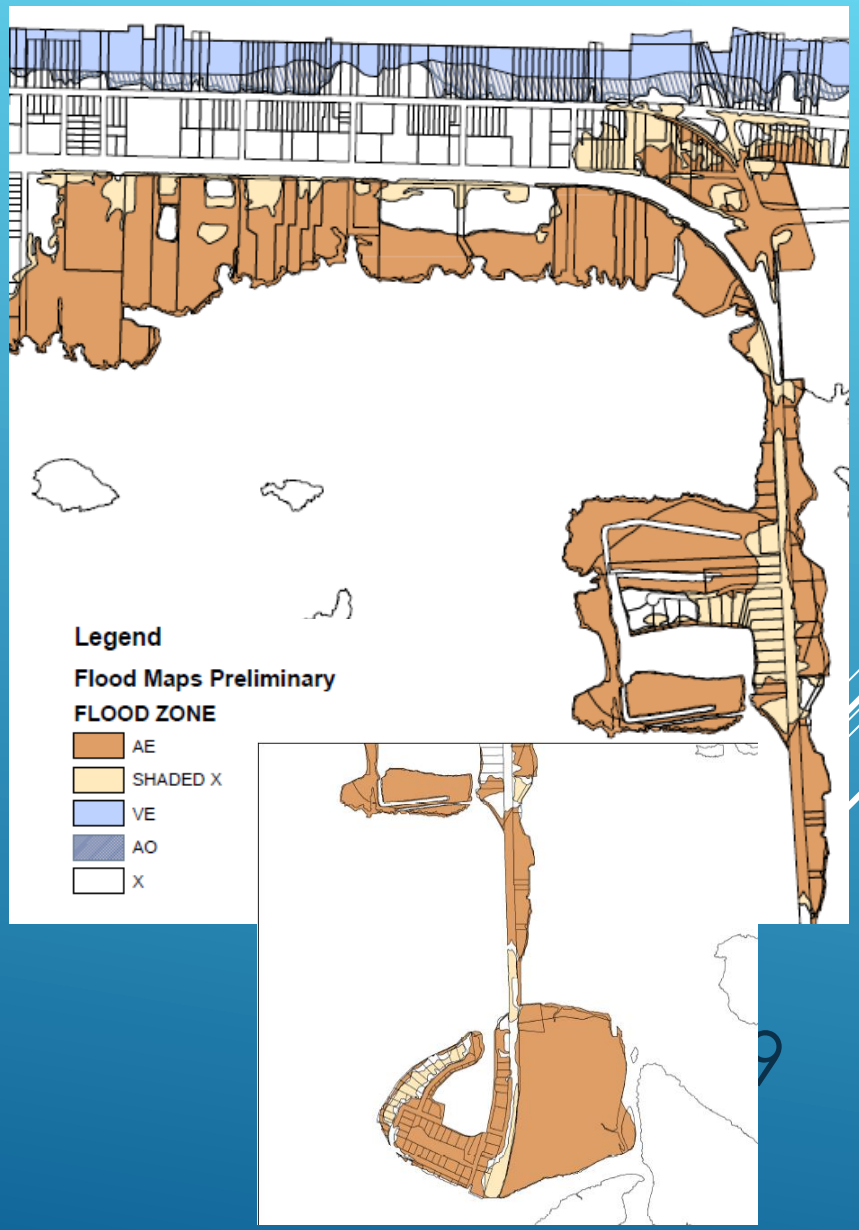
Flood Zone Comparison North

Flood Zone Comparison South

Effective FIRM (2006)

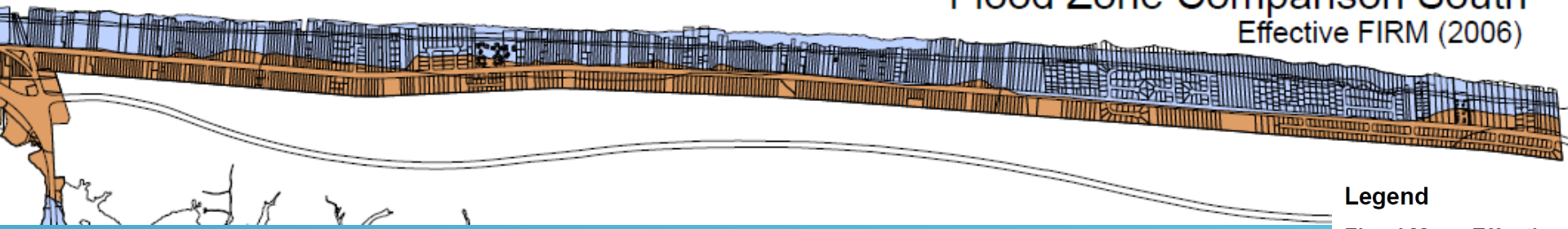


Prelminary FIRM (2016)



Flood Zone Comparison South

Effective FIRM (2006)



Legend

Flood Maps Effective

FLOOD ZONE

- AE
- SHADED X
- VE

Prelminary FIRM (2016)

Legend

Flood Maps Preliminary

FLOOD ZONE

- AE
- SHADED X
- VE
- AO
- X

CREATION OF LOCAL ELEVATION STANDARD (LES)

- Locally adopted elevation level used as the Regulatory Flood Protection Elevation (RFPE) to mitigate flood hazards in Shaded X and X, AE, AO, or VE flood zones as depicted on the FIRMS for Nags Head.

BENEFITS OF LES

- The town is proactively regulating based on known historical risk.
- The model flood damage prevention ordinance, the terminology, and standards are consistent between the town and the rest of the county.
- Allows property owners to experience a decrease in flood insurance premiums, but allows the town to regulate using a local elevation standard based on known flooding risk.
- Avoid future loss and risk to property owners for new construction and additions.
- The LES protects against future costly insurance rate increases for non-conforming construction. The new maps should positively affect insurance rates for many property owners which may cause owners to cancel flood insurance coverage. However, if flood maps are updated in the future to reflect expanded flood zones or higher BFE's, these properties may become non-conforming and face costly insurance rate increases.

LOCAL ELEVATION STANDARD

- East of 12/1243:

  12' and VE construction requirements

- For non-oceanfront areas (west of NC 12 or SR 1243 and the Causeway):

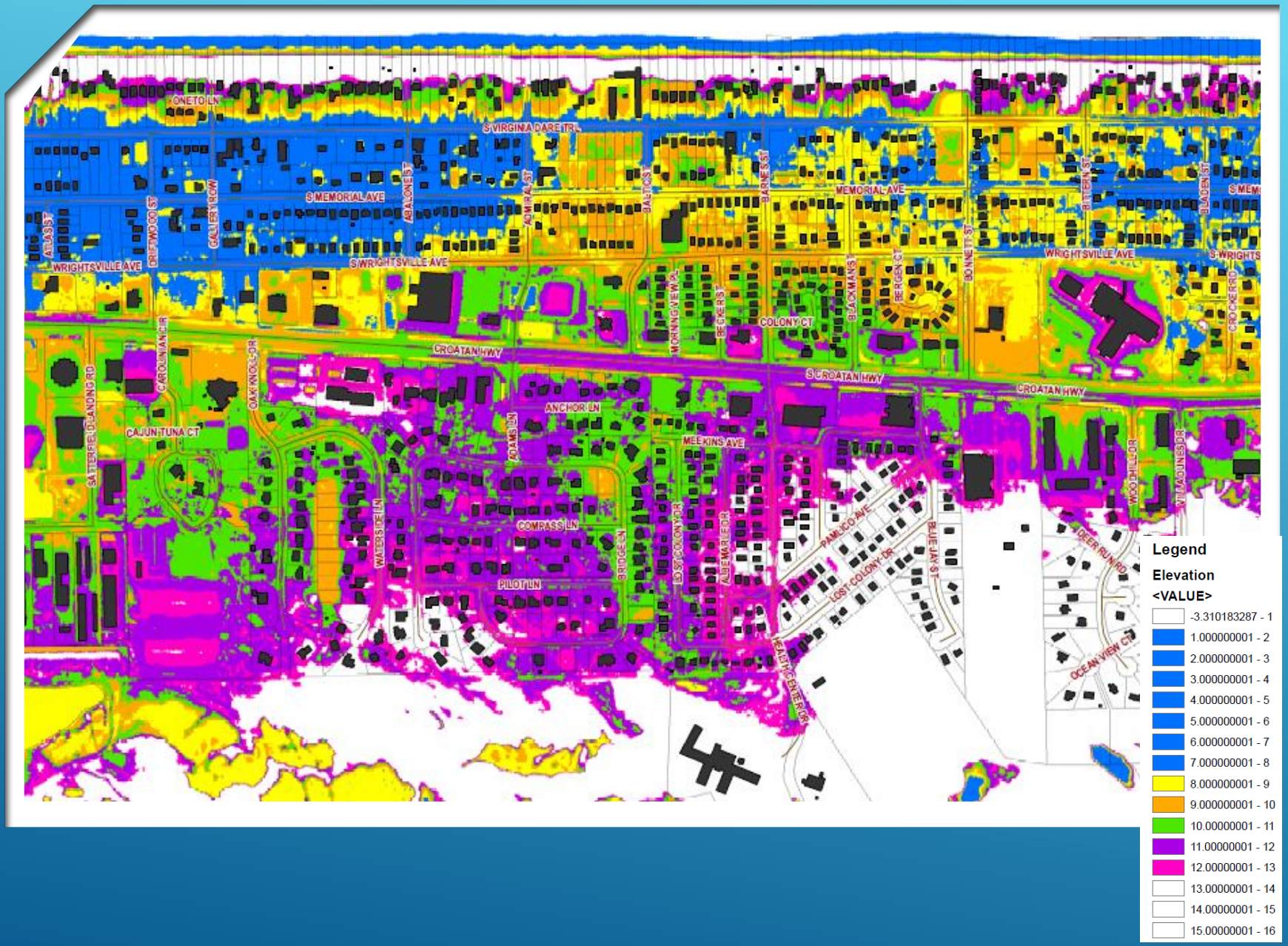
  10' feet would be required for all new construction

The Town will adopt the FIRM for flood insurance purposes.

HOW THE LES AFFECTS PROPERTY

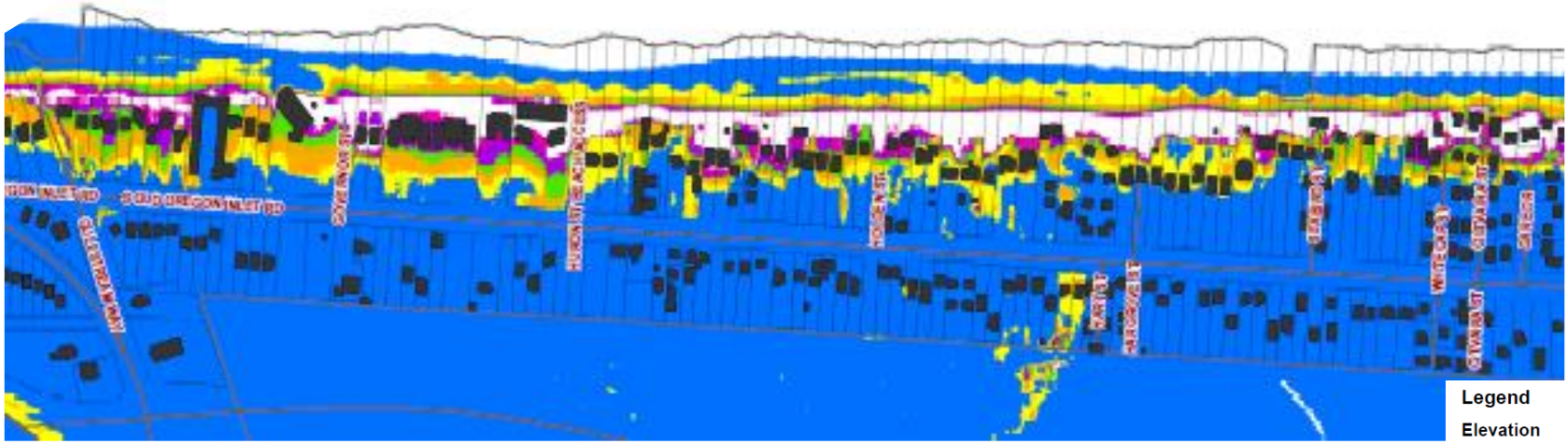
- East of 12/1243: Treat as V Zone with V zone requirements; no enclosures
- West of 12/1243: Treat as AE; Limit enclosures 300 sq. ft. or less
- Existing structures: Areas cannot be converted for temperature controlled space unless meets RFPE
- Section 11.44.2.7.9., Standards in Shaded X and X:
  - Substantial improvement/damage definitions do not apply
  - Lateral additions- structures located west of NC 12 and SR 1243 (where the reference level of existing conditioned, temperature controlled space is located below the RFPE)- may be increased by 25% at the same level, without having to be elevated to or above the RFPE
  - Remodeling/renovations existing habitable area- allowed as long as footprint does not increase.

Northern Nags Head- Ground Elevations



Central Nags Head- Ground Elevations

South Nags Head- Ground Elevations

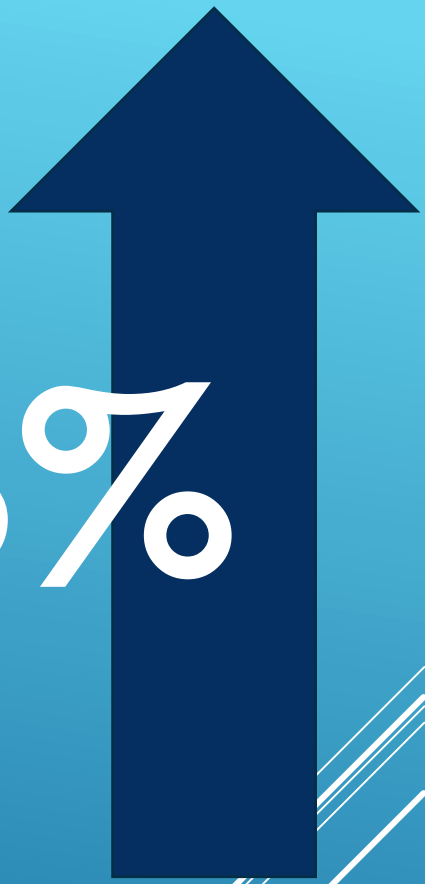


NAGS HEAD ANALYSIS

1,004/19% structures(Existing FEMA non-compliance)

1,178/22% structures (Proposed LES non-compliance)

174 structures (non-compliance)



1,178 non-compliant structures

78%

Non-compliant structures will be within an X flood zone with an LES of 10'.

Why is this significant?

Properties could build on grade without an LES.

All of these properties have ground elevations below 11'.

House built- 1972

Lot area- 11,325 sq. ft.

Ground Elevations- 6.5-6.7

First Floor- 9.7

Building/Decks- 1,363 sq. ft.

Concrete parking/drives- 559 sq. ft.

Total lot existing coverage-

1,921 sq. ft. (16.9%)

Allowable lot coverage (33%)- 3,737.25 sq. ft.

Available coverage- 1,816.25 sq. ft. (16.1%)

House built- 1972

Lot area- 11,325 sq. ft.

Ground Elevations- 6.5-6.7

First Floor- 9.7

First floor area- 768 sq. ft.

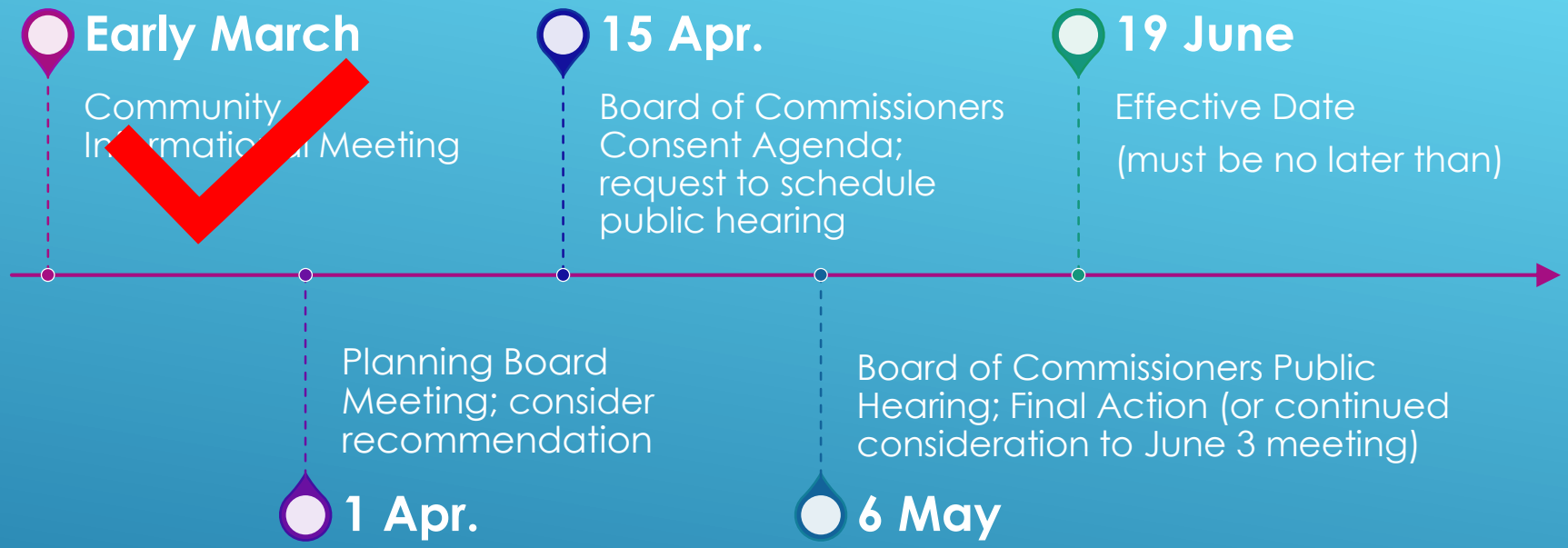
25% lateral addition- 192 sq. ft.

Available coverage- 1,816.25 sq. ft. (16.1%)

Minus lateral addition- 192 sq. ft.

Remaining coverage- 1,624.25 sq. ft.

NEXT STEPS


Early March
Community Information Meeting
15 Apr.
Board of Commissioners Consent Agenda; request to schedule public hearing
19 June
Effective Date
(must be no later than)
Planning Board Meeting; consider recommendation
1 Apr.
Board of Commissioners Public Hearing; Final Action (or continued consideration to June 3 meeting)
6 May

STAFF CONTACTS

- Planning Director- Michael Zehner (252.449.6044) or michael.zehner@nagsheadnc.gov
- Deputy Planning Director Kelly Wyatt (252.449.6042) or kelly.wyatt@nagsheadnc.gov
- Principal Planner Holly White (252.449.6041) or holly.white@nagsheadnc.gov
- Chief Building Inspector/Floodplain Administrator Cory Tate (252.449.6043) or cory.tate@nagsheadnc.gov
- Senior Building Inspector Steve Szymanski (252.449.2005) or steve.szymanski@nagsheadnc.gov

Tuesday, March 31, 2020

Town of Nags Head Planning Board
P.O. Box 99
Nags Head, NC 27959

Dear Chairman Vaughan and planning board members,

Thank you for your leadership as our community works to maximize its resilience by revising the Flood Damage Prevention Ordinance (FDPO) in preparation for the 2020 Flood Insurance Rate Map (FIRM)'s June 19 effective date. The over 500 members of the Outer Banks Home Builders Association (OBHBA) appreciate the complexity of the task before you and welcome the opportunity this process presents us to apply our professional knowledge in service to the town. We are thankful for planning staff's responsiveness to our members' recommendations as the ordinance has developed in recent months, and are confident the draft before you potentiates sound solutions to the challenges the 2020 FIRM poses for construction and development standards. We remain concerned, however, that the FDPO as currently written is problematic in two important and interrelated respects: its establishment of a 10-foot local elevation standard for areas west of NC HWY 12, and its restriction according to square footage of same-level lateral additions to nonconforming properties in X and Shaded X zones.

OBHBA members began working in early 2017 with the surveying and engineering community to assist local planning staff in designing new flood prevention measures to address an anticipated reduction in the 2006 FIRM's flood zone elevations in Dare County. Extensive consideration of historical flooding, previous FIRMs, and topographical data informed a consensus among county and municipal planning staff that administration of eight foot standards to a revised reference level, the bottom of the lowest floor or utility, would ensure adequate flood protection in X and Shaded X zones. Section 11.42.3.1.2. of Nags Head's draft ordinance proposes a 10 foot RFPE for properties west of NC HWY 12. While we recognize that each jurisdiction must determine RFPEs and other important planning objectives on localized bases, the OBHBA urges planning board members' attention to the potential consequences Nags Head's proposed ten foot RFPE poses in light of additional proposed restrictions on lateral additions.

Section 11.44.2.7.9.2. would require that lateral additions to nonconforming structures in X and Shaded X zones be elevated to the proposed ten foot RFPE if they would increase the square footage of the adjacent floor by 25% or more. This presents a problem for homeowners interested both in usably enlarging a floor that falls below the proposed RFPE and in maintaining a level floor. The OBHBA respectfully requests that you allow existing maximum lot coverage restrictions to regulate additions and remove the arbitrary 25% threshold. We believe that the category of possible lateral additions that would expand properties with a demonstrated flood history, that would conform to maximum lot coverage, and that would be large enough to constitute a compelling regulatory interest is almost vanishingly narrow. We believe that the size of lateral additions to the many moderately sized homes in Nags Head should not be rigorously constrained by a regulation with such a limited intended function.

Thank you again for participating in the Outer Banks community's cooperative endeavor to ensure sustainable building, and for your efforts to include stakeholders' concerns in your dialogue. Please address any questions to porter@obhomebuilders.org.

Regards,

Porter Graham

Government Affairs Director
Outer Banks Home Builders Association

AN ORDINANCE AMENDING THE CODE OF ORDINANCES OF THE TOWN OF NAGS HEAD, NORTH CAROLINA PERTAINING TO FLOOD DAMAGE PREVENTION

ARTICLE I. Purpose(s) and Authority.

WHEREAS, The Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Article 6 of Chapter 153A; Article 8 of Chapter 160A; and Article 7, 9, and 11 of Chapter 160D (Effective January 1, 2021) of the North Carolina General Statutes, delegated to local governmental units the authority to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, The flood prone areas of the Town are subject to periodic inundation which results in loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare; and

WHEREAS, The Town of Nags Head desires to protect human life, safety and health; minimize expenditure of public money for costly flood control projects; minimize the need for rescue and relief efforts associated with flooding; minimize prolonged business losses and interruptions; minimize damage to public facilities and utilities; minimize damage to private and public property due to flooding; maintain the natural and beneficial functions of floodplains; and mitigate flood risks in Nags Head by implementing local elevation standards for all Special Flood Hazards Areas and Shaded X and X flood zones.

WHEREAS, The Town of Nags Head 2017 Comprehensive Plan includes goals and policies that support the Town's continued participation in the National Flood Insurance Program (NFIP) and ensure the Town is a disaster resilient community that can survive, recover from, and thrive after a natural or man-made disaster; and

WHEREAS, the Board of Commissioners finds that these text amendments are consistent with the goals, objectives and policies of the Town's adopted Comprehensive Plan, and that this action is reasonable and in the public interest, and is in the interest of and not contrary to the public's health, safety, morals and general welfare for the Town to amend the Towns Unified Development Ordinance as stated below.

ARTICLE II. Amendment of the Unified Development Ordinance.

NOW, THEREFORE, BE IT ORDAINED by the Board of Commissioners of the Town of Nags Head, North Carolina, that the Unified Development Ordinance of the Town Code shall be amended as follows:

PART I. That **Article 11, Environmental Regulations**, **Part III. Flood Damage Prevention** shall be deleted in its entirety and replaced with the following:

PART III. FLOOD DAMAGE PREVENTION

SECTION 11.41 STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE AND OBJECTIVES.

11.41.1. Statutory Authorization.

The Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Article 6 of Chapter 153A; Article 8 of Chapter 160A; and Article 7, 9, and 11 of Chapter 160D (Effective January 1, 2021) of the North Carolina General Statutes, delegated to local governmental units the authority to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the Board of Commissioners does ordain as follows in this Article 11, Part III.

11.41.2. Findings of Fact.

11.41.2.1. The flood prone areas of the Town are subject to periodic inundation which results in loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.

11.41.2.2. These flood losses are caused by the cumulative effect of obstructions in floodplains causing increases in flood heights and velocities, and by the occupancy in flood prone areas of uses vulnerable to floods or other hazards.

11.41.3. Statement of Purpose.

It is the purpose of this Article 11, Part III to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions within flood prone areas by provisions designed to:

11.41.3.1. Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;

11.41.3.2. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

11.41.3.3. Control the alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of floodwaters;

11.41.3.4. Control filling, grading, dredging and other development which may increase erosion or flood damage; and

11.41.3.5. Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters, or which may increase flood hazards to other lands.

11.41.4. Objectives.

The objectives of this article are to:

11.41.4.1. Protect human life, safety and health;

11.41.4.2. Minimize expenditure of public money for costly flood control projects;

11.41.4.3. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

11.41.4.4. Minimize prolonged business losses and interruptions;

11.41.4.5. Minimize damage to public facilities and utilities, such as water and gas mains, electric, telephone, cable and sewer lines, streets and bridges, located in flood prone areas;

11.41.4.6. Minimize damage to private and public property due to flooding;

11.41.4.7. Make flood insurance available to the community through the National Flood Insurance Program (NFIP);

11.41.4.8. Maintain the natural and beneficial functions of floodplains;

11.41.4.9. Help maintain a stable tax base by providing for the sound use and development of flood-prone areas; and

11.41.4.10. To ensure that potential homebuyers are notified that property is in a Special Flood Hazard Area (SFHA) or other areas prone to flooding.

11.41.4.11. Mitigate flood risks in Nags Head by implementing local elevation standards for all Special Flood Hazards Areas and Shaded X and X flood zones.

SECTION 11.42 GENERAL PROVISIONS.

11.42.1. Lands to Which this Article 11, Part III Applies.

This Article 11, Part III shall apply to all areas within the jurisdiction of the Town, including Extra-Territorial Jurisdictions (ETJs) as allowed by law.

11.42.2. Basis for Establishing the Special Flood Hazard Areas.

The special flood hazard areas are those identified under the Cooperating Technical State (CTS) agreement between the State of North Carolina and FEMA in its Flood Insurance Study (FIS) dated June 19, 2020 for Town of Nags Head, Dare County and associated DFIRM panels, including any digital data developed as part of the FIS, which are adopted by reference and declared a part of this ordinance, and all revisions thereto after January 1, 2021. Future revisions to the FIS and DFIRM panels that do not change flood hazard data within the jurisdictional authority of the Town of Nags Head are also adopted by reference and declared a part of this ordinance. Subsequent Letter of Map Revisions (LOMRs) and/or Physical Map Revisions (PMRs) shall be adopted within 3 months.

11.42.3. Establishment of a Local Elevation Standard (LES)

The Local Elevation Standard means a locally adopted elevation level used as the Regulatory Flood Protection Elevation (RFPE) to mitigate flood hazards in the Shaded X, X, AE, AO, VE, as depicted on the FIRMs for Nags Head. These areas may be vulnerable to flooding from storm surge, wind-driven tides, and excessive rainfall. Many of these areas have repetitively flooded and continue to remain at risk to flooding. Therefore, an elevation standard and other floodplain development standards are needed to meet the objectives of this Section as identified in 11.41.4.

11.42.3.1. In Nags Head the RFPE is as defined as:

11.42.3.1.1. Coastal High Hazard Areas (CHHA)- Properties located to the east of NC 12 and SR 1243 are located in an active oceanfront environment that is vulnerable to storm surge, erosion, sea level rise, and other hazards. These areas have special flood hazards associated with high velocity waters from storm surges or seismic activity and, therefore, the RFPE is 12 feet NAVD 1988.

11.42.3.1.2. Properties west of NC 12 and SR 1243- The RFPE for properties located west of NC 12 and SR 1243 and in flood zones Shaded X, X, or AE, is 10 feet NAVD 1988. This includes properties abutting US 64, also known as the Causeway.

11.42.4. Establishment of Floodplain Development Permit.
A floodplain development permit shall be required in conformance with the provisions of this Part prior to the commencement of any development activities within the AE, AO, VE, Shaded X or X zone.

11.42.5. Compliance.
No structure or land shall hereafter be located, extended, converted, altered or developed in any way without full compliance with the terms of this Part and other applicable regulations.

11.42.6. Abrogation and Greater Restrictions.
This Part is not intended to repeal, abrogate or impair any existing easements, covenants or deed restrictions. However, where this Part and another provision conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

11.42.7. Interpretation.
In the interpretation and application of this Part, all provisions shall be considered as minimum requirements; liberally construed in favor of the Board of Commissioners; and deemed neither to limit nor repeal any other powers granted under state statutes.

11.42.8. Warning and Disclaimer of Liability.
The degree of flood protection required by this Part is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur; actual flood heights may be increased by manmade or natural causes. This Part does not imply that land outside the special flood hazard areas or uses permitted within such areas will be free from flooding or flood

damages. This Part shall not create liability on the part of the Town or by an officer or employee thereof for any flood damages that result from reliance on this Part or any administrative decision lawfully made thereunder.

11.42.9. Penalties for Violations.

Violation of the provisions of this Part or failure to comply with of its requirements, including violation of conditions and safeguards established in connection with grants of variance or special exceptions, shall constitute a Class 1 misdemeanor pursuant to NC G.S. § 143-215.58. Any person who violates this article or fails to comply with any of its requirements shall, upon conviction thereof, be fined not more than $500.00 or imprisoned for not more than 30 days, or both. Each day such violation continues shall be considered a separate offense. Nothing herein contained shall prevent the Town from taking such other lawful action as it necessary to prevent or remedy any violation. Other lawful actions may include, but shall not be limited to, those provisions in Section 1.10, Violation of UDO Regulations.

SECTION 11.43 ADMINISTRATION.

11.43.1. Designation of Floodplain Administrator.

The Chief Building Inspector or his designee, hereinafter referred to as the "Floodplain Administrator", is hereby appointed to administer and implement the provisions of this Part. In instances where the Floodplain Administrator receives assistance from others to complete tasks to administer and implement this ordinance, the Floodplain Administrator shall be responsible for the coordination and community's overall compliance with the National Flood Insurance Program and the provisions of this ordinance.

11.43.2. Duties and Responsibilities of the Floodplain Administrator.

Duties of the floodplain administrator shall include, but not be limited to:

11.43.2.1. Review all floodplain development applications and issue permits for all proposed development Shaded X, X, AE, AO, and VE flood zones to assure that all requirements of this Part have been satisfied.

11.43.2.2. Review all proposed development to assure that all necessary local, state and federal permits have been received, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.

11.43.2.3. Notifying adjacent communities and the North Carolina Department of Public Safety, Division of Emergency Management, State Coordinator for the National Flood Insurance Program prior to any alterations or relocation of a watercourse and submitting evidence of such notification to FEMA.

11.43.2.4. Assuring that maintenance is provided within the altered or relocated portion of such watercourse so that the flood-carrying capacity is maintained.

11.43.2.5. Obtaining the actual elevation (in relation to NAVD 1988) of the reference level (including the basement) and all attendant utilities of all new or substantially improved structures in accordance with subsection 11.43.5.1 of this section.

11.43.2.6. Obtaining the actual elevation (in relation to NAVD 1988) to which all new or substantially improved structures and utilities have been floodproofed in accordance with subsection 11.43.5.1 of this section.

11.43.2.7. Obtain actual elevation (in relation to NAVD 1988) of all public utilities in accordance with subsection 11.43.5.1 of this section.

11.43.2.8. When floodproofing is utilized for a particular structure, the floodplain administrator shall obtain certifications from a registered professional engineer or architect in accordance with subsection 11.43.5.2 of this section and subsection 11.44.2.2.

11.43.2.9. Where interpretation is needed as to the exact location of the boundaries of the special flood hazard areas (for example, where there appears to be a conflict between a mapped boundary and actual field conditions) or Shaded X or X flood zones, the floodplain administrator shall make the necessary interpretation. The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in this Part.

11.43.2.10. When the lowest floor and the lowest adjacent grade of a structure or the lowest ground elevation of a parcel or structure in a special flood hazard area is above the base flood elevation, advise the property owner of the option to apply for a letter of map amendment (LOMA) from FEMA. However, if the property is to be removed from the V Zone it must not be located seaward of the landward toe of the primary frontal dune. Maintain a copy of the letter of map amendment (LOMA) issued by FEMA in the floodplain development permit file.

11.43.2.11. Making on-site inspections of work in progress. As the work pursuant to a floodplain development permit progresses, the floodplain administrator shall make as many inspections of the work as may be necessary to ensure that the work is being done according to the provisions of this article and terms of the permit. In exercising this power, the floodplain administrator has a right, upon presentation of proper credentials, to enter on any premises within the jurisdiction of the Town at any reasonable hour for the purposes of inspection or other enforcement action.

11.43.2.12. Issue stop work orders as required. Whenever a building or part thereof is being constructed, reconstructed, altered, or repaired in violation of this Part, the floodplain administrator may order the work to be immediately stopped. The stop-work order shall be in writing and directed to the person doing the work. The stop-work order shall state the specific work to be stopped, the specific reasons(s) for the stoppage, and the conditions(s) under

which the work may be resumed. Violation of a stop-work order constitutes a misdemeanor.

11.43.2.13. Revoke floodplain development permits as required. The floodplain administrator may revoke and require the return of the floodplain development permit by notifying the permit holder in writing stating the reason(s) for the revocation. Permits shall be revoked for any substantial departure from the approved application, plans, or specifications; for refusal or failure to comply with the requirements of state or local laws; or for false statements or misrepresentations made in securing the permit. Any floodplain development permit mistakenly issued in violation of any applicable state or local law may be revoked.

11.43.2.14. Permanently maintain all records pertaining to the administration of this Part and making these records available for public inspection, recognizing that such information may be subject to the Privacy Act of 1974, as amended.

11.43.2.15. Providing the North Carolina Department of Public Safety, Division of Emergency Management, State Coordinator for the National Flood Insurance Program with two copies of the maps delineating new corporate limits within six months from date of annexation or change in corporate boundaries.

11.43.2.16. Make periodic inspections throughout the jurisdiction of the Town. The floodplain administrator and each member of his or her inspections department shall have a right, upon presentation of proper credentials, to enter on any premises within the territorial jurisdiction of the department at any reasonable hour for the purposes of inspection or other enforcement action.

11.43.2.17. Follow through with corrective procedures of subsection 11.43.6.

11.43.2.18. Review, provide input, and make recommendations for variance requests.

11.43.2.19. Maintain a current map repository to include, but not limited to, historical and effective FIS report, historical and effective FIRM and other official flood maps and studies adopted in accordance with subsection 11.42.2 of this Part, including any revisions thereto including letters of map change, issued by FEMA. Notify state and FEMA of mapping needs.

11.43.2.20. Coordinate revisions to FIS reports and FIRMS, including letters of map revision based on fill (LOMR-F) and letters of map revision (LOMR).

11.43.3. Floodplain Development Application Requirements.
Application for a floodplain development permit shall be made to the floodplain administrator on forms prior to any development activities. The following items shall

be presented to the floodplain administrator to apply for a floodplain development permit:

11.43.3.1. Two copies of a plot plan drawn to scale, along with an electronic version, which shall include, but shall not be limited to, the following specific details of the proposed floodplain development; at the discretion of the floodplain administrator, such plot plans shall be certified by a North Carolina registered land surveyor or professional engineer:

11.43.3.1.1. The nature, location, dimensions, and elevations of the area of development/disturbance; existing and proposed structures, utility systems, grading/pavement areas, location of fill materials, storage areas, drainage facilities, and other development;

11.43.3.1.2. The boundary of any special flood hazard area or any Shaded X or X Zone as delineated on the FIRM or other flood map as determined in subsection 11.42.2 or a statement that the entire lot is within the special flood hazard area;

11.43.3.1.3. Flood zone(s), including any Shaded X or X zone, designation of the proposed development area as determined on the FIRM or other flood map as determined in subsection 11.42.2;

11.43.3.1.4. The base flood elevation (BFE) and/or the Regulatory Flood Protection Elevation (RFPE) where provided as set forth in subsection 11.42.2;

11.43.3.1.5. The old and new location of any watercourse that will be altered or relocated as a result of proposed development; and

11.43.3.1.6. The boundary and designation date of the CBRS area or OPA, if applicable.

11.43.3.2. Proposed elevation, and method thereof, of all development including but not limited to:

11.43.3.2.1. The elevation in relation to NAVD 1988 of the proposed reference level (including the basement) of all new and substantial improvements; and

11.43.3.2.2. Elevation in relation to NAVD 1988 to which any non-residential structure in zone AE, AO, Shaded X, or X Zone will be floodproofed; and

11.43.3.2.3. Elevation in relation to NAVD 1988 to which any proposed utility systems will be elevated or floodproofed.

11.43.3.3. If floodproofing, a floodproofing certificate (FEMA Form 086-0-34) with supporting data, an operational plan, and an inspection and maintenance

plan that includes, but is not limited to, installation, exercise, and maintenance of floodproofing measures.

11.43.3.4. A foundation plan, drawn to scale, which shall include details of the proposed foundation system to ensure all provisions of this Part are met. These details include but are not limited to:

> ***11.43.3.4.1.*** The proposed method of elevation, if applicable (i.e., fill, solid foundation perimeter wall, solid backfilled foundation, open foundation, open foundation on columns/posts/piers/piles/shear walls).
>
> ***11.43.3.4.2.*** Openings to facilitate equalization of hydrostatic flood forces on walls in accordance with subsection 11.44.2.4 when solid foundation perimeter walls are used in zones AE or Shaded X or X Zone.
>
> ***11.43.3.4.3.*** The following, in coastal high hazard areas, in accordance with subsection 11.44.2.4.4 and subsection 11.44.3:
>
> > ***11.43.3.4.3.1.*** V-Zone certification with accompanying plans and specifications verifying the engineered structure and any breakaway wall designs (breakaway wall designs are only for accessory structures). In addition, prior to the Certificate of Compliance/Occupancy issuance, the floodplain administrator may require a registered professional engineer or architect to certify that the finished construction is compliant with the design, specifications and plans for VE Zone construction if determined necessary.
> >
> > ***11.43.3.4.3.2.*** Plans for open wood lattice or insect screening, if applicable.
> >
> > ***11.43.3.4.3.3.*** Plans for non-structural fill, if applicable. If non-structural fill is proposed, it must demonstrate through coastal engineering analysis that the proposed fill would not result in any increase in the base flood elevation or otherwise cause adverse impacts by wave ramping and deflection onto the subject structure or adjacent properties.

11.43.3.5. Usage details of any enclosed areas below the regulatory flood protection elevation.

11.43.3.6. Plans and/or details for the protection of public utilities and facilities such as sewer, gas, electrical, and water systems to be located and constructed to minimize flood damage.

11.43.3.7. Certification that all other local, state and federal permits required prior to floodplain development permit issuance (wetlands, endangered

species, erosion and sedimentation control, Coastal Area Management Act (CAMA), riparian buffers, mining, etc.) have been received.

11.43.3.8. Documentation for placement of recreational vehicles and/or temporary structures, when applicable, to ensure subsections 11.44.2.3 and 11.44.2.5 of this Part are met.

11.43.3.9. A description of proposed watercourse alteration or relocation, when applicable, including an engineering report on the effects of the proposed project on the flood-carrying capacity of the watercourse and the effects on properties located both upstream and downstream; and a map (if not shown on the plot plan) showing the location of the proposed watercourse alteration and relocation.

11.43.3.10. In Shaded X and X zones, a survey prepared by a licensed North Carolina surveyor may be used to demonstrate the natural grades of the parcel relative to the RFPE.

11.43.4. Floodplain Development Permit Requirements.
The Floodplain Development Permit shall include, but not be limited to:

11.43.4.1. A complete description of all the development to be permitted under the floodplain development permit. (e.g. house, garage, pool, septic, bulkhead, cabana, pier, bridge, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials, etc.).

11.43.4.2. The flood zone determination for the proposed development per available data specified in subsection 11.42.2.

11.43.4.3. The regulatory flood protection elevation required for the reference level and all attendant utilities.

11.43.4.4. The regulatory flood protection elevation required for the protection of all public utilities.

11.43.4.5. All certification submittal requirements with timelines.

11.43.4.6. The flood openings requirements, if in zones AE, Shaded X, or X Zone.

11.43.4.7. Limitations of use of the enclosures below the lowest floor, not to exceed 300 square feet in area, (i.e. parking, building access and limited storage only).

11.43.4.8. A statement, if in zone VE, that there shall be no alteration of sand dunes which would increase potential flood damage.

11.43.4.9. A statement, if in zone VE, that there shall be no fill used for structural support.

11.43.4.10 A statement, that all materials below BFE/RFPE must be flood resistant materials.

11.43.5. Floodplain Development Certification Requirements.

11.43.5.1. Elevation Certificates for AE, AO, VE, Shaded X, and X Zones.

11.43.5.1.1. An elevation certificate (FEMA Form 086-0-33) may be required prior to the actual start of any new construction if determined necessary by the floodplain administrator. It shall be the duty of the permit holder to submit to the floodplain administrator a certification of elevation of the reference level, in relation to NAVD 1988. The floodplain administrator shall review the certificate data submitted. Deficiencies detected by such review shall be corrected by the permit holder prior to the beginning of construction. Failure to submit the certification or failure to make required corrections shall be cause to deny a floodplain development permit.

11.43.5.1.2. An elevation certificate (FEMA 086-0-33) is required after the reference level is established. Within 21 calendar days of establishment of the reference level elevation, it shall be the duty of the permit holder to submit to the floodplain administrator a certification of the elevation of the reference level, in relation to NAVD 1988. Any work done within the 21 calendar-day-period and prior to submission of the certification shall be at the permit holder's risk. The floodplain administrator shall review the certificate data submitted. Deficiencies detected by such review shall be corrected by the permit holder immediately and prior to further work being permitted to proceed. Failure to submit the certification or failure to make the required corrections shall be cause to issue a stop-work order for the project.

11.43.5.1.3. A final Finished Construction elevation certificate (FEMA 086-0-33) is required after construction is completed and prior to certificate of compliance/occupancy issuance. It shall be the duty of the permit holder to submit to the floodplain administrator a certification of final as-built construction of the elevation of the reference level and all attendant utilities. The floodplain administrator shall review the certificate data submitted. Deficiencies detected by such review shall be corrected by the permit holder immediately and prior to certificate of compliance/occupancy issuance. In some instances, another certification may be required to certify corrected as-built construction. Failure to submit the certification or failure to make required corrections shall be cause to withhold the issuance to a certificate of compliance/occupancy. The Finished Construction Elevation Certificate certifier shall provide at least 2 photographs showing the front and rear of the building taken within 90 days from the date of certification. The photographs must be taken with views confirming the building description and diagram number provided in Section A. To the

extent possible, these photographs should show the entire building including foundation. If the building has split-level or multi-level areas, provide at least 2 additional photographs showing side views of the building. In addition, when applicable, provide a photograph of the foundation showing a representative example of the flood openings or vents. All photographs must be in color and measure at least 3" × 3". Digital photographs are acceptable.

11.43.5.1.4. For Shaded X and X flood zones east of NC 12 and SR 1243, the submission of the under construction elevation certificate may be waived if a survey of the parcel was used to certify the natural grade of the parcel was to or above 12 feet at the time of permit application. For Shaded X and X flood zones west of NC 12 and SR 1243, the submission of the under construction elevation certificate may be waived if a survey of the parcel was used to certify the natural grade of the parcel was to or above 10 feet at the time of permit application. In all cases, a finished construction elevation certificate is required at the completion of the project.

11.43.5.2. Floodproofing Certificate. If non-residential floodproofing is used to meet the regulatory flood protection elevation requirements, a floodproofing certificate (FEMA 086-0-33), with supporting data, an operational plan, and an inspection and maintenance plan is required prior to the actual start of any new construction. It shall be the duty of the permit holder to submit to the floodplain administrator a certification of the floodproofed design elevation of the reference level and all attendant utilities in relation to NAVD 1988. Floodproofing certification shall be prepared by or under the direct supervision of a professional engineer or architect and certified by same. The floodplain administrator shall review the certificate data, the operational plan, and the inspection and maintenance plan. Deficiencies detected by such review shall be corrected by the applicant prior to permit approval. Failure to submit the certification or failure to make required corrections shall be cause to deny a floodplain development permit. Failure to construct in accordance with the certified design shall be cause to withhold the issuance of a certificate of compliance/occupancy.

11.43.5.3. A final Finished Construction Floodproofing Certificate (FEMA Form 086-0-34), with supporting data, an operational plan, and an inspection and maintenance plan are required prior to the issuance of a Certificate of Compliance/Occupancy. It shall be the duty of the permit holder to submit to the Floodplain Administrator a certification of the floodproofed design elevation of the reference level and all attendant utilities, in relation to NAVD 1988. Floodproofing certificate shall be prepared by or under the direct supervision of a professional engineer or architect and certified by same. The Floodplain Administrator shall review the certificate data, the operational plan, and the inspection and maintenance plan. Deficiencies detected by such review shall be corrected by the applicant prior to Certificate of Occupancy. Failure to submit the certification or failure to make required corrections shall be cause to deny a Floodplain Development Permit. Failure to construct in

accordance with the certified design shall be cause to deny a Certificate of Compliance/Occupancy.

11.43.5.4. If a watercourse is to be altered or relocated, a description of the extent of the watercourse alteration or relocation, a professional engineer's certified report on the effects of the proposed project on the flood-carrying capacity of the watercourse and the effects to properties located both upstream and downstream; and a map showing the location of the proposed watercourse alteration or relocation shall be submitted by the permit applicant prior to issuance of a floodplain development permit.

11.43.5.5. Certification Exemptions. The following structures, if located within zones AE, AO, and Shaded X or X, are exempt from the elevation/floodproofing certification requirements specified in subsections 11.43.5.1.1 and 11.43.5.1.2 above:

> ***11.43.5.5.1.*** Recreational vehicles meeting requirements of subsection 11.44.2.3;
>
> ***11.43.5.5.2.*** Temporary structures meeting requirements of subsection 11.44.2.5; and
>
> ***11.43.5.5.3.*** Accessory structures less than 150 square feet meeting or $5,000 or less and meeting requirements of requirements of subsection 11.44.2.6.

11.43.5.6. A V-Zone certification with accompanying design plans and specifications is required prior to issuance of a floodplain development permit within coastal high hazard areas. It shall be the duty of the permit applicant to submit to the floodplain administrator said certification to ensure the design standards of this Part are met. A registered professional engineer or architect shall develop or review the structural design, plans and specifications for construction and certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of this Part. This certification is not a substitute for an elevation certificate. In addition, prior to the Certificate of Compliance/Occupancy issuance, the floodplain administrator may require a registered professional engineer or architect to shall certify that the finished construction is compliant with the design, specifications and plans for VE Zone construction if determined necessary.

11.43.5.7. Determinations for existing buildings and structures. For applications for building permits to improve buildings and structures, including alterations, movement, enlargement, replacement, repair, change of occupancy, additions, rehabilitations, renovations, substantial improvements, repairs of substantial damage, and any other improvement of or work on such buildings and structures, the Floodplain Administrator, in coordination with the Building Official, shall:

11.43.5.7.1. Estimate the market value, or require the applicant to obtain an appraisal of the market value prepared by a qualified independent appraiser, of the building or structure before the start of construction of the proposed work; in the case of repair, the market value of the building or structure shall be the market value before the damage occurred and before any repairs are made;

11.43.5.7.2. Compare the cost to perform the improvement, the cost to repair a damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, if applicable, to the market value of the building or structure;

11.43.5.7.3 Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage; and

11.43.5.7.4. Notify the applicant if it is determined that the work constitutes substantial improvement or repair of substantial damage and that compliance with the flood resistant construction requirements of the NC Building Code and this ordinance is required.

11.43.6. Corrective Procedures.

11.43.6.1. Violations to be corrected. When the floodplain administrator finds violations of applicable state and local laws, it shall be his duty to notify the owner or occupant of the building of the violation. The owner or occupant shall immediately remedy each of the violations of law cited in such notification.

11.43.6.2. Actions in event of failure to take corrective action. If the owner of a building or property shall fail to take prompt corrective action, the floodplain administrator shall give the owner written notice, by certified or registered mail, to his last known address or by personal service that:

11.43.6.2.1. The building or property is in violation of the flood damage prevention regulations;

11.43.6.2.2. A hearing will be held before the floodplain administrator at a designated place and time, not later than ten (10) working days after the date of the notice, at which time the owner shall be entitled to be heard in person or by counsel and to present arguments and evidence pertaining to the matter; and

11.43.6.2.3. Following the hearing, the floodplain administrator may issue such order to alter, vacate or demolish the building; or to remove fill as appears appropriate.

11.43.6.3. Order to take corrective action. If, upon a hearing held pursuant to the notice prescribed above, the floodplain administrator shall find that the

building or development is in violation of this Part, he or she shall issue an order in writing to the owner, requiring the owner to remedy the violation within such period not less than sixty (60) days, nor more than one hundred and eighty (180) calendar days, as the floodplain administrator may prescribe; provided, however, that where the floodplain administrator finds that there is imminent danger to life or other property, he or she may issue an order that corrective action be taken in such lesser period as may be feasible.

11.43.6.4. Appeal. Any owner who has received an order to take corrective action may appeal the order to the board of adjustment by giving notice of appeal in writing to the floodplain administrator and the Town Clerk within ten (10) days following issuance of the final order. In the absence of an appeal, the order of the floodplain administrator shall be final. The Board of Adjustment shall hear an appeal within a reasonable time and may affirm, modify and affirm, or revoke the order.

11.43.6.5. Failure to comply with order. If the owner of a building or property fails to comply with an order to take corrective action from which no appeal has been taken, or fails to comply with an order of the board of adjustment following an appeal, the owner shall be guilty of a misdemeanor and shall be punished in the discretion of the court.

11.43.7. Variance Procedures.

Variance procedures shall be applied in AE, AO, VE, and Shaded X and X flood zones in accordance with Section 3.10, Variances of this UDO and the following additional provisions:

11.43.7.1. The Board of Adjustment, as established by the Town, shall hear and decide requests for variances from the requirements of this Part.

11.43.7.2. Any person aggrieved by the decision of the Board of Adjustment may appeal such decision to superior court, as provided in NCGS Chapter 7A.

11.43.7.3. Variances may be issued for:

11.43.7.3.1. The repair or rehabilitation of historic structures upon the determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.

11.43.7.3.2. Functionally dependent facilities if determined to meet the definition as stated in Appendix A, provided provisions of subsections 11.43.7.10.2 and 11.43.7.10.3 have been satisfied, and such facilities are protected by methods that minimize flood damages during the base flood and create no additional threats to public safety; or

11.43.7.3.3. Any other type of development provided it meets the requirements stated in this section.

11.43.7.4. In passing upon variances, the Board of Adjustment shall consider all technical evaluations, all relevant factors, all standards specified in other sections of this Part and the:

11.43.7.4.1. Danger that materials may be swept onto other lands to the injury of others;

11.43.7.4.2. Danger to life and property due to flooding or erosion damage;

11.43.7.4.3. Susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;

11.43.7.4.4. Importance of the services provided by the proposed facility to the community;

11.43.7.4.5. Necessity to the facility of a waterfront location as defined under Appendix A as a functionally dependent facility, where applicable;

11.43.7.4.6. Availability of alternative locations, not subject to flooding or erosion damage, for the proposed use;

11.43.7.4.7. Compatibility of the proposed use with existing and anticipated development;

11.43.7.4.8. Relationship of the proposed use to the Town's Comprehensive Plan and floodplain management program for that area;

11.43.7.4.9. Safety of access to the property in times of flood for ordinary and emergency vehicles;

11.43.7.4.10. Expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site; and

11.43.7.4.11. Costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, and streets and bridges.

11.43.7.5. A written report addressing each of the above factors shall be submitted with the application for a variance.

11.43.7.6. Upon consideration of the factors listed in subsection 11.43.7.4 of this Part and the purposes of this Part, the Board of Adjustment may attach such conditions to the granting of variances as it deems necessary to further the purposes of this Part.

11.43.7.7. Any applicant to whom a variance is granted shall be given written notice specifying the difference between the RFPE and the elevation to which the structure is to be built and that such construction below the RFPE increases risks to life and property, and that the issuance of a variance to construct a structure below the RFPE will result in increased premium rates for flood insurance up to $25.00 per $100.00 of insurance coverage. Such notification shall be maintained with a record of all variance actions, including justification for their insurance.

11.43.7.8. The floodplain administrator shall maintain the records of all appeal actions and report any variances to the Federal Emergency Management Agency and the State of North Carolina upon request.

11.43.7.9. Conditions for variances.

11.43.7.9.1. Variances shall not be issued when the variance will make the structure in violation of other federal, state or local laws, regulations or ordinances.

11.43.7.9.2. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

11.43.7.9.3. Variances shall only be issued prior to development permit approval.

11.43.7.9.4. Variances shall only be issued upon:

11.43.7.9.4.1. A showing of good and sufficient cause;

11.43.7.9.4.2. A determination that failure to grant the variance would result in exceptional hardship; and

11.43.7.9.4.3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, or extraordinary public expense, create nuisance, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances

11.43.7.10. A variance may be issued for solid waste disposal facilities or sites, hazardous waste management facilities, salvage yards, and chemical storage facilities that are located in special flood hazard areas provided that all of the following conditions are met:

11.43.7.10.1. The use serves a critical need in the community;

11.43.7.10.2. No feasible locations exist for the use outside the SFHA;

11.43.7.10.3. The reference level of any structure is elevated or floodproofed to at least the RFPE;

11.43.7.10.4. The use complies with all other applicable federal, state and local laws; and

11.43.7.10.5. The Town has notified the Secretary of the North Carolina Department of Public Safety of its intention to grant a variance at least 30 calendar days prior to granting the variance.

SECTION 11.44 PROVISIONS FOR FLOOD HAZARD REDUCTION.

11.44.1. General Standards.

The following provisions are required in Shaded X, X, AE, AO, and VE flood zones:

11.44.1.1. All new construction and substantial improvements shall be designed (or modified) and adequately anchored to prevent flotation, collapse or lateral movement of the structure.

11.44.1.2. All new construction or substantial improvements shall be constructed with materials and utility equipment resistant to flood damage in accordance with the FEMA Technical Bulletin 2, Flood Damage-Resistant Materials Requirements.

11.44.1.3. All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damages.

11.44.1.4. All new electrical, heating, ventilation, plumbing, air conditioning equipment and other service facilities shall be located at or above the RFPE or designed and/or installed so as to prevent water from entering or accumulating within the components during occurrence of base flood. These include, but are not limited to, HVAC equipment, water softener units, bath/kitchen fixtures, ductwork, electric/gas meter panels/boxes, utility, cable boxes, appliances (washers, dryers, refrigerators, freezers, freezers, etc.), hot water heaters, and electric outlets/switches.

11.44.1.4.1. Replacements that are part of a substantial improvement, electrical, heating, ventilation, plumbing, air conditioning equipment, and other service equipment shall also meet the above provisions.

11.44.1.4.2. Replacements that are for maintenance and not part of a substantial improvement, may be installed at the original location provided the addition and/or improvements only comply with the

standards for new construction consistent with the code and requirements for the original structure.

11.44.1.5. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems.

11.44.1.6. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the systems into floodwaters.

11.44.1.7. On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding.

11.44.1.8. Nothing in this ordinance shall prevent the repair, reconstruction, or replacement of a building or structure existing on the effective date of this ordinance and located totally or partially within the floodway, non-encroachment area, or stream setback, provided there is no additional encroachment below the Regulatory Flood Protection Elevation in the floodway, non-encroachment area, or stream setback, and provided that such repair, reconstruction, or replacement meets all of the other requirements of this ordinance.

11.44.1.9. New solid waste disposal facilities and sites, hazardous waste management facilities, salvage yards, and chemical storage facilities shall not be permitted except by variance as specified in subsection 11.43.7.10. A structure or tank for chemical or fuel storage incidental to an allowed use or to the operation of a water treatment plant or wastewater treatment facility may be located in an SFHA only if the structure or tank is either elevated or floodproofed to at least the regulatory flood protection elevation and certified according to subsection 11.43.5 of this Part.

11.44.1.10. All subdivision proposals and other development proposals shall be consistent with the need to minimize flood damage.

11.44.1.11. All subdivision proposals and other development proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.

11.44.1.12. All subdivision proposals and other development proposals shall have adequate drainage provided to reduce exposure to flood hazards.

11.44.1.13. All subdivision proposals and other development proposals shall have received all necessary permits from those governmental agencies for which approval is required by federal or state law, including Section 404 of the Federal Water Pollution Control Act Amendment of 1972, 33 U.S.C. 1334.

11.44.1.14. When a structure is partially located in a Special Flood Hazard Area or Shaded X or X flood zone, the entire structure shall meet the requirements for new construction and substantial improvements.

11.44.1.15. When a structure is located in multiple flood hazard zones or in a flood hazard risk zone with multiple base flood elevations, the provisions for the more restrictive flood hazard risk zone and the highest RFPE shall apply.

11.44.2. Specific Standards.
In Shaded X, X, AE, AO, and VE flood zones as set forth in subsection 11.42.2 and 11.42.3, the following provisions, in addition to subsection 11.44.1 of this section are required:

11.44.2.1. Residential Construction. New construction or substantial improvement of any residential structure shall have the reference level, including the basement, elevated no lower than the regulatory flood protection elevation, as defined in Appendix A.

11.44.2.2. Non-Residential Construction. New construction and substantial improvement of any commercial, industrial, or other non-residential structure shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation, as defined in Appendix A. Structures located in AE, AO, Shaded X, and X zones may be floodproofed to the regulatory flood protection elevation in lieu of elevation provided that all areas of the structure, together with attendant utility and sanitary facilities, below the regulatory flood protection elevation are watertight with walls substantially impermeable to the passage of water, using structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. For AO Zones, the floodproofing elevation shall be in accordance Section 11.44.3. and 11.44.5. A registered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification shall be provided to the floodplain administrator as set forth in subsection 11.43.5, along with the operational and the inspection and maintenance plan.

11.44.2.3. Recreational Vehicles. Recreational vehicles placed on sites shall either:

11.44.2.3.1. Be on-site for fewer than 180 days; or

11.44.2.3.2. **Be** fully licensed and ready for highway use (a recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick-disconnect type utilities, and has no permanently attached additions); or

11.44.2.3.3. Meet all the requirements for new construction, including anchoring and elevation requirements of subsection 11.42.3 and subsections 11.44.1 of this section.

11.44.2.4. Elevated Buildings. Fully enclosed areas of new construction and substantially improved structures, which are below the regulatory flood protection elevation in AE, AO, Shaded X, or X Zones:

11.44.2.4.1. Shall not be designed or used for human habitation, but shall only be used for parking of vehicles, building access, or limited storage of maintenance equipment used in connection with the premises. Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment (standard exterior door), or entry to the living area (stairway or elevator). The interior portion of such enclosed area shall not be finished or partitioned into separate rooms, except to enclose storage areas;

11.44.2.4.2. Shall not be temperature-controlled or conditioned Non-temperature controlled dehumidifiers may be used in enclosed areas and shall not result in the enclosed area being determined to be conditioned space;

11.44.2.4.3. Shall be constructed entirely of flood-resistant materials, up to the regulatory flood protection elevation;

11.44.2.4.4. Shall not, in areas governed by the local elevation standard, exceed 300 "square feet in area" below the reference level with the exception of crawl space construction, and shall also include flood openings to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters. For the purposes of this requirement, enclosures shall be measured to the outside of the wall framing (to calculate floor area) excluding the thickness of sheathing, siding, or trim applied to the outside of the framing. To meet this requirement, the openings must either be certified by a professional engineer or architect or meet or exceed the following minimum design criteria:

> ***11.44.2.4.4.1.*** A minimum of two flood openings on different sides of each enclosed area subject to flooding;
>
> ***11.44.2.4.4.2.*** The total net area of all flood openings must be at least one square inch for each square foot of enclosed area subject to flooding or a minimum of one engineered square inch for each square foot of enclosed area for an engineered opening;
>
> ***11.44.2.4.4.3.*** If a building has more than one enclosed area, each enclosed area must have flood openings to allow floodwaters to automatically enter and exit;
>
> ***11.44.2.4.4.4.*** The bottom of all required flood openings shall be no higher than one foot above the adjacent grade;

11.44.2.4.4.5. Flood openings may be equipped with screens, louvers, or other coverings or devices, provided they permit the automatic flow of floodwaters in both directions; and

11.44.2.4.4.6. Enclosures made of flexible skirting are not considered enclosures for regulatory purposes, and, therefore, do not require flood openings. Masonry or wood underpinning, regardless of structural status, is considered an enclosure and requires flood openings as outlined above.

11.44.2.4.5. Shall allow, in coastal high hazard areas (zones VE), open wood latticework or insect screening, provided it is not part of the structural support of the building and is designed so as to breakaway, under abnormally high tides or wave action, without causing damage to the structural integrity of the building.

11.44.2.4.6. Property owners shall be required to execute and record a non-conversion agreement prior to issuance of a building permit declaring that the area below the lowest floor shall not be improved, finished or otherwise converted to habitable space; The Town of Nags Head will have the right to inspect the enclosed area .This agreement shall be recorded with the Dare County Register of Deeds and shall transfer with the property in perpetuity.

11.44.2.4.7*.* Release of restrictive covenant. If a property which is bound by a non-conversion agreement is modified to remove enclosed areas below BFE, then the owner may request release of restrictive covenant after staff inspection and submittal of confirming documentation.

11.44.2.5. Temporary Non-Residential Structures. Prior to the issuance of a floodplain development permit, for a temporary structure, all applicants must submit to the floodplain administrator a plan for the removal of such structures in the event of a hurricane, flash flood or other type of flood warning notification. The following information shall be submitted in writing to the floodplain administrator for review and written approval:

11.44.2.5.1. A specified time period for which the temporary use will be permitted. The time specified should not exceed three months, renewable up to one year;

11.44.2.5.2. The name, address and phone number of the individual responsible for the removal of the temporary structure;

11.44.2.5.3. The time frame prior to the event at which a structure will be removed (i.e.: minimum of 72 hours before landfall of a hurricane or immediately upon flood warning notification);

11.44.2.5.4. A copy of the contract or other suitable instrument with a trucking company to ensure the availability of removal equipment when needed; and

11.44.2.5.5. Designation, accompanied by documentation, of a location outside the Special Flood Hazard Area to which the temporary structure will be moved.

11.44.2.6. Accessory Structure. Accessory structures (sheds, detached garages, etc.), shall meet the following criteria:

11.44.2.6.1. Accessory structures with floor area located below the regulatory flood protection elevation shall not be used for human habitation, (including working, sleeping, living, cooking or restroom areas).

11.44.2.6.2. Accessory structures shall not be temperature controlled.

11.44.2.6.3. Any portion of an accessory structure located below the regulatory flood protection elevation shall not exceed 300 "square feet in area."

11.44.2.6.4. Accessory structures shall be designed to have low flood damage potential.

11.44.2.6.5. Accessory structures shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters.

11.44.2.6.6. Accessory structures shall be firmly anchored in accordance with subsection 11.44.1.1 of this section.

11.44.2.6.7. All service facilities such as electrical and heating equipment shall be installed in accordance with subsection 11.44.1.4 of this section.

11.44.2.6.8. Flood openings to facilitate automatic equalization of hydrostatic flood forces shall be provided below regulatory flood protection elevation in conformance with subsection 11.44.2.4.3 of this section.

11.44.2.6.9. An accessory structure with a footprint less than 150 square feet or that is a minimal investment of $5,000 or less and that satisfies the criteria outlined above does not require an elevation or floodproofing certificate. Elevation or floodproofing certifications are required for all other accessory structures in accordance with subsection 11.43.5.

11.44.2.6.10. Other secondary structures located on the same parcel, in

addition to a principal use structure, which feature conditioned, temperature-controlled areas elevated above the regulatory flood protection elevation shall be constructed consistent with Section 11.44.1. General Standards and 11.44.2. Specific Standards. The certification requirements of 11.43.5.1. Elevation Certificates shall apply.

11.44.2.6.11. Accessory structures, regardless of the size or cost, shall not be placed below elevated buildings in Coastal High Hazard Areas (CHHA).

11.44.2.7. Additions/Improvements/Conversions.

11.44.2.7.1. Additions and/or improvements to pre-FIRM structures when the addition and/or improvements in combination with any interior modifications to the existing structure are:

11.44.2.7.1.1. Not a substantial improvement, the addition and/or improvements must be designed to minimize flood damages and must not be any more nonconforming than the existing structure.

11.44.2.7.1.2. A substantial improvement, with modifications/rehabilitations/improvements to the existing structure or the common wall is structurally modified more than installing a doorway, both the existing structure and the addition and/or improvements must comply with the standards for new construction.

11.44.2.7.2. Additions to pre-FIRM or post-FIRM structures with no modifications to the existing structure other than a standard door in the common wall shall require only the addition to comply with the standards for new construction.

11.44.2.7.3. Additions and/or improvements to post-FIRM structures when the addition and/or improvements in combination with any interior modifications to the existing structure are:

11.44.2.7.3.1. Not a substantial improvement, the addition and/or improvements only must comply with the standards for new construction consistent with the code and requirements for the original structure.

11.44.2.7.3.2. A substantial improvement, both the existing structure and the addition and/or improvements must comply with the standards for new construction.

11.44.2.7.4. Where an independent perimeter load-bearing wall is provided between the addition and the existing building, the addition(s)

shall be considered a separate building and only the addition must comply with the standards for new construction.

11.44.2.7.5. Any combination of repair, reconstruction, rehabilitation, addition or improvement of a building or structure taking place during a 365 day period, the cumulative cost of which equals or exceeds 50 percent of the market value of the structure before the improvement or repair is started must comply with the standards for new construction. For each building or structure, the 365 day period begins on the date of the first improvement or repair of that building or structure subsequent to the effective date of this ordinance. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The requirement does not, however, include either:

11.44.2.7.6. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to assume safe living conditions.

11.44.2.7.7. Any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure.

11.44.2.7.8. Areas in existing structures shall not be converted for use as conditioned, temperature controlled space unless the reference level is located to or above the RFPE.

11.44.2.7.9. Additional Standards in Shaded X and X Flood Zones

> ***11.44.2.7.9.1.*** The substantial improvement/substantial damage definitions as established in Appendix A, Definitions, do not apply to Shaded X and X zones.
>
> ***11.44.2.7.9.2.*** In structures located west of NC 12 and SR 1243 where the reference level of existing conditioned, temperature controlled space is located below the RFPE, such space may be increased by 25% at the same level, without having to be elevated to or above the RFPE.
>
> ***11.44.2.7.9.3.*** Remodeling or renovations of existing habitable area in structures with the reference level located below the current applicable RFPE that do not increase the footprint of the structure may be authorized at the existing reference level or higher.
>
> ***11.44.2.7.9.4.*** Reconstruction of damaged portions of a structure may be authorized at the existing reference level or higher. However, if a structure is entirely demolished, for

whatever reason, the replacement structure shall be constructed to or above the RFPE.

11.44.2.7.9.5. Structures that are relocated on the same site or to another site shall be elevated to or above the applicable RFPE of the lot or to or above the RFPE of the new site.

11.44.2.7.9.6. Areas in existing structures shall not be converted for use as conditioned, temperature controlled space unless the reference level is located to or above the RFPE.

11.44.2.8. Tanks. When gas and liquid storage tanks are to be placed within the Shaded X, X, AE, AO, or VE flood zones, the following criteria shall be met:

11.44.2.8.1. **Underground tanks.** Underground tanks in flood hazard areas shall be anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty;

11.44.2.8.2. **Above-ground tanks, elevated.** Above-ground tanks in flood hazard areas shall be elevated to or above the Regulatory Flood Protection Elevation on a supporting structure that is designed to prevent flotation, collapse or lateral movement during conditions of the design flood. Tank-supporting structures shall meet the foundation requirements of the applicable flood hazard area;

11.44.2.8.3. **Above-ground tanks, not elevated.** Above-ground tanks that do not meet the elevation requirements of Section 11.44.2.2. of this ordinance shall not be permitted in V or VE Zones. Tanks may be permitted in other flood hazard areas provided the tanks are designed, constructed, installed, and anchored to resist all flood-related and other loads, including the effects of buoyancy, during conditions of the design flood and without release of contents in the floodwaters or infiltration by floodwaters into the tanks. Tanks shall be designed, constructed, installed, and anchored to resist the potential buoyant and other flood forces acting on an empty tank during design flood conditions.

11.44.2.8.4. **Tank inlets and vents.** Tank inlets, fill openings, outlets and vents shall be:

11.44.2.8.4.1. At or above the Regulatory Flood Protection Elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tanks during conditions of the design flood; and

11.44.2.8.4.2. Anchored to prevent lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects

of buoyancy, during conditions of the design flood.

11.44.3. Coastal High Hazard Areas (Zones VE) and Properties East of NC 12 and SR 1243.

Coastal high hazard areas are special flood hazard areas established in subsection 11.42.2 and designated as zones VE.–Properties located to the east of NC 12 and SR 1243 are located in an active oceanfront environment that is vulnerable to storm surge, erosion, sea level rise, and other hazards. These areas have special flood hazards associated with high velocity waters from storm surges or seismic activity and, therefore, in addition to meeting all requirements of Part III Flood Damage Prevention, the following provisions shall apply:

11.44.3.1 All new construction and substantial improvements shall:

11.44.3.1.1. Be located landward of the reach of mean high tide;

11.44.3.1.2. Be located landward of the first line of stable natural vegetation; and

11.44.3.1.3. Comply with all applicable Coastal Area Management Act (CAMA) setback requirements.

11.44.3.2. All new construction and substantial improvements shall be elevated so that the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings or columns) is no lower than the regulatory flood protection elevation. Floodproofing shall not be utilized on any structures in VE zones to satisfy the regulatory flood protection elevation requirements."

11.44.3.3. All new construction and substantial improvements, including properties with elevations above the regulatory flood protection elevation, shall have the space below the bottom of the lowest horizontal structural member of the lowest floor either be free of obstruction or constructed with open wood latticework or insect screening so as not to impede the flow of floodwaters, provided they are not part of the structural support of the building and are designed so as to breakaway, under abnormally high tides or wave action without causing damage to the elevated portion of the building or supporting foundation system or otherwise jeopardizing the structural integrity of the building in accordance with subsection 11.43.3. The following design specifications shall be met:

11.44.3.3.1. Design plans shall be submitted in accordance with subsection 11.43.3.

11.44.3.3.2. Material shall consist of open wood or plastic lattice having at least 40 percent of its area open, or insect screening.

11.44.3.4. All new construction and substantial improvements shall be securely anchored to an open "pile or column foundation" to allow floodwaters and waves to pass beneath the structure. "All pilings and columns and the structures attached thereto shall be anchored to resist flotation, collapse and lateral movement due to the effect of wind and water loads acting simultaneously on all building components."

11.44.3.4.1. Water loading values used shall be those associated with the base flood.

11.44.3.4.2. Wind loading values used shall be those required by the current edition of the North Carolina State Building Code.

11.44.3.5. All new construction, initiated after the adoption of this UDO, located east of NC 12 and SR 1243 shall limit the total enclosed habitable living space of individual structures to 5,000 square feet. Enclosed habitable living space for large residential dwellings shall also include any enclosed habitable space that may be present in any accessory structure or accessory dwelling that is located on the same lot as the principal structure.

11.44.3.6. For concrete pads, including patios, decks, parking pads, walkways, driveways, pool decks, etc. the following is required:

11.44.3.6.1. Shall be structurally independent of the primary structural foundation system of the structure and shall not adversely affect structures through redirection of floodwaters or debris; and

11.44.3.6.2. Shall be constructed to breakaway cleanly during design flood conditions, shall be frangible, and shall not produce debris capable of causing damage to any structure. (The installation of concrete in small segments (approximately 4 feet x 4 feet) that will easily break up during the base flood event, or score concrete in 4 feet x 4 feet maximum segments is acceptable to meet this standard); and

11.44.3.6.3. Reinforcing, including welded wire fabric, shall not be used in order to minimize the potential for concreted pads being a source of debris; and

11.44.3.6.4. Pad thickness shall not exceed 4 inches; or

11.44.3.6.5. Provide a Design Professional’s certification stating the design and method of construction to be used meet the applicable criteria of this section.

11.44.3.7. For swimming pools and spas, the following is required:

11.44.3.7.1. Be designed to withstand all flood-related loads and load combinations.

11.44.3.7.2. Be elevated so that the lowest horizontal structural member is elevated above the RFPE; or

11.44.3.7.3. Be designed and constructed to break away during design flood conditions without producing debris capable of causing damage to any structure; or

11.44.3.7.4. Be sited to remain in the ground during design flood conditions without obstructing flow that results in damage to any structure.

11.44.3.7.5. Registered design professionals must certify to local officials that a pool or spa beneath or near a VE Zone building will not be subject to flotation or displacement that will damage building foundations or elevated portions of the building or any nearby buildings during a coastal flood.

11.44.3.7.6. Pool equipment shall be located above the RFPE whenever practicable. Pool equipment shall not be located beneath an elevated structure.

11.44.3.8. All elevators, vertical platform lifts, chair lifts, etc., the following is required:

11.44.3.8.1. Elevator enclosures must be designed to resist hydrodynamic and hydrostatic forces as well as erosion, scour, and waves.

11.44.3.8.2. Utility equipment in Coastal High Hazard Areas (VE Zones) must not be mounted on, pass through, or be located along breakaway walls.

11.44.3.8.3. The cab, machine/equipment room, hydraulic pump, hydraulic reservoir, counter weight and roller guides, hoist cable, limit switches, electric hoist motor, electrical junction box, circuit panel, and electrical control panel are all required to be above RFPE. When this equipment cannot be located above the RFPE, it must be constructed using flood damage-resistant components.

11.44.3.8.4. Elevator shafts/enclosures that extend below the RFPE shall be constructed of reinforced masonry block or reinforced concrete walls and located on the landward side of the building to provide increased protection from flood damage. Drainage must be provided for the elevator pit.

11.44.3.8.5. Flood damage-resistant materials can also be used inside and outside the elevator cab to reduce flood damage. Use only stainless steel doors and door frames below the BFE. Grouting in of door frames and sills is recommended.

11.44.3.8.6. If an elevator is designed to provide access to areas below the BFE, it shall be equipped with a float switch system that will activate during a flood and send the elevator cab to a floor above the RFPE.

11.44.3.9. Accessory structures, regardless of size or cost, shall not be permitted below elevated structures.

11.44.3.10. A registered professional engineer, professional land surveyor, or architect shall certify that the design, specifications and plans for construction are in compliance with the provisions contained in subsection 11.43.2, subsections 11.44.3.1 and 11.44.3.2, subsection 11.44.3.4 and subsection 11.44.3.6 of this Part on the current version of the North Carolina "National Flood Insurance Program V-Zone Certification" form or equivalent local version. In addition, prior to the Certificate of Compliance/Occupancy issuance, the floodplain administrator may require a registered professional engineer or architect to certify the finished construction is compliant with the design, specifications and plans for VE Zone construction if determined necessary.

11.44.3.11. Fill/Grading

11.44.3.11.1. The placement of site-compatible, non-structural fill under or around an elevated building is limited to two (2) feet. Fill greater than two (2) feet must include an analysis prepared by a qualified registered design professional demonstrating no harmful diversion of floodwaters or wave runup and wave deflection that would increase damage to adjacent elevated buildings and structures. Excavated material moved or relocated onsite is considered fill.

11.44.3.11.2. The fill material must be similar and consistent with the natural soils in the area.

11.44.3.11.3. Minor grading and the placement of minor quantities of nonstructural fill, outside the areas referenced in 11.44.3.11.1., may be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

11.44.3.11.4. Nonstructural fill with finished slopes that are steeper than five (5) units horizontal to one (1) unit vertical shall be permitted only if an analysis prepared by a qualified registered design professional demonstrates no harmful diversion of floodwaters or wave runup and wave deflection that would increase damage to adjacent elevated buildings and structures.

11.44.3.12. There shall be no alteration of sand dunes or mangrove stands which would increase potential flood damage.

11.44.3.13. Recreational vehicles may be permitted in coastal high hazard areas provided that they meet the recreational vehicle criteria of subsection 11.44.2.3 of this section and the temporary structure provisions of subsection 11.44.2.5 of this section.

11.44.3.14. A deck that is structurally attached to a building or structure shall have the bottom of the lowest horizontal structural member at or above the Regulatory Flood Protection Elevation and any supporting members that extend below the Regulatory Flood Protection Elevation shall comply with the foundation requirements that apply to the building or structure, which shall be designed to accommodate any increased loads resulting from the attached deck. The increased loads must be considered in the design of the primary structure and included in the V-Zone Certification required under Section 11.43.5.6.

11.44.3.15. A deck or patio that is located below the Regulatory Flood Protection Elevation shall be structurally independent from buildings or structures and their foundation systems, and shall be designed and constructed either to remain intact and in place during design flood conditions or to break apart into small pieces to minimize debris during flooding that is capable of causing structural damage to the building or structure or to adjacent buildings and structures.

11.44.3.16. In coastal high hazard areas, development activities other than buildings and structures shall be permitted only if also authorized by the appropriate state or local authority; if located outside the footprint of, and not structurally attached to, buildings and structures; and if analyses prepared by qualified registered design professionals demonstrate no harmful diversion of floodwaters or wave runup and wave deflection that would increase damage to adjacent buildings and structures. Such other development activities include but are not limited to:

11.44.3.16.1. Bulkheads, seawalls, retaining walls, revetments, and similar erosion control structures;

11.44.3.16.2. Solid fences and privacy walls, and fences prone to trapping debris, unless designed and constructed to fail under flood conditions less than the design flood or otherwise function to avoid obstruction of floodwaters.

11.44.3.16.3. Docks, piers, and similar structures.

11.44.3.17. No more than four (4) electrical outlets and no more than four (4) electrical switches may be permitted below RFPE unless required by building code.

11.44.5. Standards for Areas Of Shallow Flooding (Zone AO). Located within the Special Flood Hazard Areas established in Article 3, Section B, are areas

designated as shallow flooding areas. These areas have special flood hazards associated with base flood depths of one (1) to three (3) feet where a clearly defined channel does not exist and where the path of flooding is unpredictable and indeterminate. In addition to Sections 11.44.1. and 11.44.2., all new construction and substantial improvements shall meet the requirements of Section 11.44.3. Coastal High Hazard Areas (Zones VE) and Properties East of NC 12 and SR 1243.

SECTION 11.45 REMEDIES.

Any violation of this Article 11, Part III shall be subject to the remedies as stated in Section 1.10, Violation of UDO Regulations of this UDO.

SECTION 11.46 LEGAL STATUS PROVISIONS.

11.46.1. Effect on Rights and Liabilities Under the Existing Flood Damage Prevention Ordinance.

This Article 11, Part III in part comes forward by re-enactment of some of the provisions of the flood damage prevention ordinance enacted February 3, 1975 as amended, and it is not the intention to repeal but rather to re-enact and continue to enforce without interruption of such existing provisions, so that all rights and liabilities that have accrued thereunder are reserved and may be enforced. The enactment of this Article 11, Part III shall not affect any action, suit or proceeding instituted or pending. All provisions of the flood damage prevention ordinance of the Town of Nags Head enacted on February 3, 1975, as amended, which are not reenacted herein are repealed.

11.46.2. Effect Upon Outstanding Floodplain Development Permits.

Nothing herein contained shall require any change in the plans, construction, size, or designated use of any development or any part thereof for which a floodplain development permit has been granted by the floodplain administrator or his or her authorized agents before the time of passage of this Article 11, Part III; provided, however, that when construction is not begun under such outstanding permit within a period of six (6) months subsequent to the date of issuance of the outstanding permit, construction or use shall be in conformity with the provisions of this Article 11, Part III.

11.46.3. Severability.

If any section, clause, sentence, or phrase of the Ordinance is held to be invalid or unconstitutional by any court of competent jurisdiction, then said holding shall in no way effect the validity of the remaining portions of this Ordinance.

SECTION 11.47 EFFECTIVE DATE.

This ordinance shall become effective June 19, 2020.

SECTION 11.48 ADOPTION CERTIFICATION.

I hereby certify that this is a true and correct copy of the Flood Damage Prevention Ordinance as adopted by the Board of Commissioners of the Town of Nags Head, North Carolina, on the Day (number or text) day of Month, 2020.

WITNESS my hand and the official seal of insert Name, Title, this the Day (number or text) day of Month, 2020.

_____
(signature)

SECTION 11.49 – 11.50 RESERVED.

PART II. That **Appendix A. Definitions** be amended with the addition of the following new terms and definitions in appropriate alphabetical order:

Breakaway wall means a wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces without causing damage to the elevated portion of the building or the supporting foundation system (for the purposes of Article 11, Part III, Flood Damage Prevention).

Enclosure/Enclosed Area means that portion of an elevated building below the lowest elevated floor that is either partially or fully shut in by rigid/solid walls and is located either partially or fully below the RFPE.

Local Elevation Standard means a locally adopted elevation level used as the Regulatory Flood Protection Elevation (RFPE) to mitigate flood hazards in the Shaded X, X, AE, AO, VE, as depicted on the FIRMs for Nags Head. These areas may be vulnerable to flooding from storm surge, wind-driven tides, and excessive rainfall. Many of these areas have repetitively flooded and continue to remain at risk to flooding.

Map Repository means the location of the official flood hazard data to be applied for floodplain management. It is a central location in which flood data is stored and managed; in North Carolina, FEMA has recognized that the application of digital flood hazard data products carries the same authority as hard copy products. Therefore, the NCEM's Floodplain Mapping Program websites house current and historical flood hazard data. For effective flood hazard data, the NC FRIS website (http://FRIS.NC.GOV/FRIS) is the map repository, and for historical flood hazard data the FloodNC website (http://FLOODNC.GOV/NCFLOOD) is the map repository.

Secondary Structure means a structure that features habitable conditioned space above the RFPE located on the same parcel as a primary use structure. A secondary structure is not an accessory structure as defined in this section. A secondary structure is subject to the same standards as a primary use structure.

Shaded X Zone means areas of moderate flood hazard shown on the FIRM and are the areas between the limits of the base flood and the 0.2% annual chance for flood. Also commonly referred to as the 500-year flood.

X Zone means the areas of minimal flood hazard shown on the FIRM which are areas outside of the Special Flood Hazards Areas and higher than the elevation of the 0.2% annual flood chance. Also referred to as Unshaded X zone.

PART III. That **Appendix A. Definitions** be amended by deleting the existing definitions for the following terms and replacing with the definitions as provided:

Building means any structure enclosed and isolated by exterior walls constructed or used for residence, business, industry or other purposes. For the purposes of Article 11, Part III, Flood Damage Prevention, see the definition for Structure.

Coastal high hazard area means a Special Flood Hazard Area extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The area is designated on a FIRM, or other adopted flood map as determined in Article 11, Part III, Flood Damage Prevention, as Zone VE, or any property east of NC 12 and SR 1243.

Development means any land disturbing activity that increases the amount of built-upon area or that otherwise decreases the infiltration of precipitation into the soil or any man-made change to improved or unimproved real estate including buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials, not including existing residential or commercial development already in place.

Existing building and existing structure means any building and/or structure for which the "start of construction" commenced before the community entered the NFIP, dated November 10, 1972.

Fill is the depositing of soil, rock or other earthen materials by artificial means, but not including poured slab, asphalt, porous pavement, Turfstone™, or other manmade materials or surfaces designed in association with construction. Excavated material moved or relocated onsite is considered fill.

Flood Insurance Rate Map (FIRM) means an official map of a community issued by the Federal Emergency Management Agency on which both the special flood hazard areas and the risk premium zones applicable to the community are delineated (also see DFRIM).

Floodway encroachment analysis means an engineering analysis of the impact that a proposed encroachment into a floodway or non-encroachment area is expected to have on the floodway boundaries and flood levels during the occurrence of the base flood discharge. The evaluation shall be prepared by a qualified North Carolina licensed engineer using standard engineering methods and hydraulic models meeting the minimum requirement of the National Flood Insurance Program.

Freeboard means the height added to the BFE to account for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, blockage of bridge

or culvert openings, storm surge or precipitation exceeding the base flood and the hydrological effects of urbanization on the watershed. The base flood elevation plus the freeboard establishes the "regulatory flood protection elevation."

Height means the vertical distance measured from the tallest part of a building to the ground at the base of the building. Typically, height is measured from the tallest portion of the roof to the top of the concrete slab. In cases where a concrete slab is not present, height is measured from the tallest part of the roof to the average finished grade using the corners at the base of the building.

- In Shaded X, X, or AE special flood hazard area west of NC 12 and SR 1243, as defined in 11.42.3.1.2, height will be measured from the regulatory flood protection elevation or finished grade, whichever is higher. In cases where there is a ground floor enclosure below the regulatory flood protection elevation, height shall be measured from finished grade.

- In coastal high hazard areas and VE zones east of NC 12 and SR 1243 as defined in 11.42.3.1.1., height shall be measured from regulatory flood protection elevation (lowest horizontal structural member). In cases where the finished grade elevation is above the regulatory flood protection elevation, height shall be measured at approximately eighteen (18) inches above the highest, undisturbed, finished grade directly beneath the structure (free-of-obstruction).

Existing manufactured home park or manufactured home subdivision means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, either final site grading or the pouring of concrete pads, and the construction of streets) was completed before February 3, 1975 (for the purposes of Article 11, Part III, Flood Damage Prevention).

Post-FIRM means construction or other development for which the start of construction occurred on or after December 31, 1974, the effective date of the initial Flood Insurance Rate Map.

Pre-FIRM means construction or other development for which the start of construction occurred before November 10, 1972, the effective date of the initial Flood Insurance Rate Map.

Recreational vehicle (RV) means a vehicle which is built on a single chassis; 400 square feet or less when measured at the largest horizontal projection; designed to be self-propelled or permanently towable by a light-duty truck; designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel or seasonal use; and is fully licensed and ready for highway use.

Reference level is:

(1) The reference level is the bottom of the lowest floor or the bottom of the lowest attendant utility including ductwork, whichever is lower, with only

flood resistant materials located below the reference level west of NC 12 and SR 1243.

(2) The reference level is the bottom of the lowest horizontal structural member of the lowest floor for structures in Coastal High Hazard Areas (CHHA) east of NC 12 and SR 1243.

Regulatory flood protection elevation means the Local Elevation Standard (LES). *The Local Elevation Standard is a locally adopted elevation level used as the Regulatory Flood Protection Elevation (RFPE) to mitigate flood hazards in the Shaded X, X, AE, AO, VE, as depicted on the FIRMs for Nags Head. These areas may be vulnerable to flooding from storm surge, wind-driven tides, and excessive rainfall. Many of these areas have repetitively flooded and continue to remain at risk to flooding.*

Coastal High Hazard Areas (CHHA) - Properties located to the east of NC 12 and SR 1243 are located in an active oceanfront environment that is vulnerable to storm surge, erosion, sea level rise, and other hazards. These areas have special flood hazards associated with high velocity waters from storm surges or seismic activity and, therefore, the RFPE is 12 feet NAVD 1988.

Properties west of NC 12 and SR 1243 - The RFPE for properties located west of NC 12 and SR 1243 and in flood zones Shaded X, X, or AE, is 10 feet NAVD 1988. This includes properties abutting US 64, also known as the Causeway.

Substantial improvement means any combination of repairs, reconstruction, rehabilitation, addition or other improvement of a structure, taking place during any one-year period for which the cost equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:

(1) Any correction of existing violations of state or local health, sanitary or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to ensure safe living conditions; or

(2) Any alteration of a historic structure, provided that the alteration will not preclude the structure's continued designation as a historic structure and the alteration is approved by variance issued pursuant to 11.43.7. Variance Procedures.

Technical bulletin and technical fact sheet mean a FEMA publication that provides guidance concerning the building performance standards of the NFIP, which are contained in Title 44 of the U.S. Code of Federal Regulations at Section 60.3. The bulletins and fact sheets are intended for use primarily by State and local officials responsible for interpreting and enforcing NFIP regulations and by members

of the development community, such as design professionals and builders. New bulletins, as well as updates of existing bulletins, are issued periodically as needed. The bulletins do not create regulations; rather they provide specific guidance for complying with the minimum requirements of existing NFIP regulations. It should be noted that Technical Bulletins and Technical Fact Sheets provide guidance on the minimum requirements of the NFIP regulations. State or community requirements that exceed those of the NFIP take precedence. Design professionals should contact the community officials to determine whether more restrictive State or local regulations apply to the building or site in question. All applicable standards of the State or local building code must also be met for any building in a flood hazard area.

PART IV. That **Article 4. Development Review Process, Section 4.11 Permit Types** be deleted and replaced with the following:

4.11.3. Floodplain Development Permit.
Floodplain Development Permits are can be issued in combination with a zoning, land disturbance, and/or building permit or as a stand-alone permit for any development within the Special Flood Hazard Area (SFHA) Shaded X, X, AE, AO, and VE flood zones.

PART V. That **Section 4.12.2.1., For All Types of Development Activity**, be deleted and replaced with the following:

4.12.2.1 For All Types of Development Activity.

- Site plan/survey
    - Property information- address, ownership, lot number/map book/page reference
    - Existing and proposed development including but not limited to streets, topographic and natural features, and drainage
- Coastal Area Management Act (CAMA) Permit.
- Wastewater approval from Dare County Health Department or NC Department of Environmental Quality.
- Erosion control approval is issued with general development for projects disturbing more than 5,000 square feet (see Article 11, Part II).
- Flood (if in a Special Flood Hazard Area, Shaded X, or X Zone, see Article 11, Part III).
- Stormwater management (for projects which propose filling greater than one foot or for all new commercial construction, see Article 11, Part I).

- Architecture (for residential structures greater than 3,500 square feet, see UDO Section 7.4., Dwelling, Large Residential).

- Utility connections (see Town Code Chapter 44).

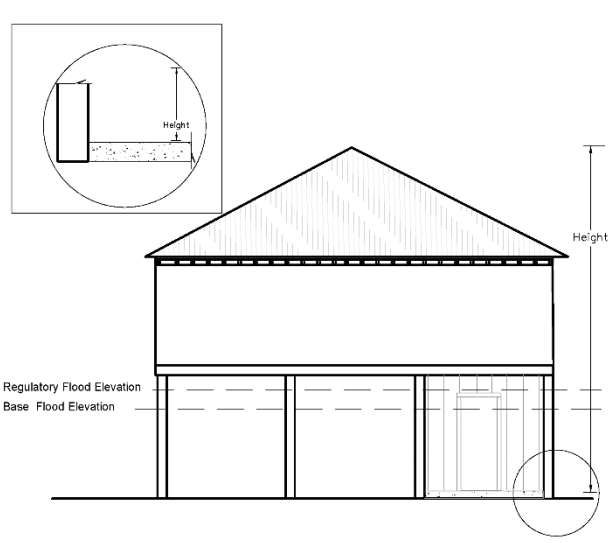
- Any other State or Federal Permits

PART VI. That **Section 8.6.4. Building Height and the subsections thereof** be deleted and replaced with the following:

8.6.4. Building Height.

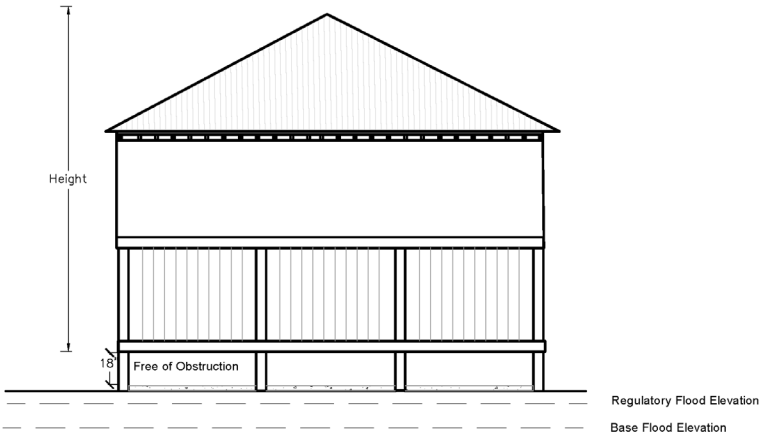
8.6.4.1. Measurement of height. Height means the vertical distance measured from the tallest part of a building to the ground at the base of the building. Typically, height is measured from the tallest portion of the roof to the top of the concrete slab. In cases where a concrete slab is not present, height is measured from the tallest part of the roof to the average finished grade using the corners at the base of the building.

8.6.4.1.1. In Shaded X, X, or AE special flood hazard area west of NC 12 and SR 1243, as defined in 11.42.3.1.2., height will be measured from the regulatory flood protection elevation or finished grade, whichever is higher. In cases where there is a ground floor enclosure below the regulatory flood protection elevation, height shall be measured from finished grade.



8.6.4.1.1. West of NC 12 and SR 1243: Flood Zone- Height

8.6.4.1.2. In coastal high hazard areas and VE zones east of NC 12 and SR 1243 in as defined in 11.42.3.1.1., height shall be measured from regulatory flood protection elevation (lowest horizontal structural member). In cases where the finished grade elevation is above the regulatory flood protection elevation, height shall be measured at approximately eighteen (18) inches above the highest, undisturbed, finished grade directly beneath the structure (free-of-obstruction).



8.6.4.1.2. East of NC 12 and SR 1243: Flood Zone- Height

PART VII. That **Section 11.5.3. Standard for Depth or Elevation of Fill and the subsections thereof** be deleted and replaced with the following:

11.5.3. Standard for Depth or Elevation of Fill.

Any residential or duplex development or redevelopment which utilizes fill shall be limited to the following standards:

11.5.3.1. Properties East of NC 12 and SR 1243.

11.5.3.1.1. Fill shall be subject to the provisions of Section 11.44.3.11.

11.5.3.1.2. Areas of fill exceeding the height of existing grade shall not exceed ten (10) percent of the lot area (see Article 8, District Development Standards), excluding the footprint of the active drainfield and septic system as approved by the Dare County Health Department in accordance with the septic permit. Lot area is defined as that portion of the lot landward of the first line of stable vegetation as defined by CAMA.

11.5.3.1.3. No bulkheads are allowed.

11.5.3.2. Properties West of NC 12 and SR 1243.

11.5.3.2.1. In areas where the most recent Flood Insurance Rate Map (FIRM) provides a base flood elevation for a subject property, fill shall not be permitted to exceed the base flood elevation except in cases where it is placed directly beneath a slab that is designed to meet the base flood

elevation depicted on the FIRM. In these instances, fill may exceed the base flood elevation by up to twelve inches (12”) to support a turn-down or thickened edge slab or beneath a slab that is supported by a ring-wall style foundation. Fill placed above the base flood elevation shall not extend beyond the outside edge of the slab.

11.5.3.2.1. In areas where the most recent Flood Insurance Rate Map (FIRM) provides no base flood elevation, fill shall not exceed the amount required for wastewater permits required by the Dare County Health Department, or two feet (2’) above pre-development surface elevation, whichever is greater.

ARTICLE III. Severability.

All Town ordinances or parts of ordinances in conflict with this ordinance amendment are hereby repealed. Should a court of competent jurisdiction declare this ordinance amendment or any part thereof to be invalid, such decision shall not affect the remaining provisions of this ordinance amendment nor the Unified Development Ordinance or Town Code of the Town of Nags Head, North Carolina which shall remain in full force and effect.

ARTICLE IV. Effective Date.

This ordinance amendment shall be in full force and effect upon the date of adoption by the Board of Commissioners.

_____
Benjamin Cahoon, Mayor
Town of Nags Head

ATTEST:
Carolyn F. Morris, Town Clerk

APPROVED AS TO FORM:
Town Attorney
Date adopted: _____
Motion to adopt by Commissioner _____
Motion seconded by Commissioner _____
Vote: ____ AYES ____ NAYS

Agenda Item Summary Sheet

Item No: **F-1**
Meeting Date: **May 6, 2020**

Item Title: Update from Planning Director

Item Summary:

Attached please find a monthly update from Planning Director Michael Zehner.

Number of Attachments: 1

Specific Action Requested:

Provided for Board information and update.

Submitted By: Planning and Development Date: April 28, 2020

Finance Officer Comment:

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

The report provided by the Planning and Development Director is intended to update the Board and public on items that you have prioritized, such as building permit review and turnaround time. Staff's intent is to provide you with the attached report as well as an opportunity for Board members to ask any questions or for clarifications on any of the items in the report. A verbal presentation is not planned to accompany the attached report. Ordinarily, unless there is a specific item to be heard under this agenda item, nothing takes place.

Signature: Cliff Ogburn Date: April 28, 2020

MEMORANDUM
Town of Nags Head
Planning & Development Department

To: Board of Commissioners
Planning Board
From: Michael Zehner, Director of Planning & Development
Date: April 29, 2020
Subject: Planning and Development Director's Report

This memo provides an overview of selected Planning and Development Department activities, projects, and initiatives. If requested, Staff will be prepared to discuss any of this information in detail at the Board of Commissioners meeting on May 6, 2020.

Monthly Activity Report

Attached for the Board's review is the *Planning and Development Monthly Report for March 2020*. In addition to permitting, inspections, code enforcement, and Todd D. Krafft Septic Health Initiative activities, Staff was involved in the following meetings or activities of note during the month:

- Wednesday, March 4, 2020 - Board of Commissioners Meeting
- Friday, March 6, 2020 - NC State Sustainability Studio Midsemester Review
- Monday, March 9, 2020 - Flood Map/Ordinance Community Information Meeting
- Tuesday, March 10, 2020 - Flood Map/Ordinance Meeting with Outer Banks Home Builders Association representatives
- Wednesday, March 11, 2020 - Outer Banks 2020 (J-1) Community & Employer Forum
- Wednesday, March 11, 2020 - Arts & Culture Committee Meeting
- Thursday, March 12, 2020 - Mayors J-1 Housing Discussion with Dan Bullock
- Tuesday, March 17, 2020 - Planning Board Meeting Cancelled
- Wednesday, March 18, 2020 - CRS Pre-Planning Meeting
- Monday, March 30, 2020 - NCDOT Great Trails State Plan - Division 1 Stakeholder Meeting

Impact of Coronavirus on Permitting

As previously reported, a total of 67 building permits (non-trade) were applied for in both March 2020 and in March 2019. With regard to permits applied for since March 16 through April 23, 66 permits were applied for in 2019 and 72 were applied for in 2020; in the most recent two weeks, there were 23 permits applied for in 2020 and 9 permits applied for in 2019.

Our previous reporting on permit numbers did not include trade permits. For comparison purposes, a total of 202 trade permits were issued in March and April 2019; at present, from March 1 through April 23, a total of 110 trade permits have been applied for.

With the opening of the County to non-resident property owners, Staff does have an expectation that the number of permit-eligible projects will increase as owners begin to prepare properties for the season. We will continue to monitor and report any impacts to permitting.

Online Permitting

As previously reported, as of April 15, 2020, online permitting has been activated for the following additional permit types:

- Sign permits
- Commercial and residential repair permits
- Residential demolition permits
- Residential remodel permits (without additional heated square footage)

Staff is working to activate online permitting for all other permits by the week of May 4, 2020.

Building Code Effectiveness Grading

The Town recently received the attached Building Code Enforcement Evaluation Report from the Insurance Services Office (ISO). The Building Code Effectiveness Grading Schedule ("BCEGS") evaluates the building codes adopted in a community and the community's enforcement of these codes. BCEGS particularly emphasize building-code requirements designed to mitigate losses from natural hazards. The Town received a classification of 3 for 1- and 2-family residential property and 3 for commercial and industrial property; the classification range is 1-10, with class 1 representing "exemplary commitment."

As noted by Cory Tate, the Town's Chief Building Official, "the Town of Nags Head scored slightly higher than the other jurisdictions on the Outer Banks mainly due to the amount of experience and levels of certification of our inspections staff. All jurisdictions received nearly the same amount of credit for the edition of codes enforced, having an all hazards approach in our collective hazard mitigation plans (including similar flood damage prevention ordinances), and similar requirements for staff members to obtain continuing education credit as mandated by the state. Where Nags Head exhibited a slight edge over other jurisdictions on the Outer Banks comes from a higher level of experience and professional certifications. Both full-time inspectors have level 3 certifications from the NC Code Officials Qualification Board in building, electrical, plumbing, and mechanical trades. Both full-time inspectors are Certified Floodplain Managers. Additionally, Steve Szymanski has level 2 certification in fire prevention, and I have level 3 certification in fire prevention. We also received additional credit for the fact that I have a bachelor's degree and a building contractor's license from the NC Licensing Board for General Contractors, and that Steve and I both have an electrical contractor's license from the NC Board of Examiners of Electrical Contractors. We also scored higher because the Town of Nags Head inspectors have more years of experience as building inspectors, compared to most full-time inspection staff members employed by other jurisdictions on the Outer Banks."

Outer Banks Beachcomber Museum

The Town's Arts & Culture Committee recently agreed to request that the Board of Commissioners discuss the status and future of Mattie Midgette's store and house at 4008 South Virginia Dare Trail, more popularly known as the Outer Banks Beachcomber Museum (http://www.osob.net/). As the Board may be aware, the current owners, Dorothy Hope and Chaz Winkler, have expressed an intent in selling the property, and at least last year, there was an active listing for the property on the Preservation North Carolina website. A recent article in the Outer Banks Voice (https://www.outerbanksvoice.com/2020/04/09/out-of-the-woods/) documented the historic value of the property.

In short, the Arts & Culture Committee believes that the property and Museum are both an important and unique historic resource, as well as a collection, and are concerned that the store, house, and/or collection could be lost, no longer serving as an important contributor to the character of the Town of Nags Head and the Nags Head Beach Cottage Row Historic District. The Committee would strongly encourage the Board of Commissioners to discuss the property, including any options or interest for the acquisition and preservation of the property and collection, either directly or indirectly involving the Town. If the Board has an interest, Staff could further explore partnerships or grants that may support the preservation of the property.

Planning Board - Pending Applications and Discussions

The April 21, 2020 meeting of the Planning Board was held virtually on the Zoom platform, as was the April 1, 2020 meeting of the Planning Board. The agenda for the April 21 meeting included consideration of a revised plan for the preliminary subdivision plat for Coastal Villas (a new street is now proposed to access the subdivision from US 158/S. Croatan Highway and provide connection to the paper street known as Fourth Street), and consideration of a text amendment to add the use "Learning Center" as a permitted use in the C-2 zoning district; the Planning Board recommended approval of both items, with the Board noting that they did have a preference for the earlier iteration of the preliminary plat without access from US 158. The agenda also included further consideration of options and recommendations pertaining to legacy establishments/structures, residential stormwater regulations, and the *Planning & Development Department and Septic Health FY2020-2021 Strategic Work Plan*, but those items were continued to the Board's May meeting due to technical difficulties with the Zoom platform.

The Planning Board's next meeting is scheduled for May 19, 2020. At present, the agenda is expected to include previously discussed and considered items noted above, as well as continued discussion regarding the regulation of events within residential dwelling units and the regulation of large occupancy homes.

Additional Updates

- 2020 Census - The 2020 Census is open and collecting responses. As of April 13, 2020, the self-response rate for the Town of Nags Head was 13%, compared to a 22% response rate for Dare County and 45.4% response rate for the State.

As of April 28, 2020, the self-response rate for the Town was 14.5%, compared to a 24.8% response rate for Dare County and a 49.4% response rate for the State.

Staff has been in communication with Census officials who have offered guidance and suggestions for increasing the Town's response rate. Additionally, Census officials have noted that the number/percentage of vacant vacation/rental homes in Town would skew the response rate, as the rate is not adjusted at this time to account for those homes. As an example, if the Town's actual occupancy rate is 30%, and the reported response rate is 15%, then the actual response rate for occupied homes would be 50%.

- Town Workforce Housing Study & Plan - Phase 1 Report presented to the Board of Commissioners for the February 5, 2020 meeting. Further action on this project is on hold pending direction from the Board of Commissioners; however, it is important to note that funds associated with this project have been liquidated due to budgetary constraints associated with the Covid-19 Pandemic.

- Septic Health - Staff intends to prepare and present a draft project scope for the update of the Decentralized Wastewater Plan to the Commissioners, likely later in May or in June.

- Hazard Mitigation Plan - As of April 28, 2020, the final Plan has received approval from the State. Minor changes were necessary (and updated draft is available here: http://www.obx-hmp.com/draftDocuments.html), and the Plan will be sent to FEMA for review soon. Final consideration and adoption by the County and towns anticipated in June/July 2020.

- Grants -

    - A request is pending under the Hazard Mitigation Grant Program (Tropical Storm Michael) to update the Town's Emergency Operations Plan.

    - Staff submitted a Letter of Interest ("LOI") under the Hazard Mitigation Grant Program related to Hurricane Dorian for the acquisition of property, and assisted Fire Chief Wells in the submission of an LOI for replacement of a generator; we have been notified that the generator request has been selected for further consideration.

    - An LOI has been submitted for a National Fish and Wildlife Foundation – National Coastal Resilience Fund grant to develop an Estuarine Shoreline Management Plan. Additionally, a preapplication has been submitted for the 2020 North Carolina Attorney General Environmental Enhancement Grant for the same project, to cover or supplement costs.

    - Staff intends to submit a CAMA Access Grant preapplication for improvements to the Huron Street Beach Access.

    - Staff is reviewing additional grant opportunities for prioritized projects, including an AARP Community Challenge Grant.

- UDO - Staff continues to develop Reference Manual materials. Publishing on the Municode platform has been completed. Staff is assessing the budget for printing hardcopies of UDO; however, this would likely wait to include incorporation of the updated Flood Prevention Ordinance.

- Permitting - Staff had previously contacted representatives of the Outer Banks Home Builders Association to coordinate a schedule for a workshop/forum for the building community. However, given current circumstances, this effort will be placed on hold.

  Staff has begun an email distribution to contractors registered with the Town to provide updates on changes to permitting and inspection procedures associated with the Coronavirus Pandemic and response. Staff intends to send a further update before the end of the week to publicize the new online permitting options.

Upcoming Meetings and Other Dates

- Tuesday, April 28 - P&D Staff Meeting
- Thursday, April 29 - Septic Tipping Points Discussion
- Monday, May 4 - NC State Sustainability Studio Project Presentations
- Wednesday, May 6 - Board of Commissioners Meeting
- Wednesday, May 13 - Arts & Culture Committee Meeting
- Tuesday, May 19 - Planning Board Meeting

TOWN OF NAGS HEAD PLANNING AND DEVELOPMENT
MONTHLY REPORT
MARCH 2020

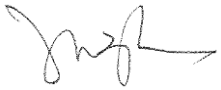
DATE SUBMITTED: April 7, 2020

	Mar-20	Mar-19	Feb-20	2019-2020 FISCAL YTD	2018-2019 FISCAL YTD	FISCAL YEAR INCREASE/ DECREASE
BUILDING PERMITS ISSUED - RESIDENTIAL						
New Single Family	2	1	1	7	14	(7)
New Single Family, 3000 sf or >	0	0	1	5	7	(2)
Duplex - New	0	0	0	0	0	0
Sub Total - New Residential	2	1	2	12	21	(9)
Miscellaneous (Total)	64	67	56	333	338	(5)
Accessory Structure	*9*	*7*	*4*	36	*41*	(5)
Addition	*3*	*3*	*2*	15	*16*	(1)
Demolition	*0*	*2*	*0*	2	*5*	(3)
Move	*0*	*0*	*0*	0	*0*	0
Remodel	*7*	*14*	*15*	70	*72*	(2)
Repair	*45*	*41*	*35*	210	*204*	6
Total Residential	**66**	**68**	**58**	**345**	**359**	(14)
BUILDING PERMITS ISSUED - COMMERCIAL						
Multi-Family - New	0	0	0	0	0	0
Motel/Hotel - New	0	0	0	0	0	0
Business/Govt/Other - New	1	2	1	2	4	(2)
Subtotal - New Commercial	1	2	1	2	4	(2)
Miscellaneous (Total)	9	12	12	68	85	(17)
Accessory Structure	*3*	*4*	*3*	17	*19*	(2)
Addition	*0*	*1*	*0*	0	*1*	(1)
Demolition	*1*	*0*	*0*	4	*4*	0
Move	*0*	*0*	*0*	0	*0*	0
Remodel	*3*	*2*	*3*	21	*25*	(4)
Repair	*2*	*5*	*6*	26	*36*	(10)
Total Commercial	**10**	**14**	**13**	**70**	**89**	(19)
Grand Total	**76**	**82**	**71**	**415**	**448**	(33)
SUB-CONTRACTOR PERMITS						
Electrical	40	18	43	340	299	41
Gas	3	0	2	17	16	1
Mechanical	30	24	34	251	250	1
Plumbing	9	5	10	66	64	2
Sprinkler	0	1	0	1	3	(2)
VALUE						
New Single Family	$572,000	$230,000	$400,000	$1,864,797	$3,008,000	($1,143,203)
New Single Family, 3000 sf or >	$0	$0	$750,000	$3,832,561	$4,450,460	($617,899)
Duplex - New	$0	$0	$0	$0	$0	$0
Misc (Total Residential)	$1,242,053	$1,262,425	$1,045,721	$7,742,589	$7,670,208	$72,381
Sub Total Residential	**$1,814,053**	**$1,492,425**	**$2,195,721**	**$13,439,947**	**$15,128,668**	($1,688,721)
Multi-Family - New	$0	$0	$0	$0	$0	$0
Motel/Hotel - New	$0	$0	$0	$0	$0	$0
Business/Govt/Other - New	$650,000	$1,800,000	$380,000	$1,030,000	$3,646,975	($2,616,975)
Misc (Total Commercial)	$497,155	$314,951	$1,008,538	$3,011,897	$3,593,190	($581,293)
Sub Total Commercial	**$1,147,155**	**$2,114,951**	**$1,388,538**	**$4,041,897**	**$7,240,165**	($3,198,268)
Grand Total	**$2,961,208**	**$3,607,376**	**$3,584,259**	**$17,481,844**	**$22,368,833**	**($4,886,989)**

TOWN OF NAGS HEAD PLANNING AND DEVELOPMENT
MONTHLY REPORT
MARCH 2020

DATE SUBMITTED: April 7, 2020

	Mar-20	Mar-19	Feb-20	2019-2020 FISCAL YTD	2018-2019 FISCAL YTD	FISCAL YEAR INCREASE/ DECREASE
ZONING						
Zoning Permits	45	43	34	238	239	(1)
CAMA						
CAMA LPO Permits	0	6	6	27	43	(16)
CAMA LPO Exemptions	22	20	18	90	73	0
Sand Relocations	86	N/A	11	97	N/A	N/A
CODE COMPLIANCE						
CCO Inspections	124	78	59	717	725	(8)
Cases Investigated	9	19	22	286	432	(146)
Warnings	3	6	2	50	64	(14)
NOVs Issued	5	8	19	233	347	(114)
Civil Citations (#)	0	0	0	1	0	1
Civil Citations ($)	$0	$0	$0	$0	$0	$0
SEPTIC HEALTH						
Tanks inspected	18	20	0	114	177	(63)
Tanks pumped	5	6	3	22	60	(38)
Water quality sites tested	0	0	0	112	138	(26)
Personnel Hours in Training/School	29	51	21	148	281	(133)



Michael D. Zehner, Director of Planning & Development

COMMENTS:

Building Code Enforcement Evaluation Report

Selections from the reviews of the

Nags Head

Building Code Enforcement Agency

In the County of Dare

In the State of North Carolina

7/9/2019 Evaluation

ISO **Building Code Effectiveness Grading Schedule (BCEGS®)**

Table of Contents

Section 1 Executive Summary

Not all communities have rigorous building codes, nor do all communities enforce their codes with equal commitment. Yet the effectiveness of local building codes can have a profound effect on how the structures in your community will fare in a hurricane, earthquake, or other natural disaster.

Studies conducted following recent natural disasters concluded that total losses might have been as much as 50% less if all structures in the area had met current building codes. Building-code enforcement can have a major influence on the economic well-being of a municipality and the safety of its citizens. Insurance Services Office (ISO) helps distinguish amongst communities with effective building-code adoption and enforcement through comprehensive program called the Building Code Effectiveness Grading Schedule (BCEGS®).

ISO is an independent statistical, rating, and advisory organization that serves the property/casualty insurance industry. ISO collects information on a community's building-code adoption and enforcement services, analyzes the data, and then assigns a Building Code Effectiveness Classification from 1 to 10. Class 1 represents exemplary commitment to building-code enforcement. The concept behind BCEGS is simple. Municipalities with well-enforced, up-to-date codes demonstrate better loss experience, and their citizens' insurance rates can reflect that. The prospect of minimizing catastrophe-related damage and ultimately lowering insurance costs gives communities an incentive to enforce their building codes rigorously.

The following management report was created specifically for Nags Head based on a BCEGS survey conducted on 7/9/2019. This report can help you evaluate your community's building-code enforcement services utilizing benchmarking data collected throughout the country. The report is designed to give your management team an expanded prospective for dealing with the important issues surrounding effective building code enforcement. This is accomplished through comparisons of your code enforcement to that of others in your area and state. The analysis goes further to allow you to compare your jurisdiction to others across the country with similar permit, plan review and inspection activity. ISO thanks you for your participation and we encourage you to take advantage of the information contained in this report to assist in making decisions regarding the level of code enforcement best suited for Nags Head.

The survey conducted has resulted in BCEGS class of 3 for 1 and 2 family dwellings and a class 3 for all other construction. More information regarding how this recent survey compares to previous surveys is provided below.

Table 1 details the points your department earned during the most recent survey as well as the points earned in the previous survey including a comparison of the two. This information may be used to track local trends or pin-point improvement target areas.

Table 1

Building Code Effectiveness Grading Point Comparison

	Point Totals						
	Current Grading Yr: 2019		Maximum Point Possible	Previous Grading Yr: 2015		Difference	
	Com	Res		Com	Res	Com	Res
Section I - Administration of Codes	39.46	38.86	54.00	43.06	42.55	-3.60	-3.69
Section 105 - Adopted Codes	8.00	7.60	8.00	6.88	6.54	1.12	1.06
Section 108 - Additional Code Adoptions	3.35	3.35	4.00	1.99	1.99	1.36	1.36
Section 110 - Modification to Adopted Codes	4.00	3.80	4.00	3.44	3.27	0.56	0.53
Section 112 Method of Adoption	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Section 115 - Training	8.37	8.37	13.00	11.34	11.34	-2.97	-2.97
Section 120 - Certification	8.59	8.59	12.00	11.26	11.26	-2.67	-2.67
Section 125 - Building Official's Qualification / Exp/ Education	2.50	2.50	4.00	2.50	2.50	0.00	0.00
Section 130 - Selection Procedure for Building Official	0.25	0.25	0.50	0.25	0.25	0.00	0.00
Section 135 - Design Professionals	0.00	0.00	2.00	0.00	0.00	0.00	0.00
Section 140 - Zoning Provisions	0.00	0.00	1.00	1.00	1.00	-1.00	-1.00
Section 145 - Contractor / Builder Licensing & Bonding	0.90	0.90	1.00	0.90	0.90	0.00	0.00
Section 155 - Public Awareness Programs	2.50	2.50	2.50	2.50	2.50	0.00	0.00
Section 160 - Participation in Code Development Activities	0.50	0.50	0.50	0.50	0.50	0.00	0.00
Section 165 - Administrative Policies & Procedures	0.50	0.50	0.50	0.50	0.50	0.00	0.00

Building Code Effectiveness Grading Point Comparison (continued)

	Point Totals						
	Current Grading Yr: 2019		Maximum Point Possible	Previous Grading Yr: 2015		Difference	
	Com	Res		Com	Res	Com	Res
Section II - Plan Review	21.22	23.00	23.00	23.00	21.07	-1.78	1.93
Section 205 - Existing Staffing	8.22	9.00	9.00	9.00	7.07	-0.78	1.93
Section 210 - Experience of Personnel	1.50	1.50	1.50	1.50	1.50	0.00	0.00
Section 215 - Detail of Plan Review	10.50	11.50	11.50	11.50	11.50	-1.00	0.00
Section 220 - Performance Evaluation for Quality Assurance	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Section III - Field Inspection	18.75	20.55	23.00	20.82	15.65	-2.07	4.90
Section 305 - Existing Staffing	7.20	9.00	9.00	8.82	3.65	-1.62	5.35
Section 310 - Experience of Personnel	2.55	2.55	3.00	3.00	3.00	-0.45	-0.45
Section 315 - Managing Inspection and Re-inspection activity	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Section 320 - Inspection Checklist	0.00	0.00	2.00	0.00	0.00	0.00	0.00
Section 325 - Special Inspections	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Section 330 - Inspections for Natural Hazard Mitigation	1.50	1.50	1.50	1.50	1.50	0.00	0.00
Section 335 - Final Inspections	2.50	2.50	2.50	2.50	2.50	0.00	0.00
Section 340 - Certificate of Occupancy	2.00	2.00	2.00	2.00	2.00	0.00	0.00
Section 345 - Performance Evaluations for Quality Assurance	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Subtotal:	79.43	82.41	100.00	86.88	79.27	-7.45	3.14
The final score is determined by a relationship between Item 105 and the balances of the scoring.							
Final Score:	79.43	78.67	100.00	75.68	66.00	3.75	12.67

Section 2 Background Information

Introduction

ISO collects information from communities in the United States on their adoption and enforcement of building codes. ISO analyzes the data using its Building Code Effectiveness Grading Schedule (BCEGS) and then assigns a BCEGS Classification number to the community. The classification number-which ranges from 1 to 10-measures a jurisdiction's commitment to the adoption and enforcement of building codes affecting the construction of new buildings. Class 1 indicates the most favorable classification of commitment to the adoption and enforcement of building codes.

ISO's commitment to polling each building code enforcement agency on a regular basis is important to the program - periodic surveying helps determine if a community has made any significant changes since its last field evaluation. This ongoing effort is designed to re-evaluate each community at approximate 5-year intervals or sooner if changes indicate a potential revision to the classification number.

The purpose of this report is fourfold:

1. To summarize a community's scoring under the criterion contained in the BCEGS program.
2. To identify opportunities for communities desiring to improve their BCEGS classification number.
3. To assist a community in understanding how other jurisdictions with similar needs address building code adoption and enforcement.
4. To provide hazard mapping information important in planning and developing a sustainable community.

Data Collection and Analysis

ISO has evaluated over 14,000 code enforcement departments across the United States. In each of these communities, three elements of building code adoption and enforcement are reviewed. These three elements are the administration of codes, plan review and field inspection.

Administration of Codes:

ISO evaluates the administrative support for code enforcement within the jurisdiction -- the adopted building codes and the modifications of those codes through ordinance, code enforcer qualifications, experience and education, zoning provisions, contractor/builder licensing requirements, public awareness programs, the building department's participation in code development activities, and the administrative policies and procedures. This section represents 54% of the analysis in the BCEGS program.

Plan review division:

Consideration is given to determine staffing levels, personnel experience, performance evaluation schedules, and the level of review of construction documents for compliance with the adopted building code of the jurisdiction being graded. This section represents 23% of the analysis.

Field inspection:

Consideration is given to determine staffing levels, personnel experience, performance evaluation schedules, and the level of the agency's review of building construction. This section also represents 23% of the analysis.

The information necessary to determine the BCEGS classification number was collected from the community building officials through a combination of on-site interviews and completed questionnaires.

Section 3 Code Adoption

Recognizing that building codes are continually being reviewed and updated to reflect emerging technology and best practices, the BCEGS program encourages communities to make every effort to adopt the latest edition of one of the building codes without amendments. The program is sensitive to the reality that building code adoption is not always a local issue, nor do the wheels of progress turn rapidly all the time. To receive maximum BCEGS credit for this very important section a community must adopt and implement the revised code within two years of the publication of the building code.

As detailed in Figure 3-1 below, eight points are the maximum available for the adoption of a building code. The final calculation to determine a jurisdiction's BCEGS classification employs the ratio of the points possible and the points earned in the building code adoption section as a factor for all other points earned in the system. Therefore, a jurisdiction enforcing the latest building code will have a ratio of 1 and no adjustment will be made to the points earned. A department enforcing a building code that was published six years prior to the survey date would have a ratio of 6.88/8 or .86 so the jurisdiction would receive credit for 86% of the points earned throughout the evaluation process.

Table 3-1 Criteria for Building Code Adoption Points

If the published date of the listed codes is within 5 years of the date of the grading: Building Code(s) addressing commercial and /or residential construction	8.00	points
If the published date of the listed codes is within 6 years of the date of the grading: Building Code(s) addressing commercial and /or residential construction	6.88	points
If the published date of the listed codes is within 10 years of the date of the grading: Building Code(s) addressing commercial and /or residential construction	2.21	points
If an earlier edition of the listed codes is adopted: Building Code(s) addressing commercial and /or residential construction	0.85	point

For departments surveyed in 2019 the BCEGS program uses the following as the latest edition of Building codes available.

Table 3-2 Latest Edition Available

	Publisher	Publication Year
Commercial Building Code		
Residential Building Code		

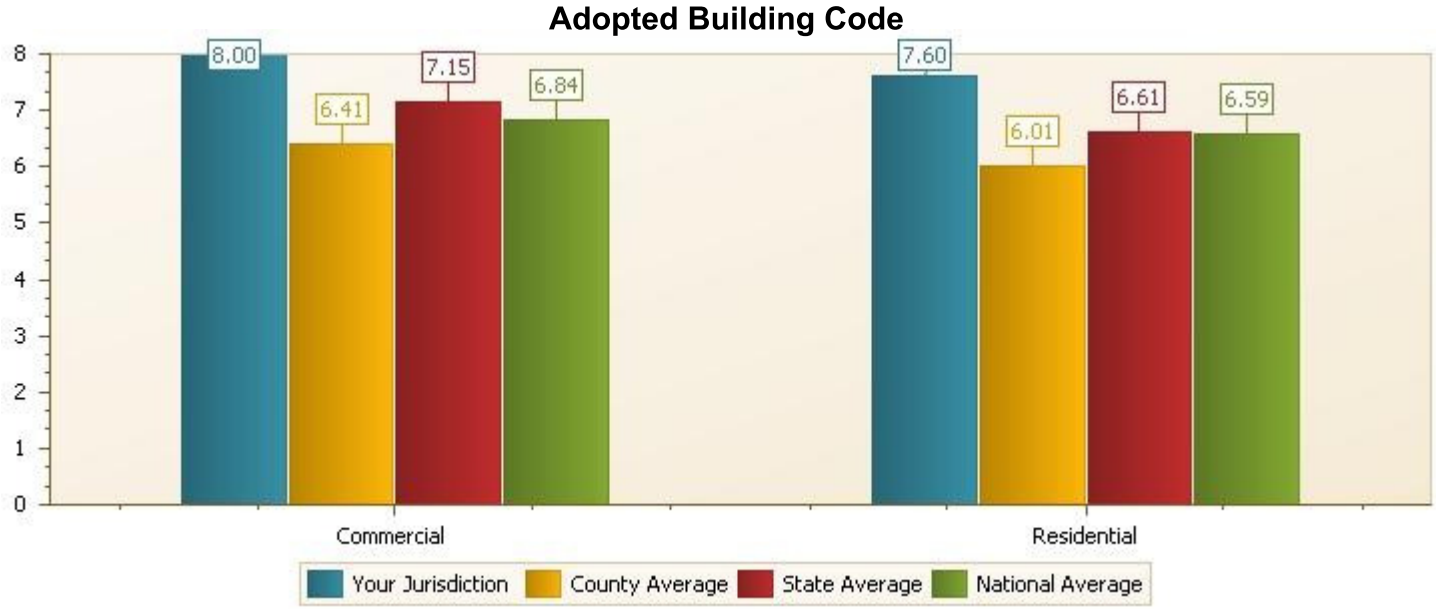
Table 3-3 Building Codes Enforced in Nags Head

	Publisher	Publication Year	Effective Year
Commercial Building Code	ICC	2015	2019
Residential Building Code	ICC	2015	2019

The following is the first of many "Benchmarking Information" sections located in this report. The purpose of the benchmarking information is to provide data ISO has collected in the course of its evaluations of code enforcement departments throughout the country. The data should not be considered a standard but rather information which allows you to compare operations in your jurisdiction to those conducted by other jurisdictions with similar conditions. Benchmarking information will be distinguished from other information in this report by a green Benchmarking Information bar above the table or figure.

Benchmarking Information

Chart 3-4 BCEGS points awarded comparison



Item 108. Additional Code Adoptions:

This section reviews the adoption and enforcement of electrical, mechanical, plumbing, energy, and wildland urban interface codes. Adopted codes are evaluated by year of publication including amendments and enforcement efforts. Table 3-5 details the criteria for earning points under this section.

Table 3-5 Criteria for sub-code adoption points

If the published date of the listed codes is within 5 years of the date of the grading: 0.67 point for each of the five subcodes
If the published date of the listed codes is within 6 years of the date of the grading: 0.33 point for each of the five subcodes
If the published date of the listed codes is within 10 years of the date of the grading: 0.18 point for each of the five subcodes
If an earlier edition of the listed codes is adopted: 0.004 point for each of the five subcodes

For departments surveyed in 2019 the BCEGS program uses the following as the latest edition of sub -codes available.

Table 3-6 Latest edition of Sub-Codes Available

Type of Code	Publisher	Publication Year
Commercial:		
Electrical Code	NFPA	
Plumbing Code	ICC / IAPMO	
Mechanical Code	ICC / IAPMO	
Fuel Gas Code	ICC / NFPA	
Energy Code	ICC / ASHRAE	
Wildland Urban Interface Code	ICC	
Residential:		
Electrical Code	NFPA	
Plumbing Code	ICC / IAPMO	
Mechanical Code	ICC / IAPMO	
Fuel Gas Code	ICC / NFPA	
Energy Code	ICC / ASHRAE	
Wildland Urban Interface Code	ICC	

ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers
ICC - International Code Council
IAPMO - International Association of Plumbing and Mechanical Officials
NFPA - National Fire Protection Association

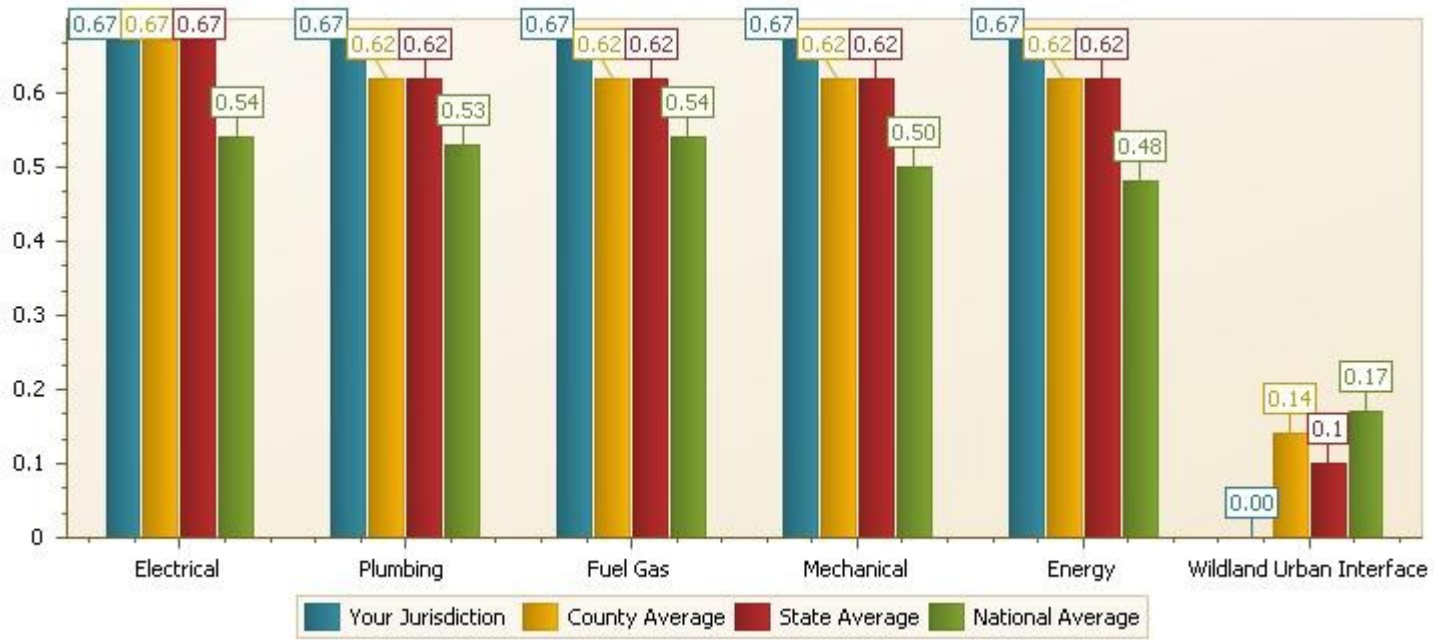
Table 3-7 Sub Codes Enforced in Nags Head

Type of code	Publisher	Publication Year	Effective Year
Commercial:			
Electrical Code	NFPA	2017	2018
Plumbing Code	ICC	2015	2019
Mechanical Code	ICC	2015	2019
Fuel Gas	ICC	2015	2019
Energy Code	ICC	2015	2019
Wildland Urban Interface Code			
Residential:			
Electrical Code	NFPA	2017	2018
Plumbing Code	ICC	2015	2019
Mechanical Code	ICC	2015	2019
Fuel Gas	ICC	2015	2019
Energy Code	ICC	2015	2019
Wildland Urban Interface Code			

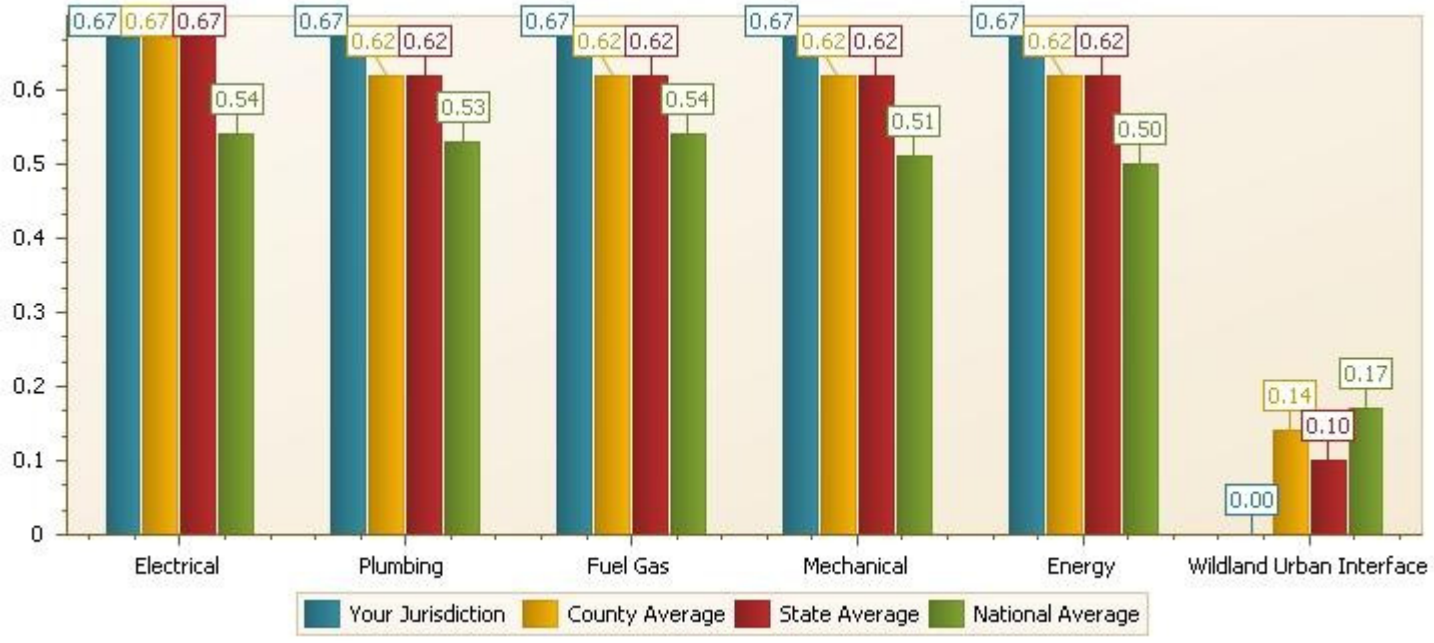
Benchmarking Information

Chart 3-8 additional code adoption

Commercial



Residential

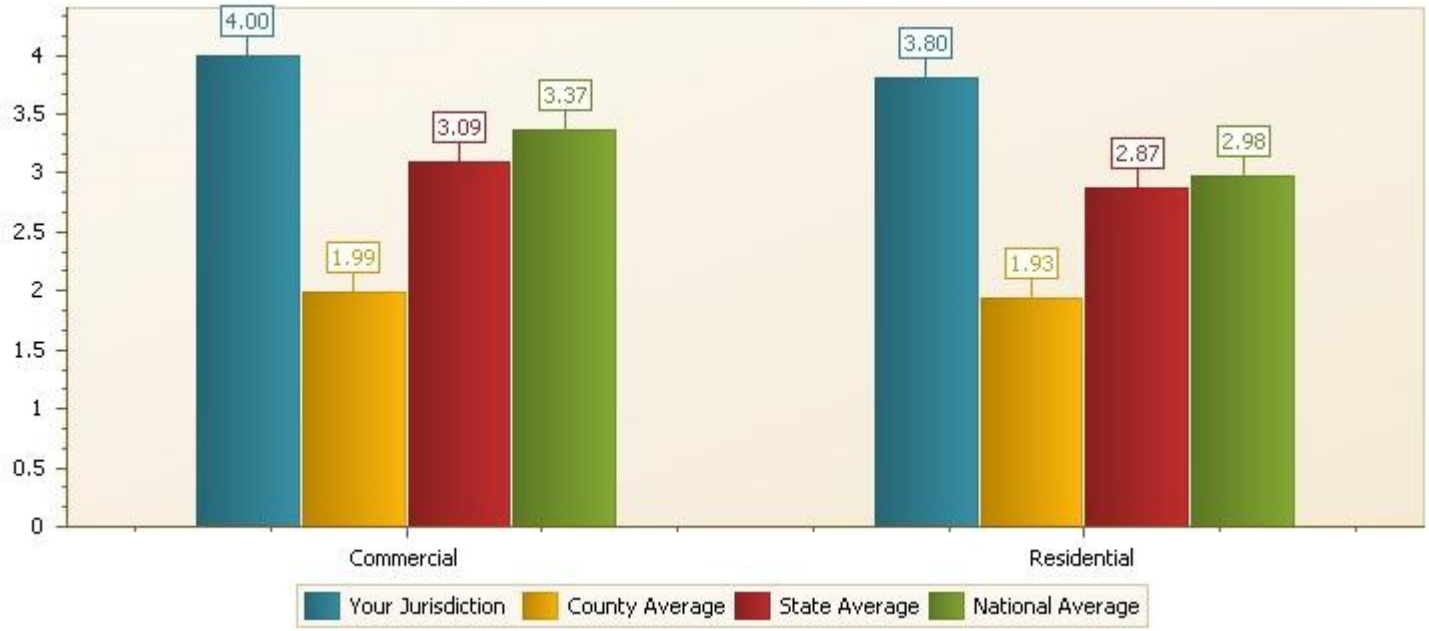


Item 110. Modification to adopted codes:

The BCEGS program encourages timely and unmodified adoption of the latest edition available of the building code. It is not uncommon for a jurisdiction to adopt a code and then modify it in some way. The most common modifications are administrative, which the BCEGS program is not overly concerned with. Some jurisdictions, however, modify the structural aspects of the code. Modifications are viewed as favorable when the intention is to strengthen the code. Due to the difficulty and expense of finitely determining the effect on a code of a specific action which weakens the code, no partial credit is available for this section. Note, however, that due to the formula: (Points credited in section 105 x 0.125 x 4.0) the points awarded for this item are reduced if the latest building code is not adopted and enforced. There is a direct correlation between the points earned for the adopted building code and the points available for this section. When modification serves to weaken the intent or effectiveness of the adopted building code relative to structural aspects or natural hazard mitigation features, no points will be awarded for this section.

Benchmarking Information

Chart 3-9 Comparison of Points Earned for Section 110

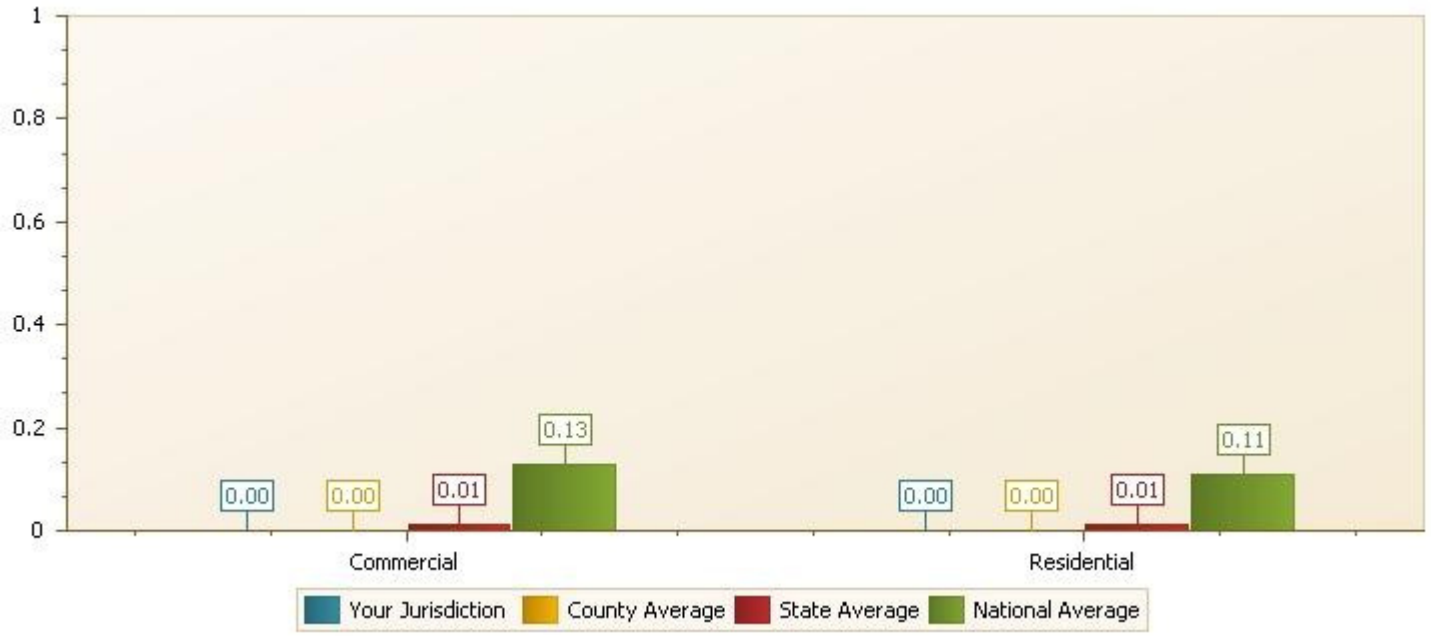


Item 112. Method of Adoption:

Updating the adopted codes to the latest code published by a nationally recognized building code development and publication organization within 12 months of the publication of the code is beneficial for the jurisdiction. It provides the latest and most modern technology for natural hazard mitigation. This section allows the opportunity to recognize the timely un-amended adoption of a nationally promulgated building code

Benchmarking Information

Chart 3-10 Points Earned for Timely (within one year of the publication date) Un-Amended Code Adoption



Section 4 Education, Training, and Certification

The Building Code Effectiveness Grading Schedule reviews the tools available to a building code department to determine what level of protection the jurisdiction has decided to offer. In this section we review the qualifications of the code enforcement personnel. By maintaining highly qualified, well trained staff the building code enforcement department is better equipped to encourage the construction of code compliant buildings.

The BCEGS program does not mandate any level of training certification or experience but it does recognize the technical and evolving nature of construction code enforcement. Therefore, 39% of the available points in the analysis are dependent on education, training and experience. The evaluation is much diversified. For instance, credit can be earned for hours of training taken, dollars spent on training, incentives for outside training, and hiring requirements. After review of this information a building code department may determine that a higher caliber employee or more incentives to current employees could assist them in performing their duties more efficiently and professionally.

The number of personnel is an important factor when comparing and correlating education and training. To standardize these numbers this report converts all employees to full time. Therefore a department with two full time code enforcers the number of employees will be two. If a department has five full time code enforcers and seven part time code enforcers each working twenty hours per week the department will show as eight and one half employees.

Nags Head employs 1.00 code enforcement personnel. This staffing level is equal to one code enforcement personnel for each 2,757 citizen or one code enforcement personnel for each 0.00 permits issued. If the jurisdiction was divided equally, each code enforcer would be responsible for an area of 6.58 square miles.

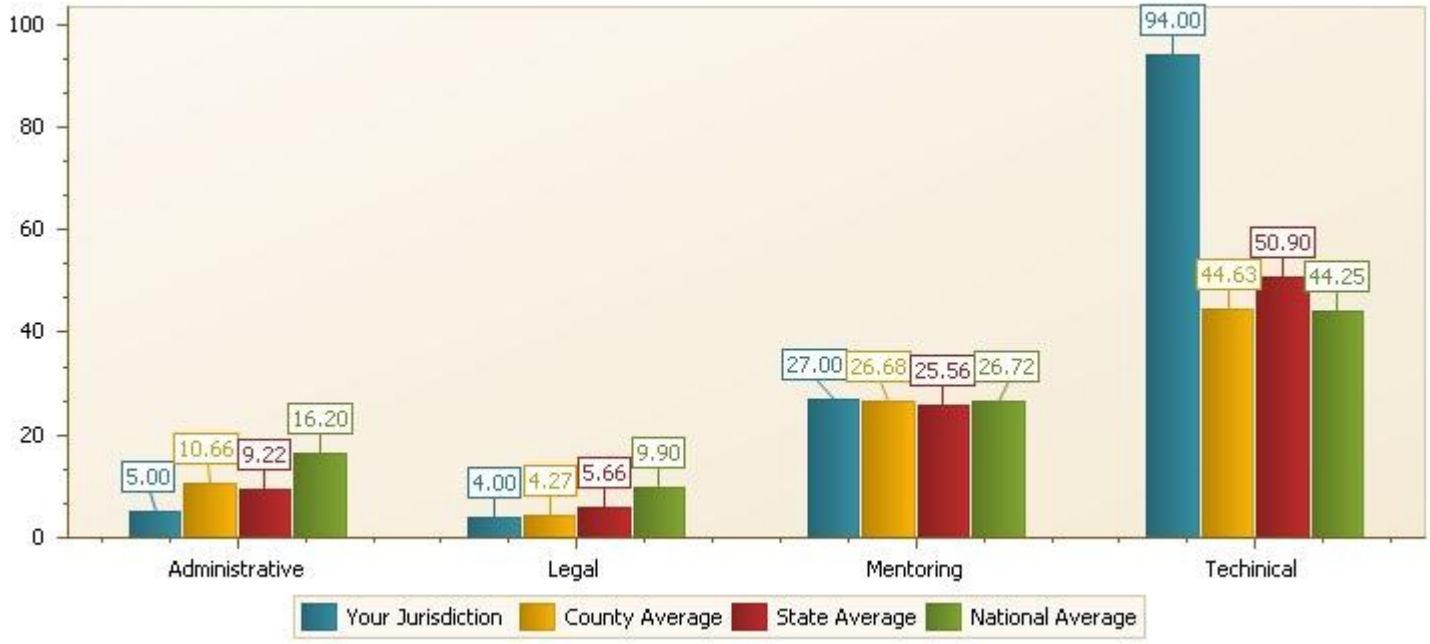
Table 4-1 displays the total and the average number of hours spent in training by code enforcement personnel in Nags Head. Training is broken down into four categories; a maximum of 1.25 points may be earned for the first 12 hours of training in administrative aspects of code enforcement, legal aspects of code enforcement, and being mentored in code enforcement. The first 60 hours of training in technical aspects of code enforcement may also earn maximum credit of 4.25 points. To receive the maximum available points in this area each employee must train a minimum of 96 hours per year and the subject must follow the details above.

Table 4-1 Training hours for Nags Head

	Total hours for department	Average hours of training
Administrative	5.00	5.00
Legal	4.00	4.00
Mentoring	27.00	27.00
Technical	94.00	94.00

Benchmarking Information

Chart 4-2 Comparison of average hours of training



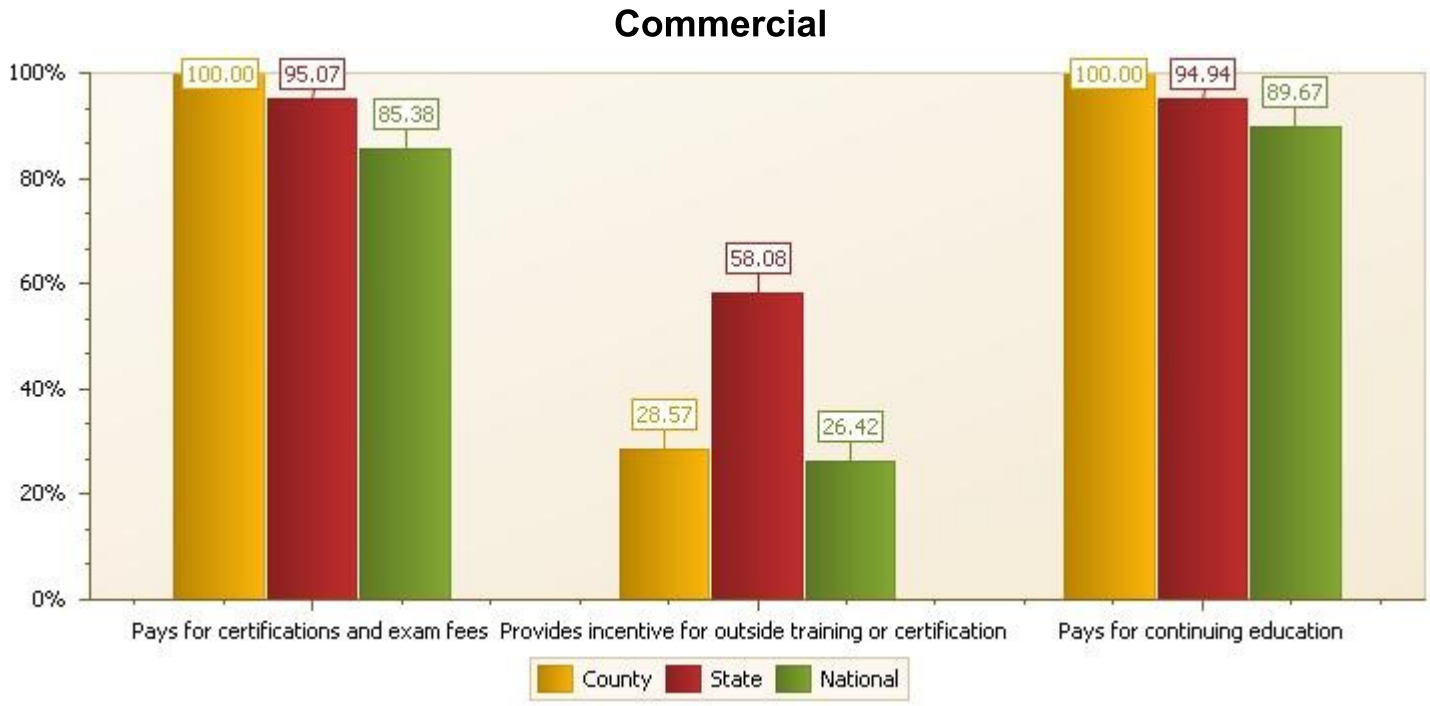
Building code enforcement departments may choose to emphasize their commitment to training and education through incentives, such as funding certification, exam fees, and continuing education or providing incentives for outside training. The following table is broken down for residential and commercial construction and indicates the incentives provided by Nags Head.

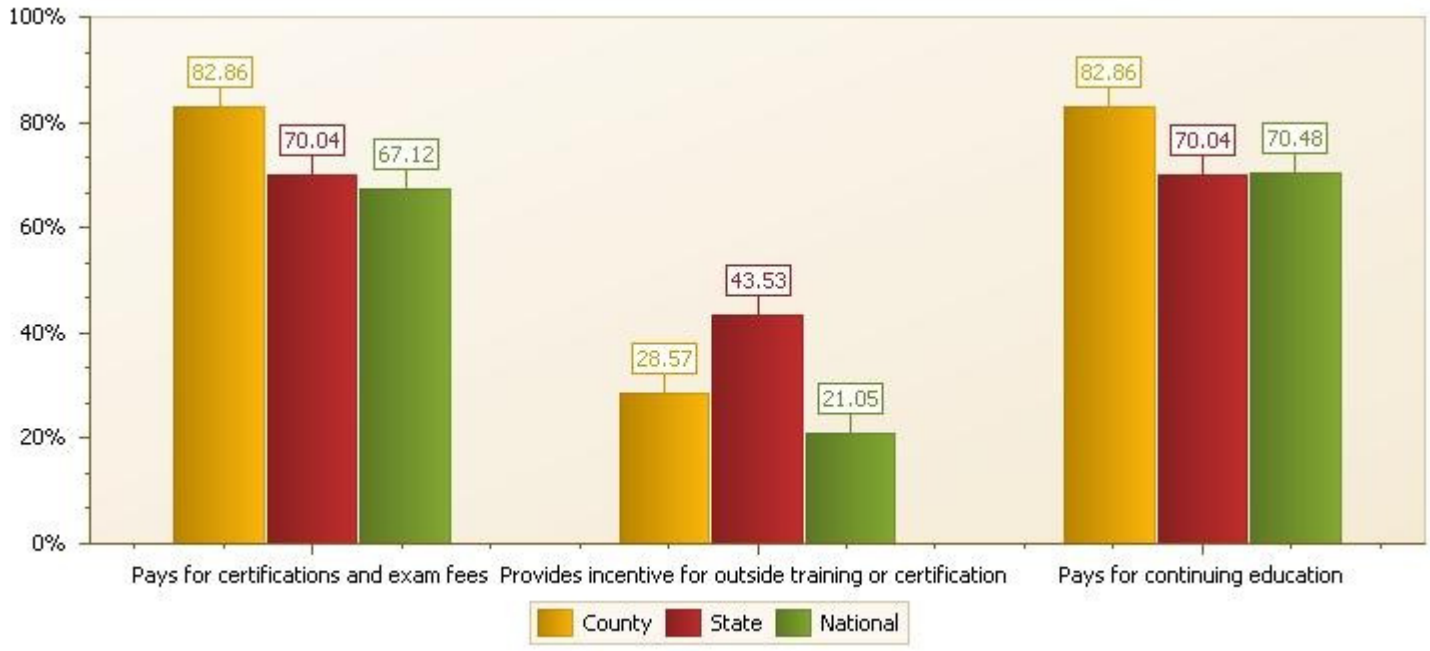
Table 4-3 BCEGS points earned by Nags Head for training incentives

	Commercial	Points Earned	Residential	Points Earned
Department pays for certifications and exam fee	Yes	0.50	Yes	0.50
Provides incentive for outside training or certification	Yes	0.50	Yes	0.50
Pays for continuing education	Yes	0.50	Yes	0.50

Benchmarking Information

Chart 4-4 Comparison of communities providing training incentive





Hiring only certified code enforcement employees or allowing a short probationary period for new hires to earn their certification are valued practices which elevate the quality and consistency of the code enforcement process. The following two charts compare your jurisdiction's policies regarding certification with those of other departments within your county, state and across the country. The charts represent the percent of plan reviewers and inspectors that held appropriate certification for the duties they performed at the time of the latest BCEGS survey. Chart 4-5 represents commercial work and Chart 4-6 represents residential work.

Chart 4-5 Comparison of Certified Personnel Performing Commercial Duties

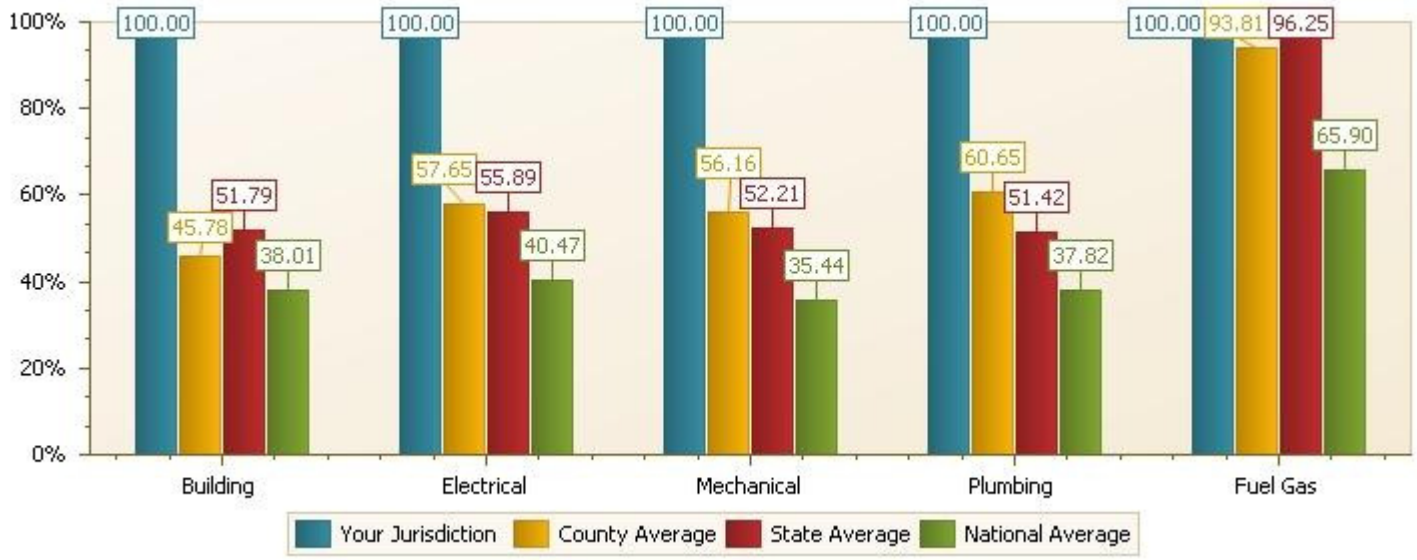
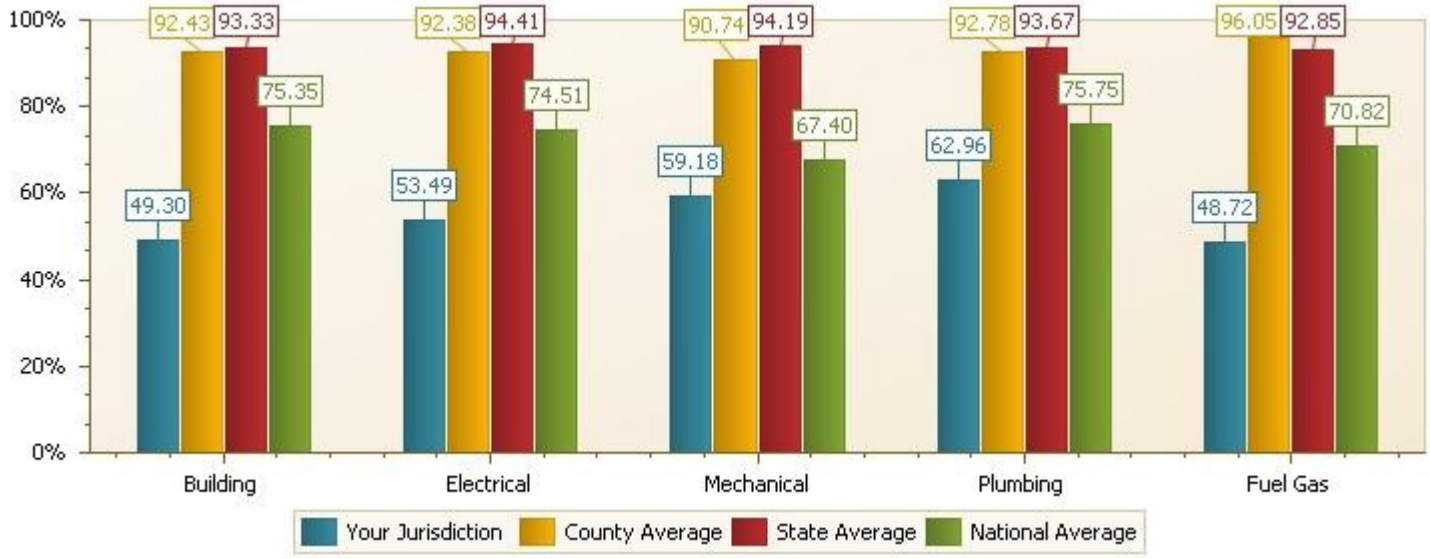


Chart 4-6 Comparison of Certified Personnel Performing Residential Duties



Requiring certification as a condition of employment is an important factor. However, the evolving nature of the building technology and the wide variety of situations encountered by plan reviewers and inspectors dictate the need for continuing education. The following two charts are based on the period of time allowed to complete the required amount of continuing education requirements for building inspectors in order for them to renew their license / certification. Information in these charts represents data gathered across the country.

Chart 4-7 Building Certification Renewal Period Commercial

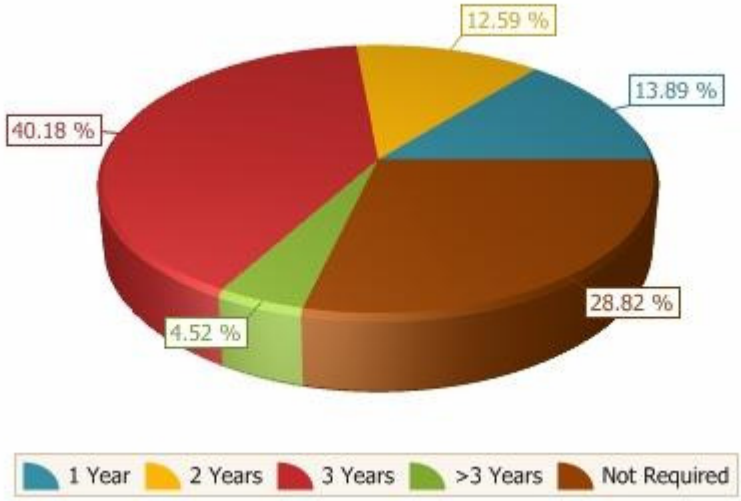
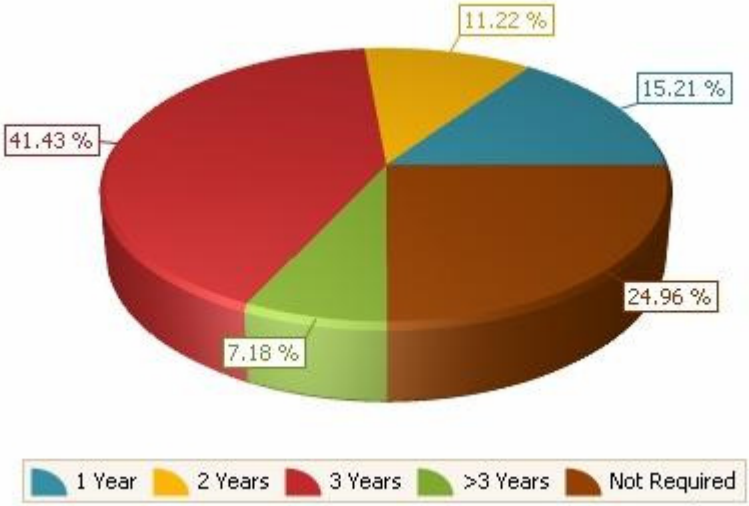


Chart 4-8 Building Certification Renewal Period Residential



Section 5 Staffing Levels

One of the most frequently asked questions from community administrators and building officials is: How many inspectors and plan reviewers do we need to supply the desired level of service to our community? This section will provide valuable information to assist in this vital decision. The BCEGS schedule uses the following benchmarks to calculate the staffing levels:

- 10 inspections per day per full time inspector
- 1 commercial plan review per day per full time plan reviewer
- 2 residential plan review per day per full time plan reviewer

These are average numbers of the entire department over the course of a year. Some inspectors because of the type of work they are assigned will exceed these benchmarks while others will not be able to reach them, the same is true of plan reviewers. The fact is that these benchmarks have proved to be realistic over the course of surveying 14,000 code enforcement departments.

However, we realize that your community may have varying circumstances and may want to base staffing decision on other information. In the following set of charts we have scoured our database to find communities that are of similar size, and population to your community to provide data that may be helpful in your decision process. The next key element of staffing decision is the workload; again we queried our records to find communities with similar number of permits issued, inspections and plan reviews completed. This data can be useful in further defining your staffing levels. Realizing that some jurisdictions cover vast area while others are metropolitan we did some calculations and arrived at a unique category of permits per square mile. You may find that this category affords benchmarking opportunities that take into account workload and travel time for your inspecting staff.

Table 5-1

Your community falls into the following ranges

Population	2,001-5,000
Square Miles	3.1-7.0
Permits Issued	<=200
Number of inspections conducted	2,201-5,700
Building Plan reviews conducted	50-150
Permits per Square Mile	<=10

Benchmarking Information

The information in Charts 5-3 through 5-14 depicts the staffing levels of your jurisdiction along with the average staffing levels of all the communities that fall within the range for each category as defined in Table 5 -1. To standardize these numbers this report converts all employees to full time equivalents. Therefore, in a department with two full time employees the number of personnel will be two. If a department has five full time code enforcers and seven part time code enforcers each working twenty hours per week the department is considered to have eight and one half full time employees. The data is further broken down by the responsibilities of each code enforcer. For example a department may allocate time as follows:

Table 5-2 Time Allocation Example

	Time allocation (hrs) employee #1 40 hrs per week	Time allocation (hrs) employee #2 30 hrs per week	Time allocation (hrs) employee #3 20 hrs per week	No. of equivalent full time employees
Commercial Plan Review	16	1.5	0	0.44
Residential Plan Review	8	1.5	0	0.24
Commercial Inspection	14	24	2	1.00
Residential Inspection	2	3	18	0.58
Total equivalent full time employees				2.25

The calculations used to make up the graphs for the example above would be the number of commercial plan reviews conducted in your jurisdiction divided by 0.44 (the number of commercial plan reviewers employed by your jurisdiction). Similarly assuming 732 residential inspections divided by the number of residential inspectors (0.58) returns a workload of 1,262 inspections per full time inspector per year. The calculation for the control group is the same except that the results are averaged.

Chart 5-3 Building Plan Review Staffing Comparisons of Communities Serving Similar Populations

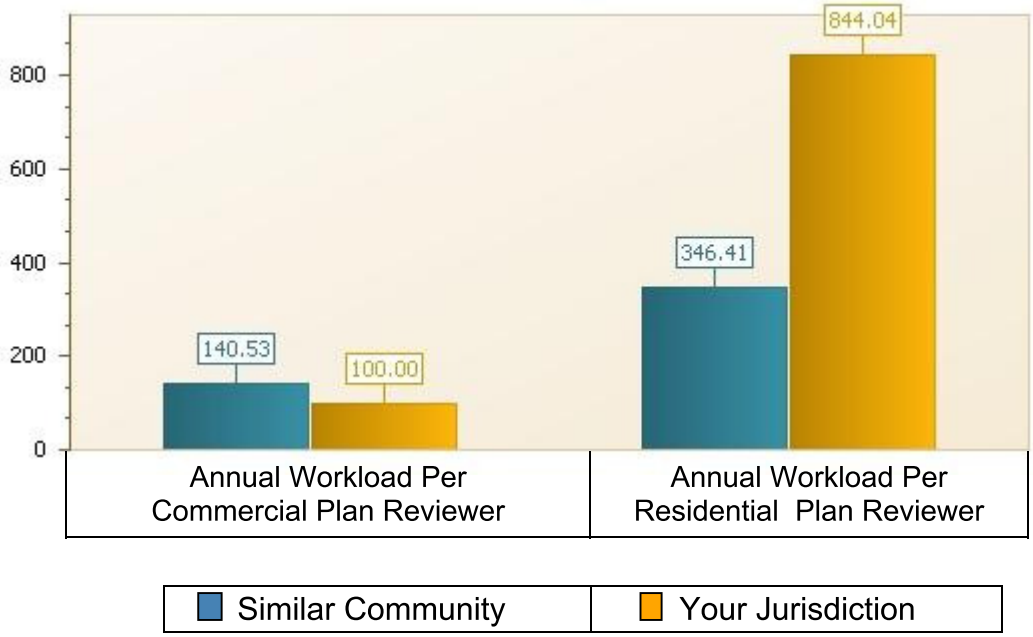


Chart 5-4 Inspection Staffing Comparisons of Communities Serving Similar Populations

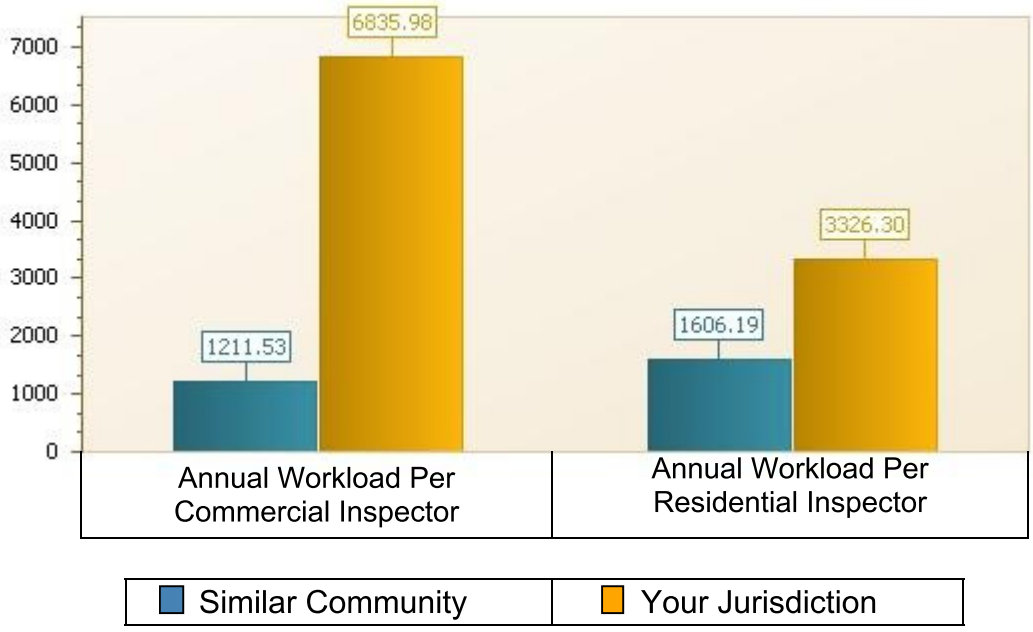


Chart 5-5 Building Plan Review Staffing Comparison of Communities Serving Similar Square Miles

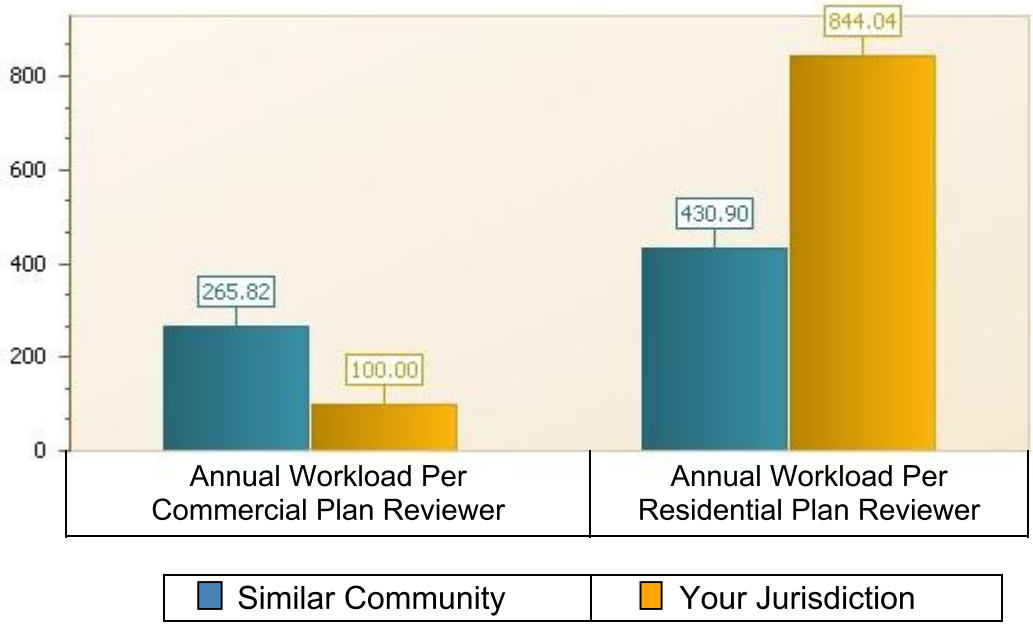


Chart 5-6 Inspection Staffing Comparison of Communities Serving Similar Square Miles

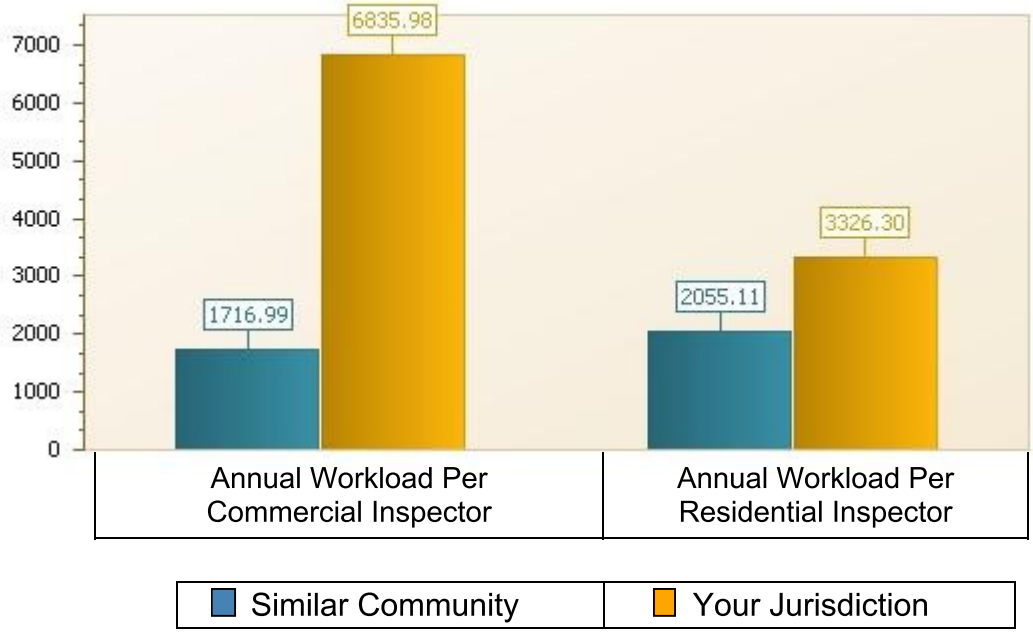


Chart 5-7 Building Plan Review Staffing Comparison of Communities Similar Number of Permits

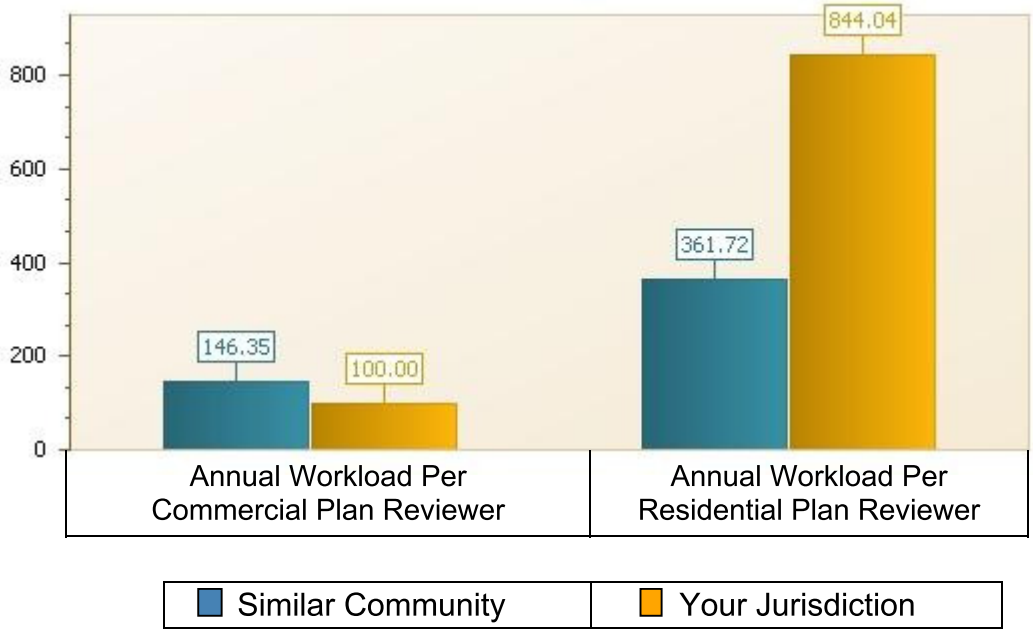


Chart 5-8 Inspection Staffing Comparison of Communities Issuing Similar Number of Permits

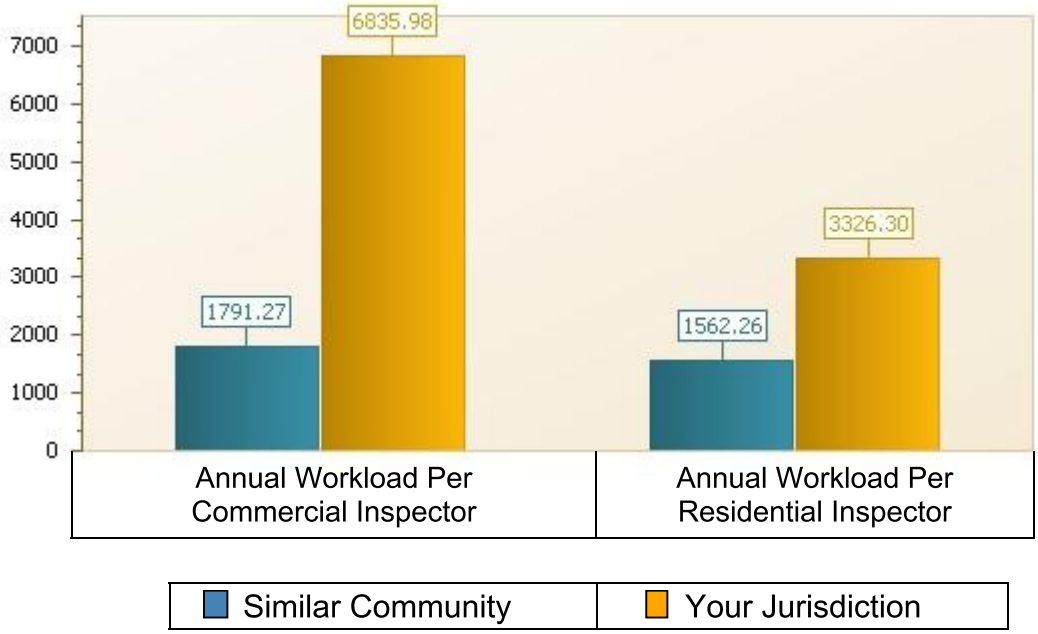


Chart 5-9 Building Plan Review Staffing Comparison of Communities Conducting Similar Number of Inspections

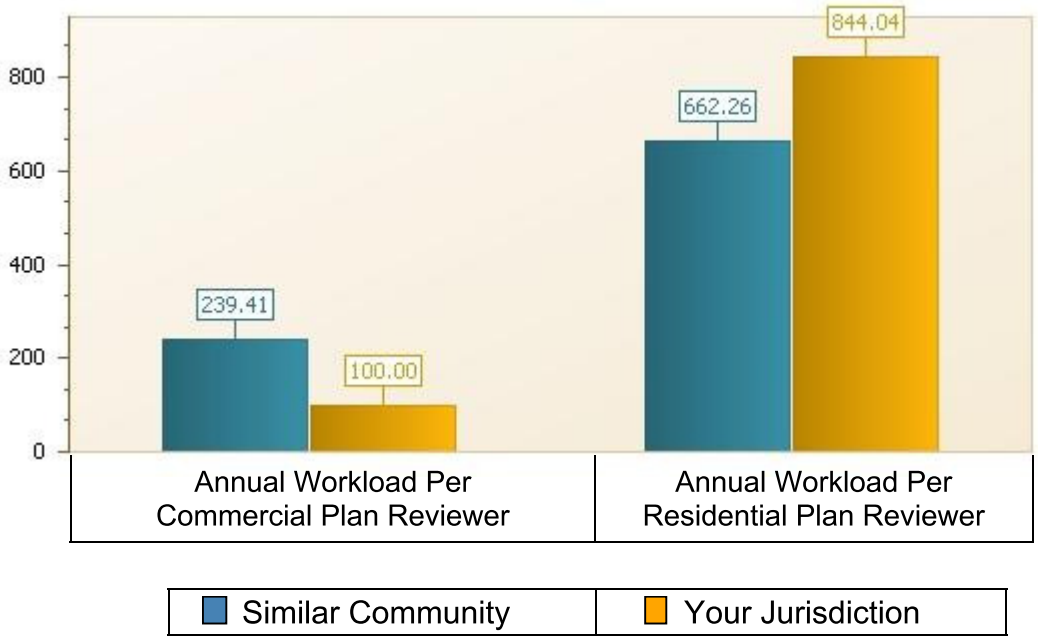


Chart 5-10 Inspection Staffing Comparison of Communities Conductiong Similar Number of Inspections

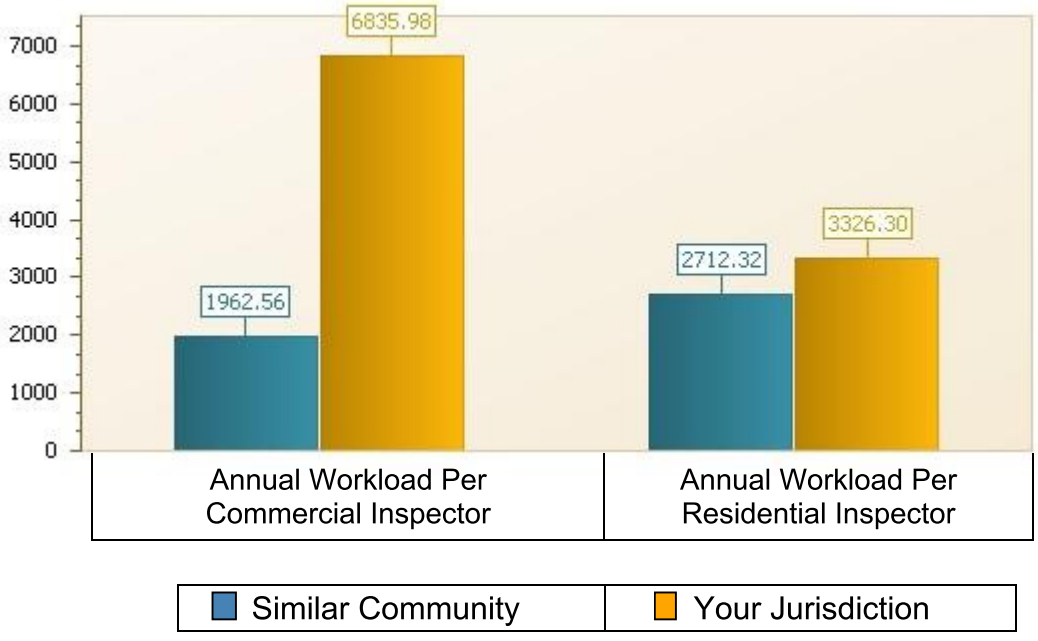


Chart 5-11 Building Plan Review Staffing Comparison of Communities Conducting Similar Number of Plan Reviews

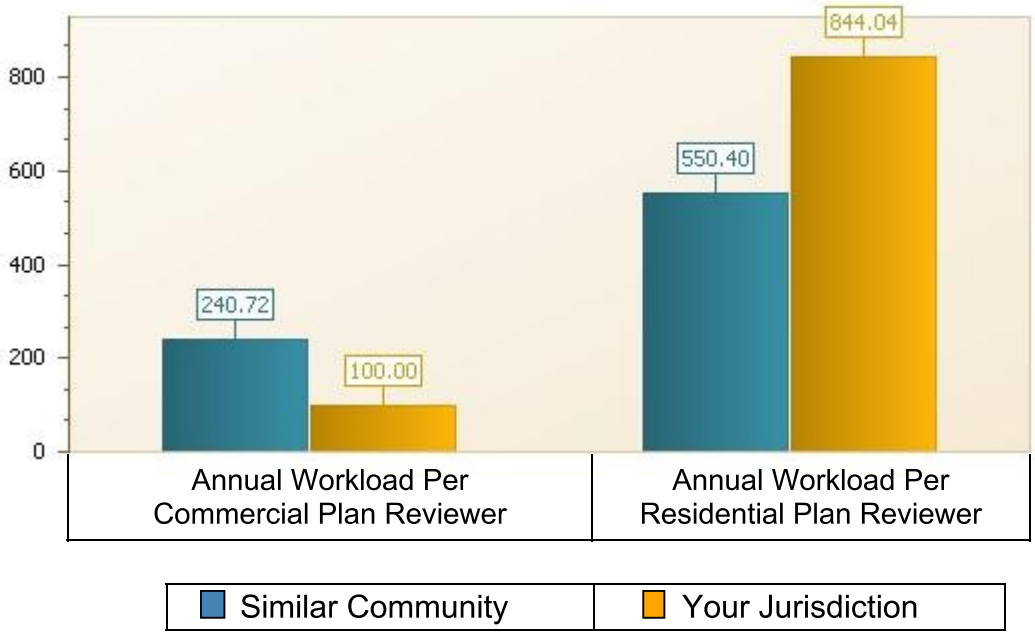


Chart 5-12 Inspector Staffing Comparison of Communities Conducting Similar Number of Plan Reviews

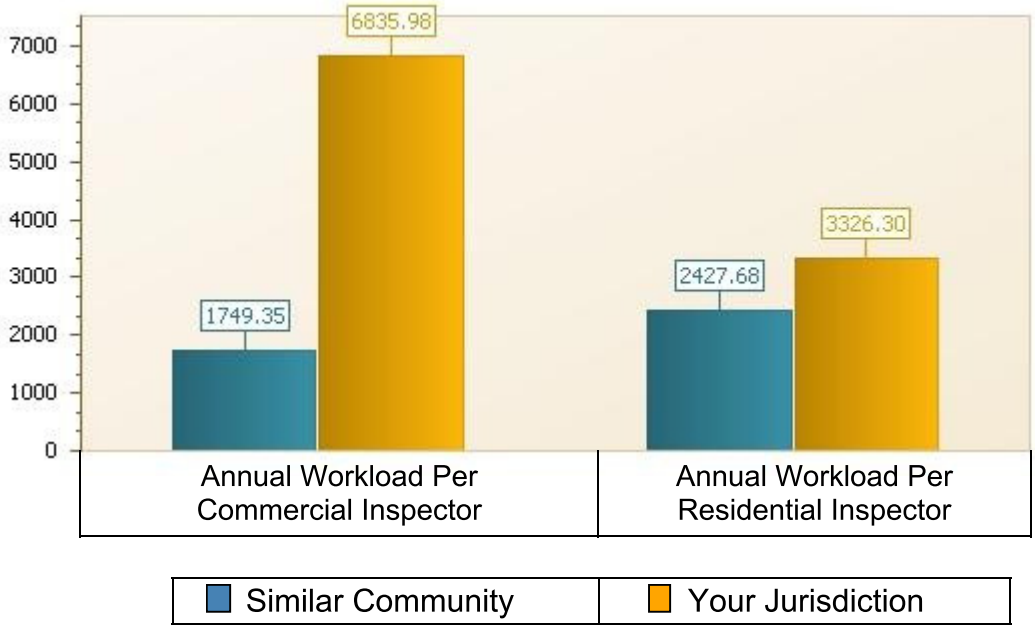


Chart 5-13 Building Plan Review Staffing Comparison of Communities Issuing Similar Number of Permits Per Square Mile

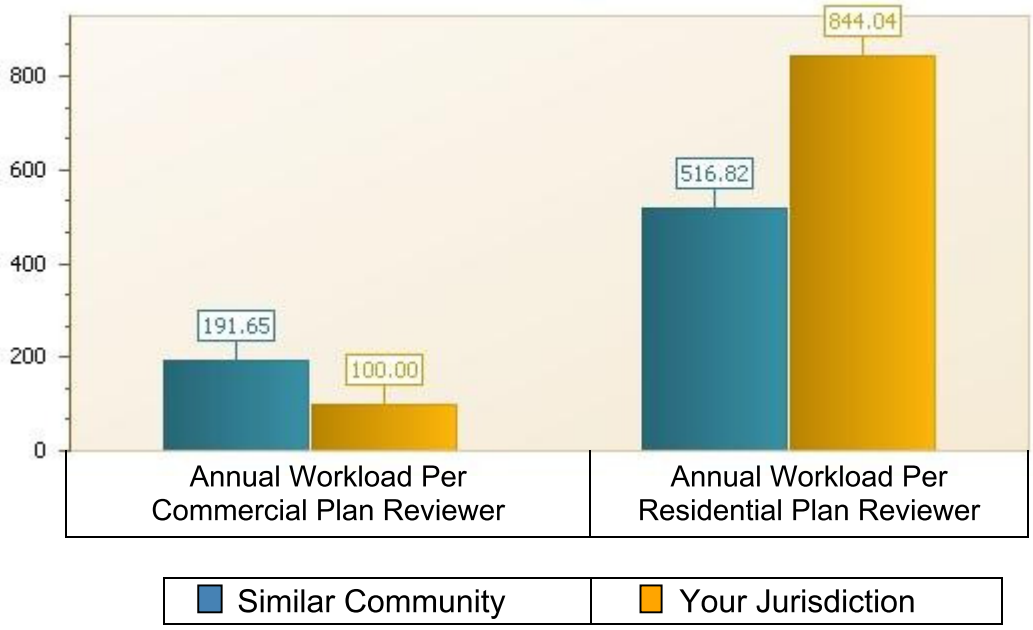
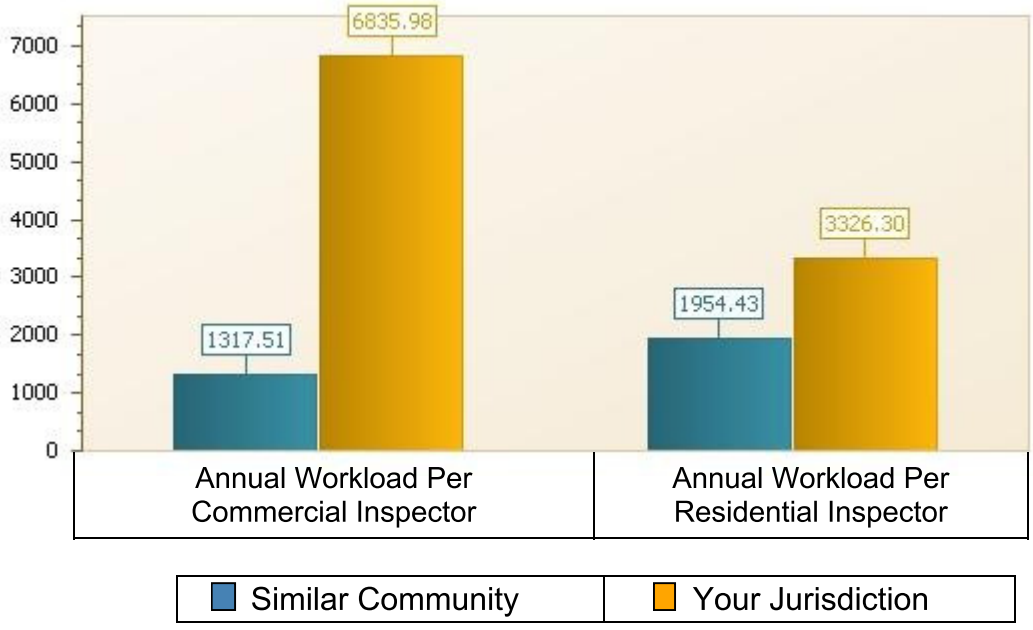


Chart 5-14 Inspector Staffing Comparison of Communities Issuing Similar Number of Permits Per Square Mile



Section 6 BCEGS Points Analysis

ISO has been surveying and evaluating building code adoption and enforcement in communities around the country since 1995. To maintain relevant information the BCEGS program is designed to conduct surveys on a 5 year cycle. The information in this section will give you some insight to trends in your jurisdiction, your state and across the country.

Benchmarking Information

Charts 6-1 through 6-2 compare the points earned by your department in each Section to the points earned by other departments in your state, county, and across the country. The charts are broken down by commercial and residential. You may use Table 1 as a guide for how points are earned in each section.

Chart 6-1 Comparison of Commercial Points Scored

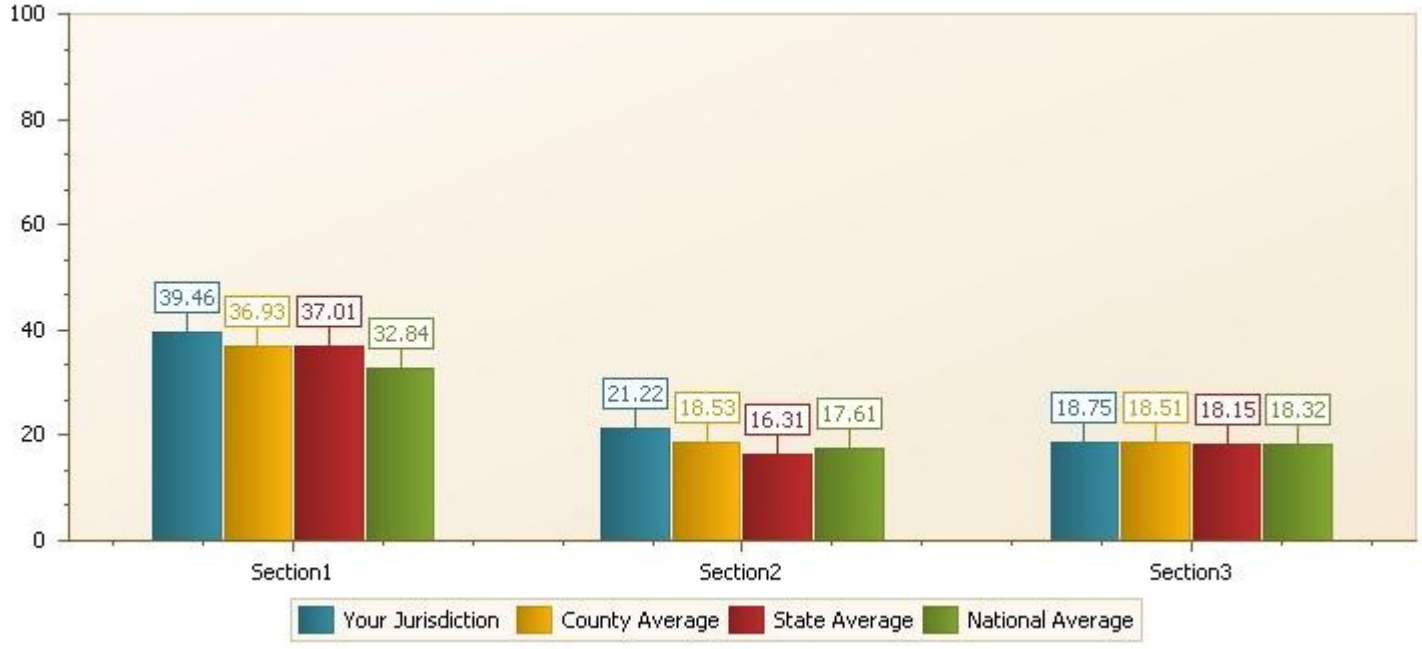
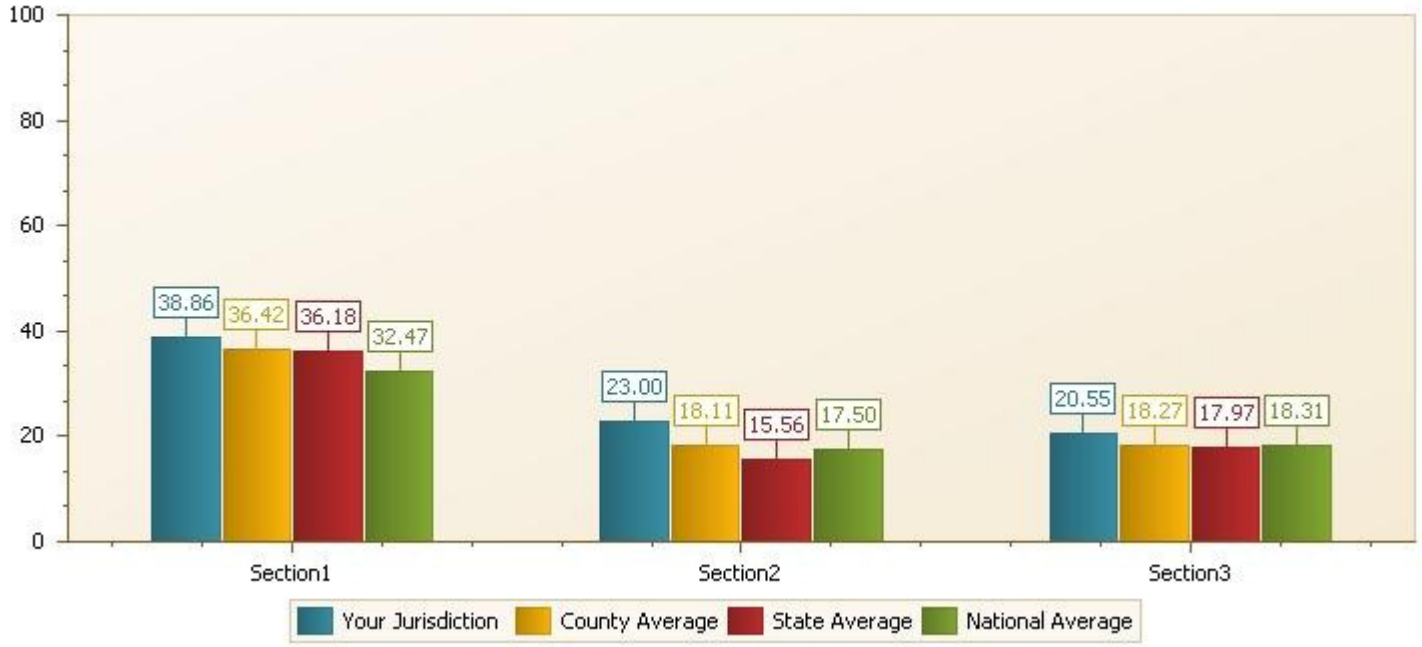


Chart 6-2 Comparison of Residential Points Scored



Section 7 Natural Hazards

Different parts of the country are subject to a variety of potential natural hazards. The map below is an overview of those potentials:

In cooperation with AIR (an ISO company) we have prepared the following hazard report using the municipal building address you supplied during the survey meeting. A full explanation of how to read and interpret the following profiles can be found in Appendix A.

CATASTROPHE HAZARD REPORT
VERISK - MARKETING LOCATION PASSPORT

ORDER NAME: Nags Head, NC

ORDER DATE: 09/25/2019

RESPONSE DATE: 09/25/2019

ORDER TIME: 01:38:17 PM

RESPONSE TIME: 01:38:18 PM

Location Name

Entered Address: 5410 S CROATAN HWY, NAGS HEAD, NC 27959

Catastrophe Hazard Information

Matched Address: 5410 S Croatan Hwy , Nags Head, NC 27959

Match Type: Street Level

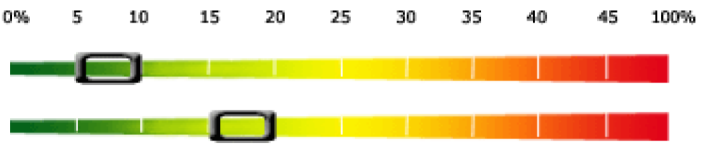
Latitude: 35.934346

Longitude: -75.612179

Hurricane Profile

Risk

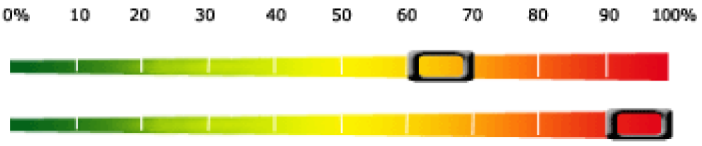
(Percentage Loss)



Average Annual Loss: 0.5 %

Relative Risk

(Percentile)



Hurricane Information

Storm Surge Potential:	Yes
Distance to effective coast:	0 - 500 feet
Distance to actual coast:	0.1134 miles
Coastal County:	Yes
Elevation:	8 - 9 feet above mean sea level

Terrain/ Land Use: Barren Land (Rock/Sand/Clay)

Florida Wind Loss Mitigation Profile

Exposure Area:

Exposure Area Enhanced: Terrain C

High Velocity Wind Region:

Windspeed Region:

Windborne Debris Region:

Historical Hurricanes

Name	Date of Landfall	Intensity at Landfall (Saffir - Simpson)	Distance of Track to Property (mi)	Intensity Closest to Property (Saffir - Simpson)
Gloria	September 27, 1985	4	14	4
Unnamed	September 14, 1944	3	25	3
Bob	August 19, 1991	3	46	3
Edna	September 11, 1954	3	59	3
Emily	August 31, 1993	3	46	3

Thunderstorm Profile

Risk

(Percentage Loss) 0% 5 10 15 20 25 30 35 40 45 100%

100-year loss level:

250-year loss level:

Average Annual Loss: <0.1 %

Relative Risk

(Percentile) 0% 10 20 30 40 50 60 70 80 90 100%

within county:

within state:

Hazard Information

Tornado: Very High/ High/ Moderate/ **Low**/ Very Low

Hail Storm: Very High/ High/ Moderate/ **Low**/ Very Low

Straight-line Wind: Very High/ High/ **Moderate**/ Low/ Very Low

Nearest Historical Tornadoes

Date	Distance (mi)	Intensity (Fujita Scale)
September 17, 1952	1.28	3
November 23, 1992	43.99	3
October 4, 1964	27.40	2
July 16, 1967	41.40	2
July 14, 1963	42.69	2

Nearest Historical Hail Storms

Date	Distance (mi)	Intensity by Average Hail Size (in)
June 13, 1998	44.31	2.0-3.0
June 15, 1998	37.64	2.0-3.0
August 1, 1980	7.28	1.3-2.0
June 22, 1990	17.48	1.3-2.0
June 3, 1978	40.07	1.3-2.0

Nearest Historical Straight - Line Wind Storms

Date	Distance (mi)	Intensity by Average Wind Speed (mph)
March 8, 2005	32.15	90-100
April 11, 1999	5.01	80-90
July 12, 1976	4.01	80-90
June 3, 1978	40.07	80-90
May 24, 1988	35.69	70-80

Winterstorm Profile

Risk

(Percentage Loss) 0% 5 10 15 20 25 30 35 40 45 100%

100-year loss level:

250-year loss level:

Average Annual Loss: 0.1 %

Relative Risk

(Percentile) 0% 10 20 30 40 50 60 70 80 90 100%

within county:

within state:

Hazard Information

Wind Frequency:	Very High/ High/ Moderate/ **Low**/ Very Low
Snow Frequency:	Very High/ High/ Moderate/ Low/ **Very Low**

Earthquake Profile

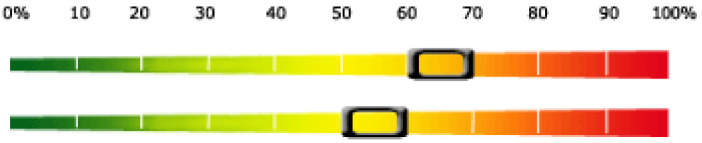
Risk

(Percentage Loss)

Average Annual Loss: <0.1 %

Relative Risk

(Percentile)



Earthquake Information

CA DOI Zone:	Not Applicable
Liquefaction Potential:	
Landslide Zone:	
Alquist - Priolo Fault Zone:	Not Applicable
Soil Type:	Stiff clay and Sandy soil(firm soil)

Intensity by Probability of Exceedance (PE):

Modified Mercalli Intensity:	VI	VII	VIII	IX	X	XI	XII
30 Year PE	0.17 %	0.09 %	0.03 %	0.00 %	0.00 %	0.00 %	0.00 %

Intensity by Return Period:

Return Period	100 Year	200 Year	250 Year	475 Year
Modified Mercalli Intensity:	3.0	3.0	3.0	3.0

Fault Information

No significant active fault has been mapped within a 200 mile radius of the address.

Historical Earthquakes

No significant historical earthquake has been recorded within a 200 mile radius of the address.

Flood Profile

Flood Information

Source:	DFIRM
Flood Zone:	500-Year Flood Zone
FEMA Flood Zone:	X500 Flood Zone
Elevation:	8 - 9 feet above mean sea level

Shortest Distance to:

Water Body:	More than 5 miles
100 Year Flood Plain:	0.03 miles
500 Year Flood Plain:	More than 5 miles

Appendix A - Natural Hazard General Information

AIR*Profiler* is designed to provide users with vital, peril-specific characteristics of the property location, such as storm surge potential and distance to nearest active fault, as well as risk scores, which are quick measures of the risk and relative risk associated with the property.

This release of AIR*Profiler* includes hurricane profiles for all states in the continental U.S. at risk from hurricanes, as well as earthquake, severe thunderstorm and flood profiles for the forty-eight contiguous states.

- The Address Profile displays important information regarding the accuracy of the look-up for the entered address, the geocode of that address and a street map. The Hurricane Profile provides hurricane risk information for the location as well as other related hazards including storm surge potential and distance to nearest historical hurricane track.

- The Earthquake Profile, in addition to showing risk level and ranking, shows susceptibility of the location to different hazards. Those hazards include liquefaction, landslide potential, and fault zone information.

- The Flood Profile provides the proximity of a location to one of five flood zone categories as well as the location's distance to various flood plain boundaries based on FEMA Digital Q3 flood data.

- The Severe Thunderstorm Profile provides information about risk from tornado, hail, and straight-line windstorms for a given location, including distance to nearest historical storms and annual frequency.

Based on the address information provided, AIR*Profiler*® displays the corrected and standardized address following USPS® rules and guidelines, as well as the geocode (latitude and longitude), county, and ZIP Code of the location. AIR*Profiler*® performs a look-up in the LOCATION™ database. The hazard is then assessed based on an exact address or ZIP Code match.

AIR's geocoding algorithm, based on the TIGER® geographical database, is used to convert the location address entered by the user into the corresponding latitude and longitude. Depending on the address match, either the exact geocode, or the geocode of the appropriate ZIP Code centroid, is used for assessing the risk.

- The Address Profile also provides a street map of the location.

Given a location, the loss potential from specific perils is represented by various risk scores. Risk scores are determined by performing a loss analysis on a typical residential building at that location. The analysis is performed using AIR's state-of-the-art modeling technologies. Note that content and time element (loss of use) calculations are excluded from the analysis. Based on this analysis of the location, AIR*Profiler*® provides two sets of scores:

Risk Scores. The user can obtain indications of risk based on three measures of potential loss: the 100-year loss level, the 250-year loss level, and the average annual loss. These levels represent, respectively, the loss likely to occur in one year out of every 100 years, one in every 250 years, and every year on average over a period of many years. The resulting risk scores are expressed in percentage terms, as below:

Low Risk		Moderate Risk				High Risk			Very High Risk
<5%	5-10%	10-15%	15-20%	20-25%	25-30%	30-35%	35-40%	40-45%	>45%

Relative Risk Scores. In addition to the risk score of a given location, AIR*Profiler*® also displays the location's relative risk by county and state. Relative risk ranks the loss potential of a location with respect to the loss potential of other locations in the county or state. The format of the ranking is based on percentile values from 10% to 100% percent.

The AIR*Profiler*® Hurricane Profile provides users with information about the hurricane risk potential for a specific location. Risk scores for 100-year, 250-year and annual average losses, as well as relative risk ranking within county and state, are displayed. The profile also displays the following hurricane risk information:

- Storm surge potential
- Distance to coast
- Elevation
- Terrain/Land use
- Intensity and nearest distance to historical storm track for nearest historical hurricanes

In addition to strong winds and tides, storm surge can pose significant danger to life and property during hurricanes. Storm surge is caused by winds pushing water toward the shore. When combined with high tide, storm surge can cause an increase in the mean water level and so result in severe flooding and substantial property loss. The densely populated Atlantic and Gulf coastlines that lie less than ten feet above mean sea level are particularly vulnerable to storm surge.

The AIR*Profiler*® Hurricane Report indicates whether or not the property is at risk from storm surge.

The AIR*Profiler*® Earthquake Profile provides users with information about the earthquake risk potential for specific location. Risk scores for 100-year, 250-year and average annual losses, as well as relative risk ranking within county and state, are displayed. The profile also displays the following risk information:

- The California Department of Insurance (DOI) zone
- Liquefaction potential
- Landslide zone
- Earthquake fault (Alquist-Priolo) zone
- Soil type
- Seismicity
- Fault information
- Historical earthquakes

When seismic waves pass through water-saturated, loosely packed sandy soils, contact pressure between the individual grains is lost. The grains become more densely configured, causing pore pressure to increase. If drainage is inadequate, what was once solid ground now behaves as a dense fluid, incapable of supporting buildings. Structures that may have survived the effects of shaking can deform, tilt or sink. They may remain structurally intact, but have become unusable and unsalvageable.

Liquefaction risk at a given site is represented by that site's potential to experience damage resulting from liquefaction. Liquefaction potential is a measure of a soil's susceptibility to liquefaction combined with a location's level of earthquake risk. AIR applies standard methodologies used by the Division of Mines and Geology (DMG), United States Geological Survey (USGS), to calculate liquefaction potential. The AIR*Profiler*® Earthquake Profile describes a location's liquefaction potential by one of five levels: very high, high, moderate, low, or very low.

The underlying soil type may have a determining effect on potential earthquake damage to structures. Certain types of soils, such as soft soils, are capable of amplifying seismic waves, hence causing more severe damage. Also, some types of soil, such as bay mud, sandy soil, and stiff to soft soil, are also more susceptible to liquefaction. Soil is classified according to its mechanical properties.

The AIR*Profiler*® Earthquake Profile for a particular location uses ten soil type classifications:

- Hard rock
- Rock
- Very dense soil
- Stiff soil
- Soft soil
- Rock to very dense soil
- Very dense to stiff soil
- Stiff to soft soil
- Bay mud Water

One measure of earthquake intensity is the level of ground shaking at any particular location. Over the years, several intensity scales have been proposed, but the Modified Mercalli Intensity (MMI) scale is the most commonly used, especially in the United States. The MMI scale describes the intensity of an earthquake based on human reaction and observed damage to natural and man-made structures. This is useful because it allows for an attribution of intensity to events that occurred prior to the advent of modern measuring devices, as well as in instances in modern times where those devices were not available. The drawback to this standard of measure is that the MMI scale is highly subjective. The following table lists the MMI scales and definitions.

MMI	Definition
I.	People do not feel any movement.
II.	A few people might notice movement if they are at rest and/or on the upper floors of tall buildings.
III.	Many people indoors feel movement. Hanging objects swing back and forth. People outdoors might not realize that an earthquake is occurring.
IV.	Most people indoors feel movement. Hanging objects swing. Dishes, windows and doors rattle. The earthquake feels like a heavy truck hitting the walls. A few people outdoors may feel movement. Parked cars rock.
V.	Almost everyone feels movement. Sleeping people are awakened. Doors swing open or close. Dishes are broken. Pictures on the wall move. Small objects move or are turned over. Trees might shake. Liquids might spill out of open containers.
VI.	Everyone feels movement. People have trouble walking. Objects fall from shelves. Pictures fall off walls. Furniture moves. Plaster in walls might crack. Trees and bushes shake. Damage is slight in poorly built buildings. No structural damage.
VII.	People have difficulty standing. Drivers feel their cars shaking. Some furniture breaks. Loose bricks fall from buildings. Damage is slight to moderate in well-built buildings; considerable in poorly built buildings.
VIII.	Drivers have trouble steering. Houses that are not bolted down might shift on their foundations. Tall structures such as towers and chimneys might twist and fall. Well-built buildings suffer slight damage. Poorly built structures suffer severe damage. Tree branches break. Hillsides might crack if the ground is wet. Water levels in wells might change.
IX.	Well-built buildings suffer considerable damage. Houses that are not bolted down move off their foundations. Some underground pipes are broken. The ground cracks. Reservoirs suffer serious damage.
X.	Most buildings and their foundations are destroyed. Some bridges are destroyed. Dams are seriously damaged. Large landslides occur. Water is thrown on the banks of canals, rivers, lakes. The ground cracks in large areas. Railroad tracks are bent slightly.
XI.	Most buildings collapse. Some bridges are destroyed. Large cracks appear in the ground. Underground pipelines are destroyed. Railroad tracks are badly bent.
XII.	Almost everything is destroyed. Objects are thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move.

The data presented in AIR*Profiler*® is developed by calculating MMI values for each location. It incorporates all potential seismic sources, the distance of those sources from the location of interest, and local site conditions. Because MMI is considered as a measure of what the ground is doing during an earthquake, rather than an index of damage to structures, damageability of building at the site is not included in the calculation. Those who are more interested in damage estimation should refer to 100- and 250-year loss levels.

The MMI values are represented in two ways in the Earthquake Profile:

- Intensity by PE (probability exceedance)
- Intensity by Return Period

The first representation, defined by probability of exceedance, is the probability that at least one event of that MMI will occur within 30 years. The second representation, based on return period, depicts the maximum intensity of an event that is likely to occur within the designated return period; that is, the intensity corresponds to the maximum event that is likely to occur within the return period displayed.

Proximity to an active fault is an important indication of seismicity for a specific location. The AIR*Profiler*® Earthquake Profile displays the property's distance to the nearest known active faults. Important characteristics of these faults are displayed, including fault length, and the magnitude and frequency of the "characteristic" event associated with that fault. (Scientists believe that many faults tend to produce earthquakes of a particular size, or magnitude, that is "characteristic" of that particular fault, and that occur with a particular frequency, or recurrence rate).

The AIR*Profiler*® Flood Profile provides users with information about the flood risk potential for a specific location. Each location is characterized by its proximity to one of five flood zone categories as follows:

- Water body: Includes large lakes and rivers
- 100-year flood plain: Areas where there is 1% chance of being flooded
- 500-year flood plain: Areas where there is 0.2% chance of being flooded
- Outside flood plain: Areas outside of water body, 100- and 500-year flood plains
- No data: Areas where there is no data available

The proximity of the location to FEMA defined flood zones is also provided:

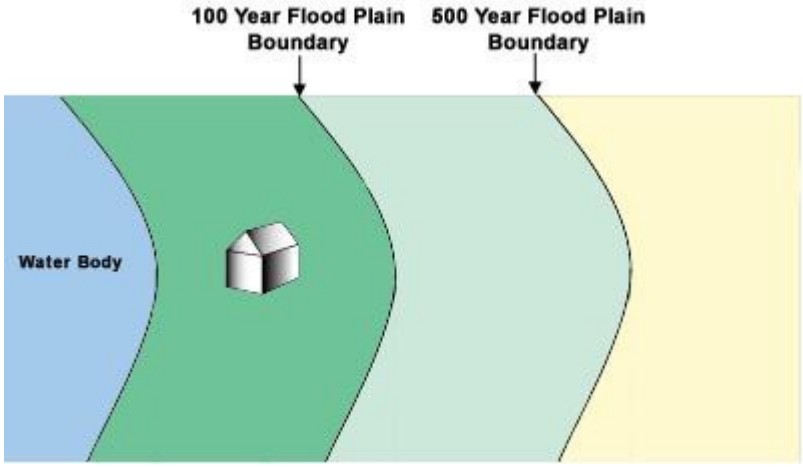
FEMA Zone	Description
V	An area inundated by 100-year flooding with velocity hazard (wave action); no BFE*s have been determined.
VE	An area inundated by 100-year flooding with velocity hazard (wave action); BFEs have been determined.
A	An area inundated by 100-year flooding, for which no BFEs have been determined.
AE	An area inundated by 100-year flooding, for which BFEs have been determined.
AO	An area inundated by 100-year flooding (usually sheet flow on sloping terrain), for which average depths have been determined; flood depths range from 1 to 3 feet.
AOVEL	An alluvial fan inundated by 100-year flooding (usually sheet flow on sloping terrain), for which average flood depths and velocities have been determined; flood depths range from 1 to 3 feet.
AH	An area inundated by 100-year flooding (usually an area of ponding), for which BFEs have been determined; flood depths range from 1 to 3 feet.
A99	An area inundated by 100-year flooding, for which no BFEs have been determined. This is an area to be protected from the 100-year flood by a Federal flood protection system under construction.
D	An area of undetermined but possible flood hazards.
AR	An area inundated by flooding, for which BFEs or average depths have been determined. This is an area that was previously, and will again, be protected from the 100-year flood by a Federal flood protection system whose restoration is federally funded and underway.
X500	An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding.
X	An area that is determined to be outside the 100- and 500-year floodplains.
100IC	An area where the 100-year flooding is contained within the channel banks and the channel is too narrow to show to scale. An arbitrary channel width of 3 meters is shown. BFEs are not shown in this area, although they may be reflected on the corresponding profile.

500IC	An area where the 500-year flooding is contained within the channel banks and the channel is too narrow to show to scale. An arbitrary channel width of 3 meters is shown.
FWIC	An area where the floodway is contained within the channel banks and the channel is too narrow to show to scale. An arbitrary channel width of 3 meters is shown. BFEs are not shown in this area, although they may be reflected on the corresponding profile.
FPQ	An area designated as a "Flood Prone Area" on a map prepared by USGS and the Federal Insurance Administration. This area has been delineated based on available information on past floods. This is an area inundated by 100-year flooding for which no BFEs have been determined.
IN	An area designated as within a "Special Flood Hazard Area" (or SFHA) on a FIRM. This is an area inundated by 100-year flooding for which BFEs or velocity may have been determined. No distinctions are made between the different flood hazard zones that may be included within the SFHA. These may include Zones A, AE, AO, AH, A99, AR, V, or VE.
OUT	An area designated as outside a "Special Flood Hazard Area"(or SFHA) on a FIRM. This is an area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; an area protected by levees from 100-year flooding; or an area that is determined to be outside the 100- and 500-year floodplains. No distinctions are made between these different conditions. These may include both shaded and unshaded areas of Zone X.
ANI	An area that is located within a community or county that is not mapped on any published FIRM.
UNDES	A body of open water, such as a pond, lake, ocean, etc., located within a community's jurisdictional limits, that has no defined flood hazard.
*BFE = Base Flood Elevation	

The Flood Profile provides the shortest distance of the location to the various flood plain boundaries. Three types of distance measurement is provided:

- Shortest distance to the boundary of water body
- Shortest distance to the boundary of 100-year flood plain
- Shortest distance to the boundary of 500-year flood plain

The following map illustrates the way distance from flood plain boundaries are calculated:



The AIR*Profiler*® Severe Thunderstorm Profile provides users with information about the severe thunderstorm risk potential for a specific location. The Severe Thunderstorm Profile includes risks due to tornado, hail, and straight-line wind. Risk scores for 100-year, 250-year and annual average losses, as well as relative risk ranking within county and state, are displayed. The profile also displays the following risk information:

Annual Frequency

This field represents the annual frequency of occurrence for tornado, hail, and straight-line windstorms. A qualitative description of the frequency (very high, high, moderate, low, or very low) is displayed.

Historical Severe Thunderstorms

In this section of the Severe Thunderstorm Profile, AIR*Profiler*® identifies information on the five most severe tornado, hail, and straight-line wind events within 50 miles of the given location. The following characteristics are displayed: year, date, distance from location, and intensity. The description of intensity varies by peril. For tornadoes, the Fujita scale is used. The intensity of hailstorms is measured by average hailstone size and the intensity of straight-line windstorms is derived from a measurement of maximum wind speed.

A description of the listed hazards follows:

A. **Brush and Forest Fires:** Areas with heavy vegetation and a dry season can be subject to forest and brush fires. Local building and zoning regulations address this hazard in some areas of the country. Buffer zones which are free from brush and other fuel sources, as well as the use of fire resistive exterior siding and roofing can be utilized to mitigate this hazard.

B. **Earthquake:** Earthquakes are caused by a tension release from the earth's tectonic plates that causes the ground to shake or vibrate. Most casualties associated with earthquakes are caused by structural failures in buildings and fires caused from electrical shorts and gas leaks. All of the model codes have seismic zones where buildings should be constructed to withstand at least a moderate earthquake. The codes are currently geared towards avoiding a structural collapse. This is a life safety issue and a building can still sustain enough physical damage to render it unusable after the earthquake occurs. Since 1900 earthquakes have occurred in 39 states and caused damage in all 50.

C. **Floods:** Floods are one of the most common disasters in the United States, and cause damage to thousands of structures annually. Floodplain construction is addressed in most building codes and many zoning regulations. Flood mitigation is addressed through the National Flood Insurance Program which provides insurance credit incentives for complying with FEMA regulations. Flood as a hazard falls outside the scope of the BCEGS program.

D. **Hail:** Consists of icy pellets of various sizes that are usually associated with thunderstorms or tornadic activity. Large hail can cause substantial damage to roof surfaces. In a typical year the insurance industry pays out $1.5 billion in hail damage claims. In rare cases hail has caused structural damage and building collapses. Building codes usually do not address potential damage from hail.

E. **High Winds:** High strait line winds can occur anywhere in the United States and are caused by pressure and temperature variances in the Earth's atmosphere. High strait line winds are common in thunder storms, in the open plains were there are no obstructions to slow down the wind, in mountainous areas from upslope and downslope wind effects, on the East Coast from "Northeasters", and on the Pacific Coast from Santa Anna winds. Model Code groups have formulated maps based on 50 year mean recurrence intervals. The model codes currently apply the concept of "fastest wind speed" which is determined by an anemometer 33 ft. above the ground in open terrain. The anemometer measures the time it takes for one mile of air to pass its location. Wind maps are not based on potential maximum wind gust, but on "fastest wind speed," which has created confusion in media coverage of storms.

F. **Hurricane:** This is a tropical low pressure system with a circular wind rotation of 74 mph or greater usually accompanied by rain, lightning, and sometimes tornadoes. These storms have the ability to travel inland for hundreds of miles, maintaining hurricane force winds.

G. The Saffir-Simpson scale is used to rate the strength of a hurricane from 1 to 5 with 5 being the most severe. The Saffir-Simpson scale uses wind speed and storm surge to rate the hurricane's strength and potential for devastation. Model codes have addressed the probability of hurricanes by creating wind zones that range from 110 mph on barrier islands to 70mph inland. Structures must be designed and built to compensate for the potential additional stress placed on structures by the wind in these zones. The structural designs must take into account both Positive and Negative Wind Loads. Roof systems must be anchored to the wall systems to resist the wind loads. The wall systems must also be strapped or bolted to the foundation and footing system to create a continuous resistive system. Building codes also address the potential storm surge for coastal construction, by requiring structures to be elevated on pilings.

H. **Landslide/mudflow/debris flow:** This hazard is more common in, but not limited to mountainous areas. Earthquakes and heavy rains cause landslides. Mudflows and debris flows can be caused by heavy rains as well as volcanic eruptions in areas with snow and ice present. This is usually a localized occurrence, and is more of a zoning than a building code issue.

I. **Lightning:** All states are subject to lightning in varying degrees. Lightning rods can be installed on structures in high probability areas, but most building codes do not address when lightning rods are required. In a typical year the insurance industry pays out over $1 billion in residential lightning damage claims.

J. **Snow Loads:** This is a concern in snow belt areas in northern states and in mountainous areas. There are snow load maps created by the model code groups that address this situation. Some areas require a minimum roof pitch and higher design factors to compensate for the additional weight imposed on roofs by snow.

K. **Soil Liquefaction:** This is a seismic concern. There are some soil types which, in the presence of a high enough water table, will take on the physical properties of a liquid when shaken by an earthquake. Buildings constructed in areas subject to liquefaction need to be designed to reduce or eliminate the possibility of uneven settling or tilting during an earthquake.

L. **Soil Subsidence:** This is the shrinking or settling of soil due to its composition. Some soils compact or or shrink excessively and this could cause foundation failure if not compensated for by foundation reinforcement. Some areas are subject to sink holes. These are typically caused by lime deposits being dissolved by underground water.

M. **Swelling Soils:** This is common in clay based soils that do not drain well and needs to be compensated for by foundation reinforcement. Footings or foundations placed on or within expansive soils need to be designed to resist differential volume changes to prevent structural damage to the supported structure. As an alternative to special design the soil can be removed and replaced or stabilized.

N. **Tornado:** Tornadoes are formed from mesocyclones or supercell thunderstorms. Tornadoes can strike in many places in the United States, but the greatest probability of tornadic activity is in a corridor from Texas to Wisconsin known as tornado alley. They occur usually in the spring or fall of the year during the late afternoon when the atmosphere is least stable. Tornadoes are measured by the Fujita Scale (F-SCALE), which measures the wind speed and damage potential. The scale ranges from F0 to F5 with F5 being the most severe storm. Damages from a direct hit by the strongest tornadoes cannot be mitigated, but the collateral damages that occur in surrounding areas can be reduced. The wind provisions of the model codes can help to limit damages from the most common, weaker tornadoes.

O. **Tsunamis:** (tidal wave) These are large sea waves usually caused by earthquakes or volcanic eruptions, and are most common in the Pacific Ocean. The potential devastation of a Tsunami is enormous, but little is being done to mitigate this hazard. Several Pacific Coast States have enacted zoning regulations to prevent schools and hospitals from being built in low areas subject to tsunamis.

P. **Volcanoes:** There are numerous dormant and active volcanoes in the Western United States, and the potential danger is catastrophic near these volcanoes. Collateral damage could occur for hundreds of miles. Building codes can do little to address this danger, but some areas require additional roof structure design to compensate for volcanic ash load. Zoning restrictions are a more viable means of mitigation.

Agenda Item Summary Sheet

Item No: **G-1**
Meeting Date: **May 6, 2020**

Item Title: From March 4th Board meeting – Beach Nourishment Coastal Engineering and Design Services presentation from Moffatt & Nichol

Item Summary:

At the May 6th Board of Commissioners meeting, Mr. Johnny Martin of Moffat & Nichol will present plans outlining engineering and design services for the Town's future shoreline management project.

Attached please find a memo from Town Manager Ogburn with additional details concerning the presentation as well as the Moffat & Nichol proposal and a copy of the presentation slides.

In addition qualifications document for beach surveying services from McKim & Creed is also attached.

Number of Attachments: 4

Specific Action Requested:

Provided for Board information and discussion.

Submitted By: Administration Date: April 28, 2020

Finance Officer Comment:

A new capital project ordinance will be presented for Board approval once a contract has been approved for future phases of work. Since costs are unknown, preliminary work (within a limited scope and within the parameters of the budget ordinance) to get to that point can be used under the existing capital project ordinance in order to keep the project going if the Board desires.

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

I will participate in the discussion.

Signature: Cliff Ogburn Date: April 28, 2020

Town of Nags Head
Post Office Box 99
Nags Head, North Carolina 27959
Telephone 252-441-5508
Fax 252-441-0776
www.nagsheadnc.gov

MEMORANDUM

To: Board of Commissioners

From: Cliff Ogburn, Town Manager

Date: April 29, 2020

Re: Beach Nourishment Coastal Engineering and Design Services presentation from Moffatt & Nichol

---

At its March regular meeting, the Board of Commissioners passed a motion to invite Moffat & Nichol to make a presentation to the Board, and to authorize the Town Manager to enter into contractual negotiations for coastal engineering services with all relevant material to come back to the Board. The Board also passed a motion to authorize the Town Manager to enter into contractual negotiations with McKim & Creed for beach surveying services.

At the upcoming meeting, the Board will hear a presentation from Johnny Martin of Moffat & Nichol which will outline the general services and qualifications of his firm as well as the anticipated services that may be provided to support the town in its shoreline management efforts. Staff is recommending that the Board consider a limited scope of services this year, to include surveying services and preparation of a beach monitoring report as well as preliminary engineering to support future modeling and project alternatives analysis. This work could be completed utilizing the existing project ordinance and budgeted funds. The presentation will also describe potential master planning efforts that would be part of future phases of work. It is anticipated that this phase of work would require a new project ordinance and budget which could be considered with the FY 2021/22 budget or at any point deemed necessary by the board.

Staff is coordinating the development of the scope of services and contracts with McKim and Creed and Moffatt and Nichol and anticipates presenting those to the Board in June. This would allow us to get underway in time for our summertime pre-hurricane survey efforts and preparation of the annual monitoring report. Attached is the presentation provided by Moffat and Nichol as well as the proposals submitted by Moffat and Nichol and McKim and Creed in response to the town's two RFQs.

Presentation for

COASTAL ENGINEERING AND DESIGN SERVICES

May 2020

THE TOWN OF NAGS HEAD
NORTH CAROLINA

moffatt & nichol

Introductions

Johnny Martin, PE (M&N)
Project Manager

Nicole VanderBeke, PE (M&N)
Project Engineer

Sam Morrison (M&N)
Bidding & Construction

Brian Joyner, PE (M&N)
Assistant Project Manager

Doug Huggett (M&N)
Permitting

About Moffatt & Nichol

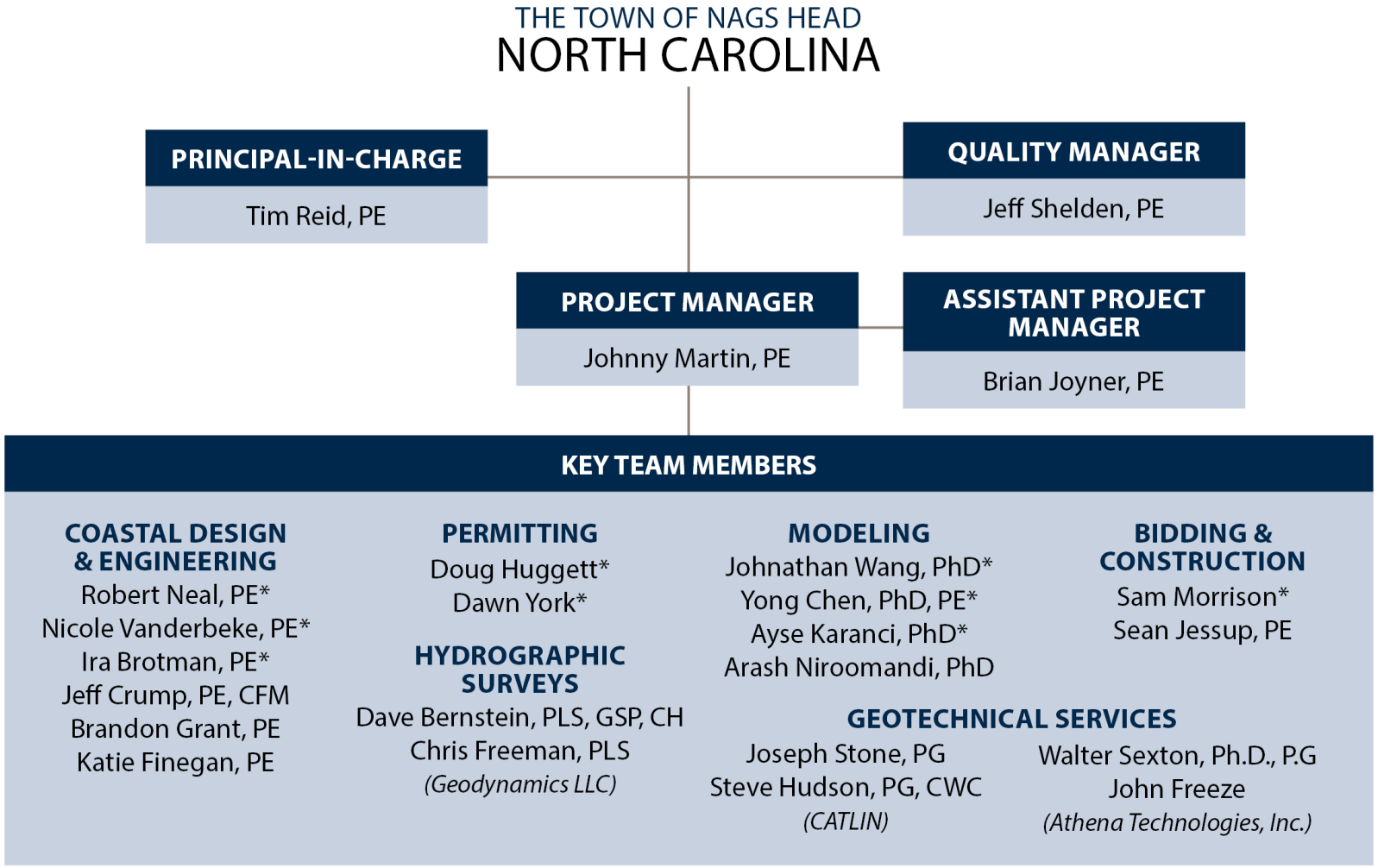
Firm History and Capacity

- Founded in 1945 to provide coastal engineering services
- More than 800 employees, including 700 marine and civil engineers and scientists
- Our Team Offers:
  - Pioneering Level of Expertise
  - Flexibility and Availability
  - Proven Track Record

moffatt & nichol

Creative People, Practical Solutions.®

Project Team



*Denotes key personnel; resume provided in the Appendix.
All personnel M&N unless otherwise noted.

Project Team

Responsive Team

- On-call coastal engineering consultant to the cities of Norfolk and Virginia Beach for more than 15 years
- Personnel from our Norfolk, Raleigh, Morehead City and Wilmington offices will support the Town of Nags Head
- 82 miles, 1.5 hours by car

Map courtesy of www.visitob.com

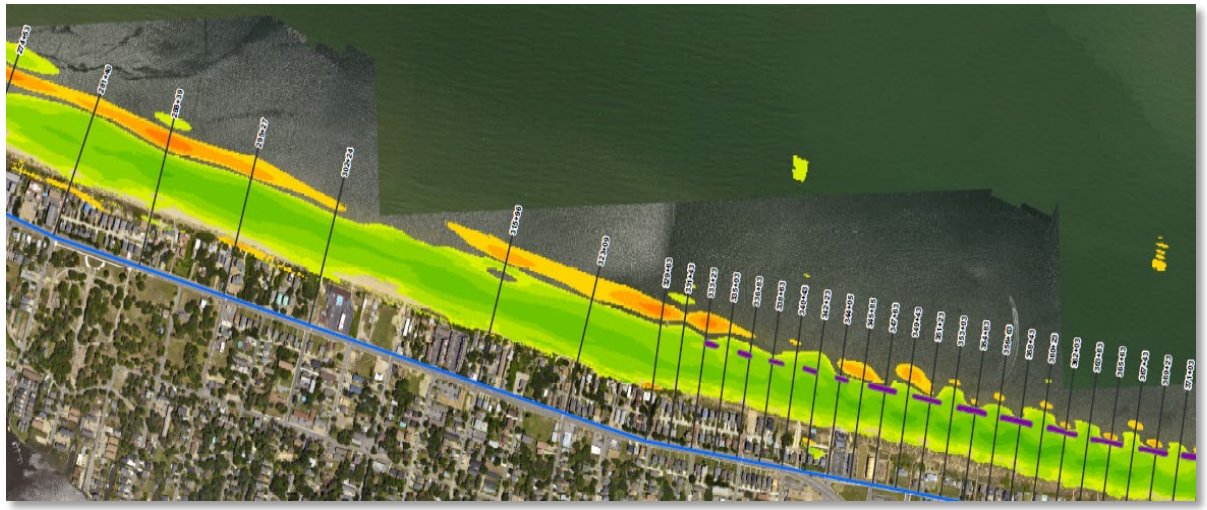
Specialized Experience

State Level Studies and Funding

- NC Shallow Draft Inlet Study
- NC Beach and Inlet Management Plan
- NC Terminal Groin Study

Experience with Coastal Structures and Nearby Beaches

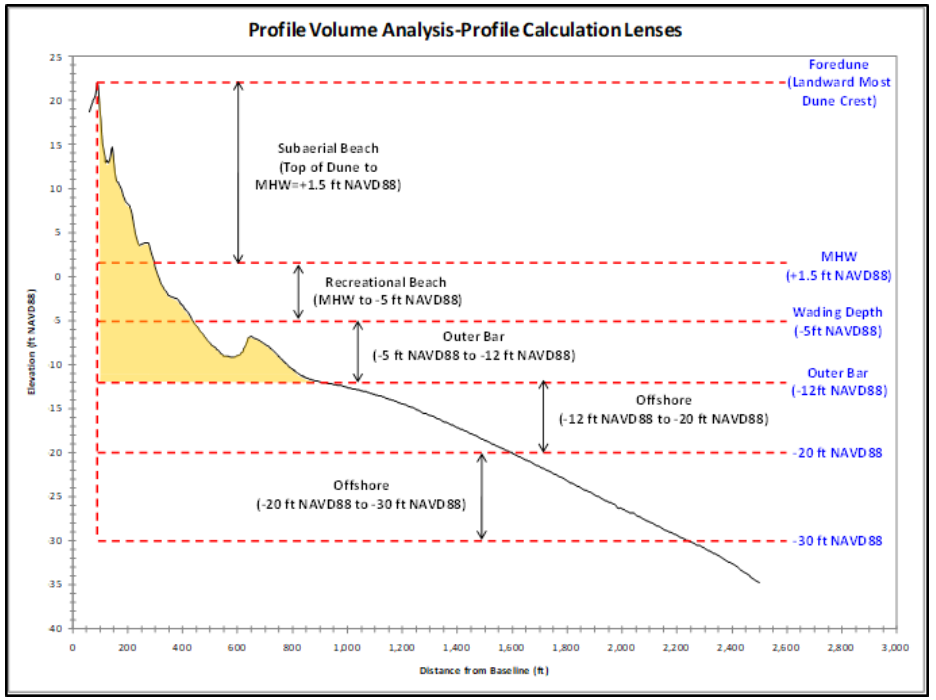
- On-call coastal engineering consultant to the cities of Norfolk and Virginia Beach for more than 15 years
- Chesapeake Bay Shorelines Have Allowed Use of Groins and Breakwaters



Coastal Engineering Scope of Work

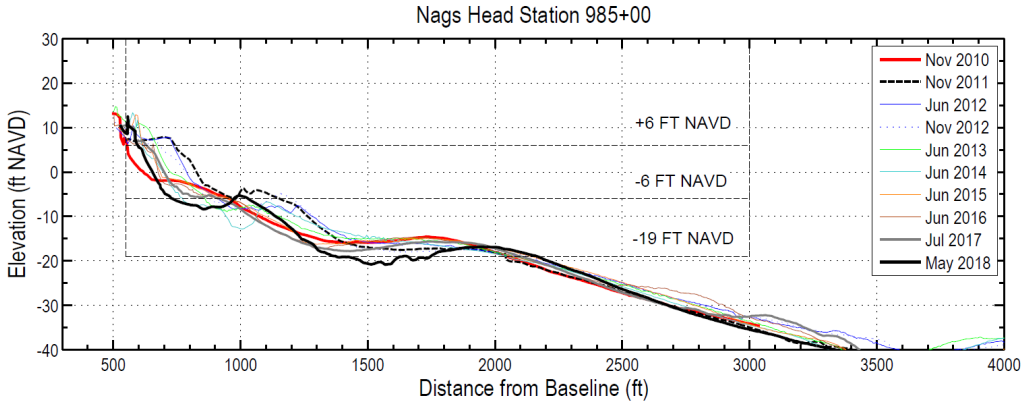
Anticipated Tasks

1. Oversee & Submit Monitoring Plan and Surveys (McKim & Creed Contracted Directly with the Town) – Year 1
2. Begin to Develop Beach Nourishment Master Plan
   - Data Collection and Review (Year 1)
   - Review Existing Monitoring/Maintenance Plan for Engineered Beach (Year 1)
   - Conduct Initial Modeling and Develop Preliminary Estimates of Nourishment Triggers and Hotspot Management (Year 1)
   - Finalize Modeling to Develop Profile Based Volumetric Triggers for Engineered Beach (Future)
   - Finalize Modeling and Plan for Managing Hotspots for Engineered Beach (Future)
   - Field Investigations/Environmental Studies/Alternatives Development/EIS/Permitting (Future)
   - Financing Plan (Future)
3. Coordinate Regional Partnerships with the County and other communities (Future)
   - Maximize resources and collaborate on funding strategies
4. Design and Implement Nourishment Events (Future)
   - Expected nourishment intervals based on modeling and working with nature



1. Oversee Monitoring Plan and Surveys

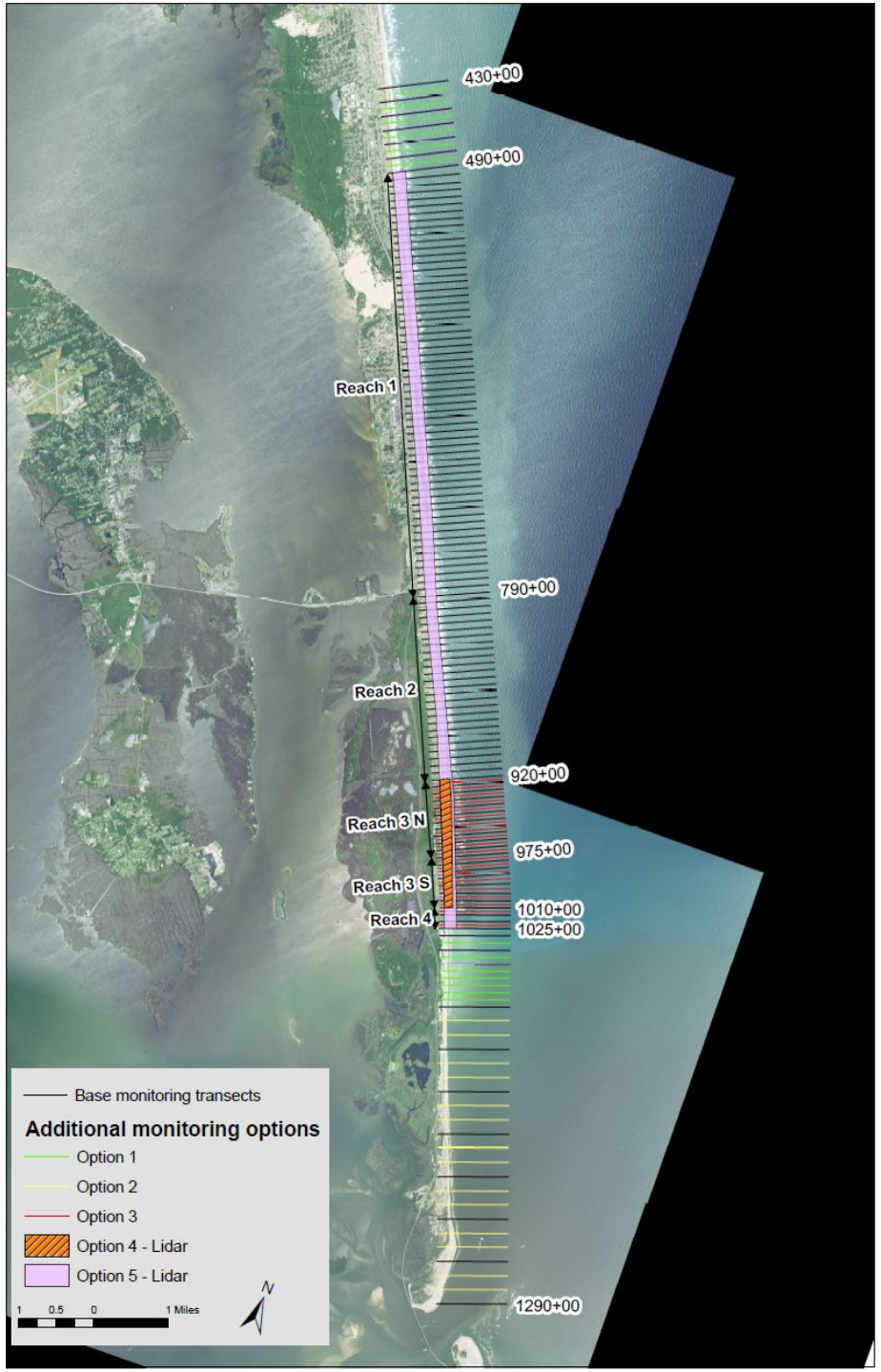
- Coordinate Transect Spacing and Locations
  - Provide Town with Options and Select Final Plan
- Review Monitoring Data
- Evaluate Trends (Shoreline and Volume Change)
- Prepare Monitoring Annual Reports



Unit Volume from the Face of Dune to Indicated Depth Contour (CY/FT)

Date	To +6 FT	To -6 FT	To to -19 FT
Nov 2010	0.1	59.1	440.8
Nov 2011	9.4	143.7	550.9
Jun 2012	11.4	122.5	534.5
Nov 2012	6.4	110.8	505.8
Jun 2013	16.1	104.0	500.4
Jun 2014	11.0	73.9	458.7
Jun 2015	10.8	91.4	479.2
Jun 2016	1.4	73.6	438.8
Jul 2017	6.6	78.6	420.2
May 2018	5.4	53.4	372.7


Photo: 12 Dec 2017 IMC

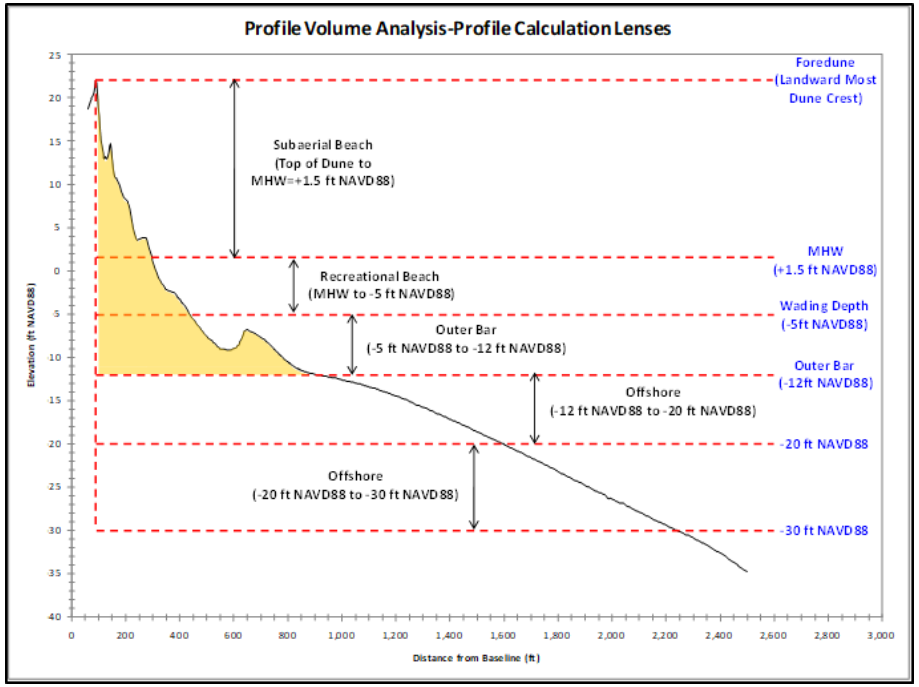


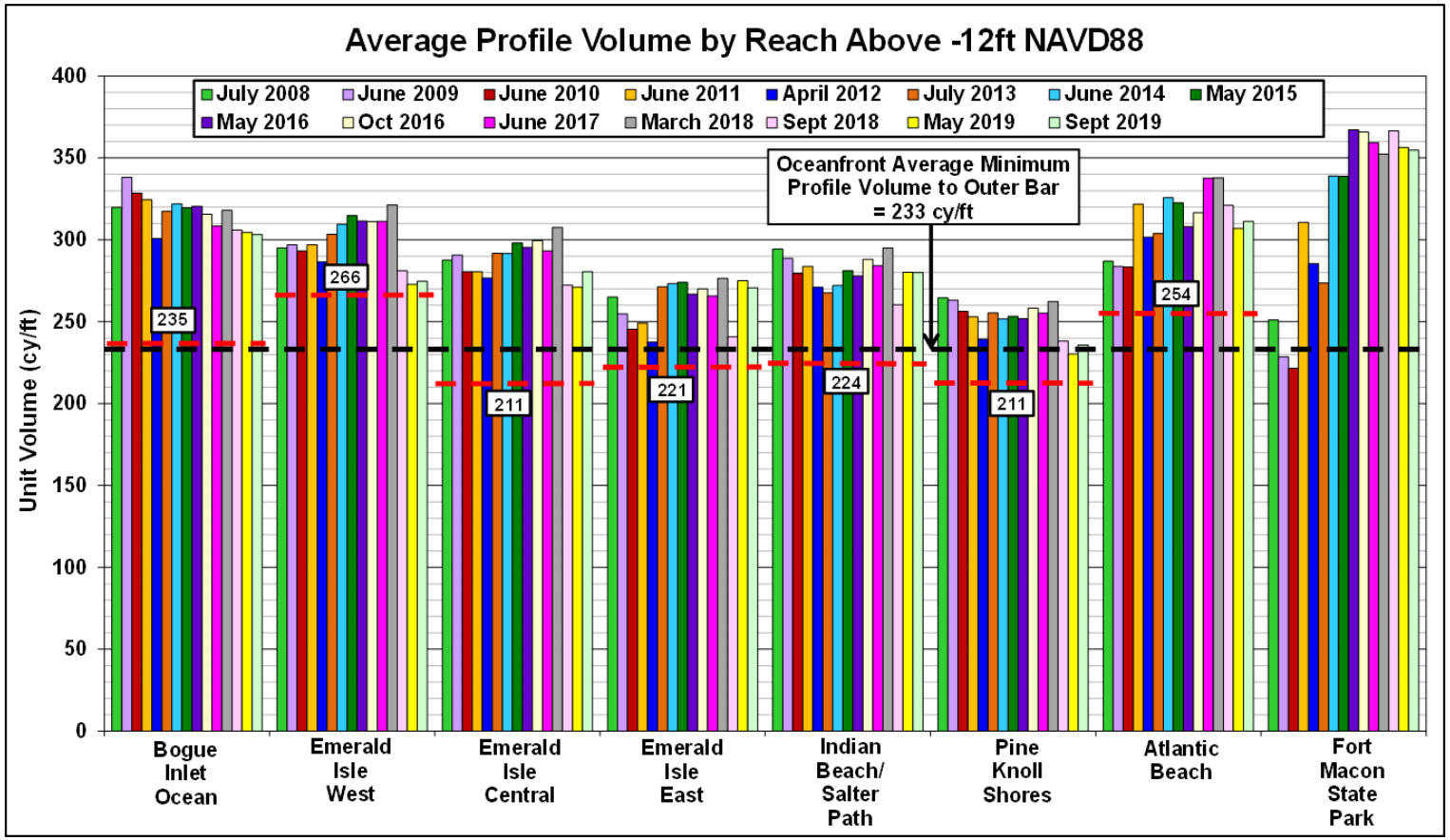
2. Begin Master Plan Development

- Complete Task 1 & Portion of Task 2 During First Year
- Vulnerability Analysis Consists of Redevelopment of Engineered Beach (Triggers and Hotspot Management) – Determine Sand Volume Need for 50 Years (Background and Storm Erosion)
- Total Master Plan Timeline May Be 4 – 6 Years Depending on Level of Field Investigations Needed & Permit/EIS Coordination
- Some Tasks/Coordination with Environmental Agencies Are In Parallel

2. Master Plan Philosophy - Engineering

- Profile Based Volumetric Triggers
- Alternatives Analysis and Recommendations





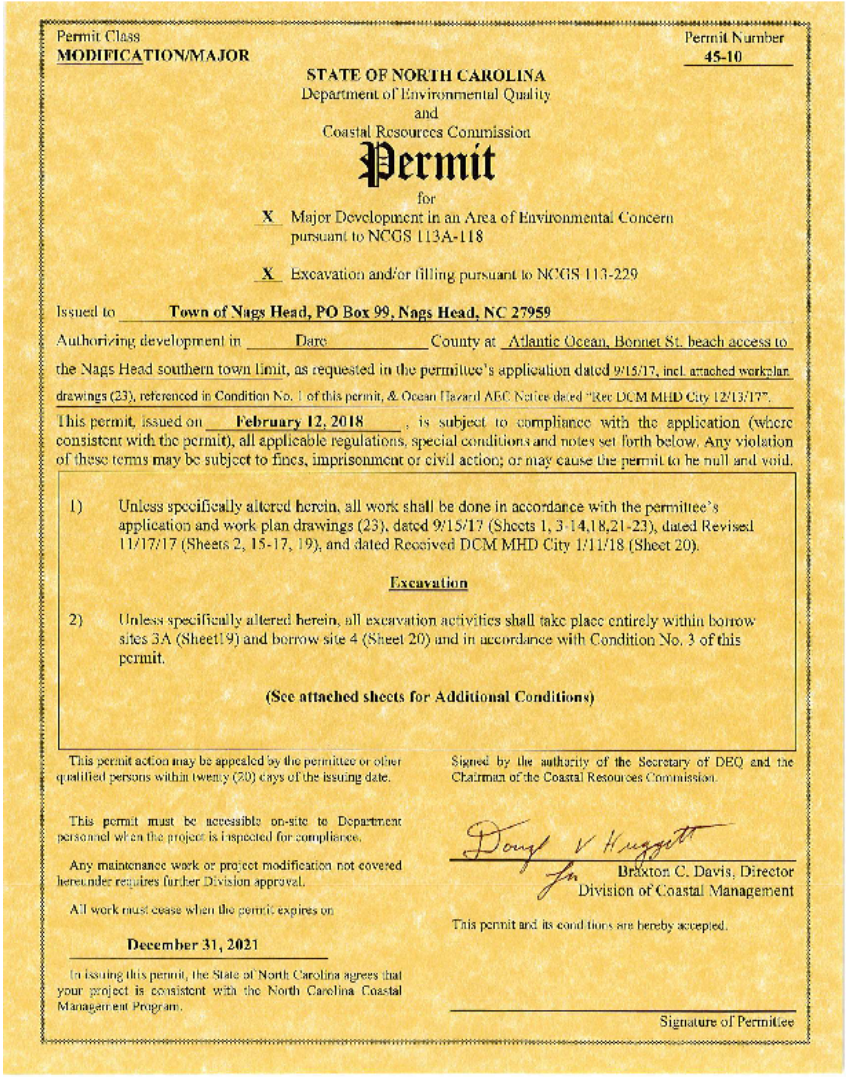
2. Master Plan Philosophy - Engineering

- Manage Hot Spots
- Equal Level of Protection Provided (Not Necessarily Equal Sand)
- Design Projects Based on Modeling, Available Funding, Response to Storm Events, and Nourishment Triggers
- Example Below from Bogue Banks

2. Master Plan Philosophy - Permitting

Permitting

- USACE 50-Year Permit
  - Operate under FWS Statewide Programmatic Biological Opinion
- USACE project specific permit (to be updated for each individual nourishment event upon event notification)
- NCDCM CAMA Major Permit (to be updated for each individual nourishment event upon event notification)
- NC DWQ 401 Certification (must apply for new permit for each event)
- BOEM Lease Authorization (If Needed)
- 50-Year NMFS Biological Opinion (Now Likely Falls Underneath New SARBO)



Permit Class
MODIFICATION/MAJOR

Permit Number
45-10

STATE OF NORTH CAROLINA
Department of Environmental Quality
and
Coastal Resources Commission

Permit

for

X Major Development in an Area of Environmental Concern pursuant to NCGS 113A-118

X Excavation and/or filling pursuant to NCGS 113-229

Issued to Town of Nags Head, PO Box 99, Nags Head, NC 27959

Authorizing development in Dare County at Atlantic Ocean, Bonnet St. beach access to the Nags Head southern town limit, as requested in the permittee's application dated 9/15/17, incl. attached workplan drawings (23), referenced in Condition No. 1 of this permit, & Ocean Hazard AEC Notice dated "Rec DCM MHD City 12/13/17".

This permit, issued on February 12, 2018, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

1) Unless specifically altered herein, all work shall be done in accordance with the permittee's application and work plan drawings (23), dated 9/15/17 (Sheets 1, 3-14,18,21-23), dated Revised 11/17/17 (Sheets 2, 15-17, 19), and dated Received DCM MHD City 1/11/18 (Sheet 20).

Excavation

2) Unless specifically altered herein, all excavation activities shall take place entirely within borrow sites 3A (Sheet19) and borrow site 4 (Sheet 20) and in accordance with Condition No. 3 of this permit.

(See attached sheets for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

December 31, 2021

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DEQ and the Chairman of the Coastal Resources Commission.

Doug V Huggett
for Braxton C. Davis, Director
Division of Coastal Management

This permit and its conditions are hereby accepted.

Signature of Permittee

3. Partnerships and Funding Strategies (Future)

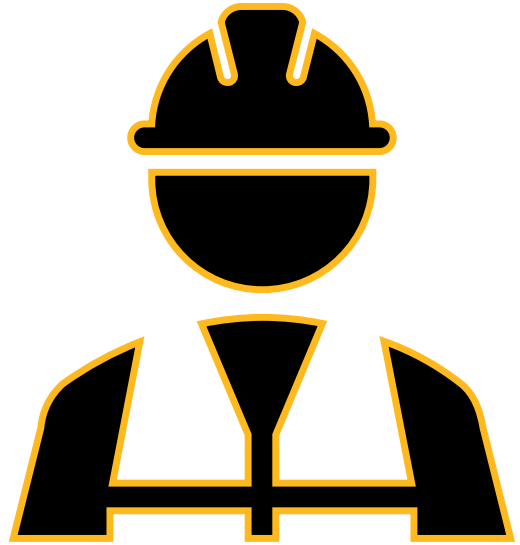
Partnerships and Funding

- Market Forces and Costs Promote Regional Approaches
  - Shared Costs (Mob/Demob)
  - Larger Projects to Encourage Economies of Scale
  - Inter-local Agreements Needed – County Sponsor?
- "The Times They Are A-Changin"
  - Local Cost Sharing
  - State Funding (Post-Storm and CSDR Funding)
  - Federal (USACE and FEMA)
  - Others (NFWF, NOAA, etc.)

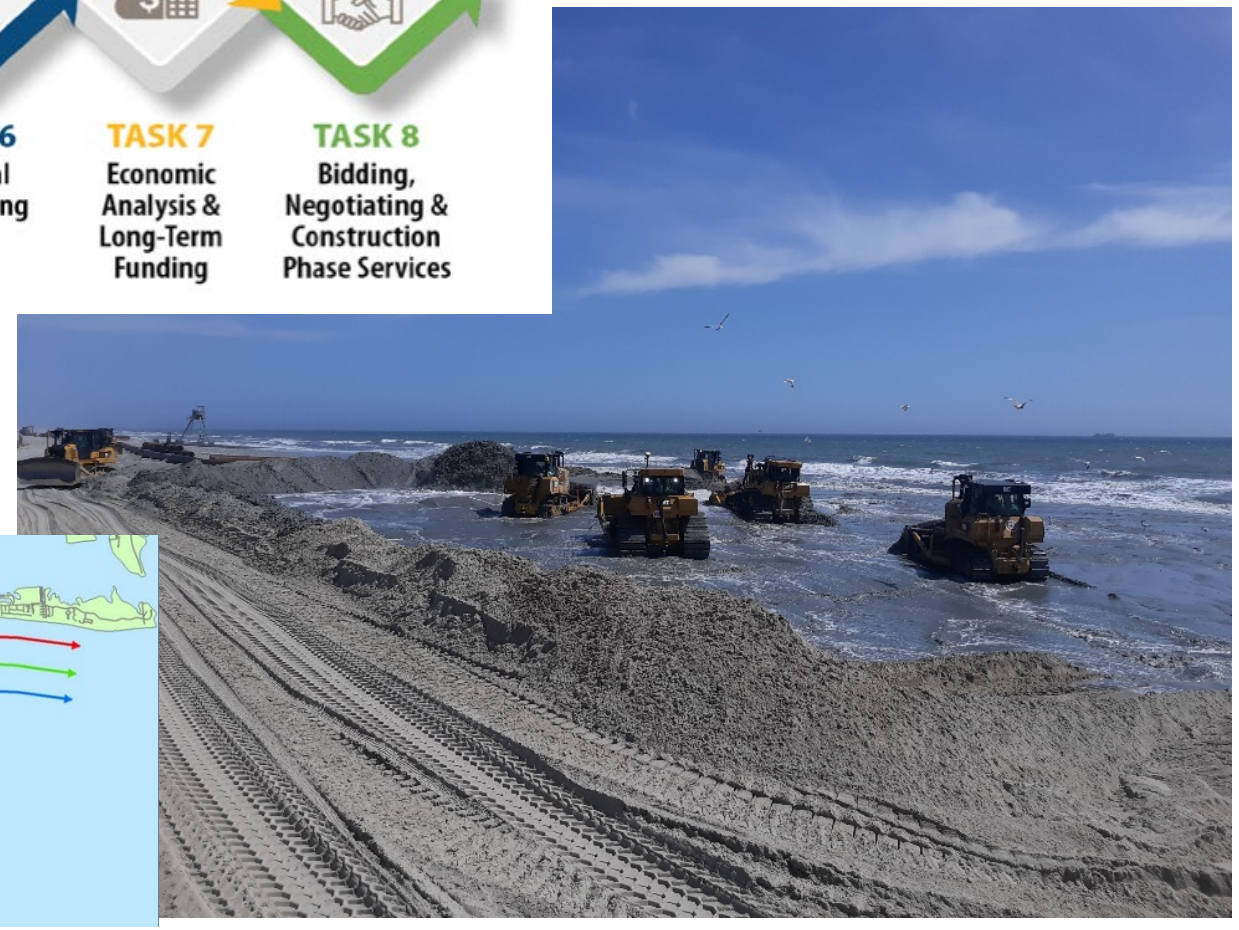
4. Design and Implement Nourishment Projects (Future)

Procurement & Contracting Strategy

- Master Plan Flexibility
  - Timing from event notification to bidding
  - Preparedness for emergency needs
    - Allows for quick changes
  - Quick reaction to market conditions
  - Provide projections on long term nourishment costs
- Methods to Reduce Project Costs
  - Maintain relationship with dredging industry
  - Follow contractor schedules and availability (market conditions)
  - Can reduce cost by developing Plans & Specifications that reduce risk NC General Statue 143-132. Minimum number of bids for public contracts
  - Design projects of economical scale to leverage high mobilization cost but not place unnecessary sand



Questions & Answers



moffatt & nichol

4700 Falls of Neuse Road, Suite 300
Raleigh, NC 27609

101 W. Main Street, Suite 800
Norfolk, VA 23510

November 26, 2019

David Ryan, Town Engineer
Town of Nags Head Town Hall
5401 S. Croatan Hwy.
Nags Head, North Carolina 27959

Reference: Coastal Engineering and Design Services

Dear Mr. Ryan:

RECOGNIZED COMMITMENT TO AND LEADERSHIP IN COASTAL ENGINEERING

Since 1977, the American Society of Civil Engineers (ASCE) has awarded the John G. Moffatt and Frank E. Nichol Harbor and Coastal Engineering Award to recognize new ideas and concepts that can be efficiently implemented to expand engineering or construction techniques for harbor and coastal projects.

Moffatt & Nichol (M&N) is a full-service consulting firm with unique experience and expertise to complete the environmental planning and engineering services required for future beach nourishment and related shoreline management efforts.

To date we have completed:

- More than 500 million cubic yards of dredging
- More than 200 waterfront environmental study projects
- More than 100 numerical and/or physical model studies

M&N will warrant that at all times during the term of the Agreement we shall maintain in good standing all required licenses, certifications, and permits required under federal, state, and local laws necessary to perform the services requested. We acknowledge addendum one. Mr. Johnny Martin will lead our team. With over 25 years of coastal engineering and project management experience with M&N, Mr. Martin brings a wealth of North Carolina-focused beach management experience to help address the Town's needs for years to come. He has worked with many of our key personnel to provide similar services throughout North Carolina and Virginia throughout the years. To supplement our efforts, we invited Geodynamics (surveying services – Woman-Owned, HUBZone), Athena Technologies (geotechnical services – HUBZone-certified, small business), and CATLIN (geotechnical services – small business) to complete our professional team.

Pioneering Level of Expertise. M&N designed, planned, and permitted the first NC multi-decadal beach and inlet management master plan that has actual permits to actually construct multiple events over multiple decades.

Proven Track Record. The M&N team has worked together to complete numerous beach nourishment and coastal management projects throughout the region. We understand all aspects of beach management including engineering, design, planning, permitting, construction, bidding, community engagement, and economic sustainability.

Flexibility and Availability. Although we have assigned a highly specialized, local team with unique technical expertise from our more than 100 professional and technical staff located within our Raleigh, Norfolk, Morehead City, and Wilmington offices we have access to more than 800 employees, including more than 700 marine and civil engineers and scientists to meet your needs. Our staff has completed or assisted in shoreline evaluation and mapping, coastal planning, design, and inlet management studies for cities and counties throughout the region including the U.S. Navy, multiple U.S. Army Corps of Engineers (USACE) Districts, and state Departments of Transportation. Through these projects, we have effectively monitored and assisted communities to manage their coastal systems.

As Vice President, I am the firm's authorized representative for this project. You can reach me at treid@moffattnichol.com or 919.781.4626. We look forward to continuing our work with you on this important project.

Very truly yours,

MOFFATT & NICHOL

Timothy R. Reid, PE
Vice President

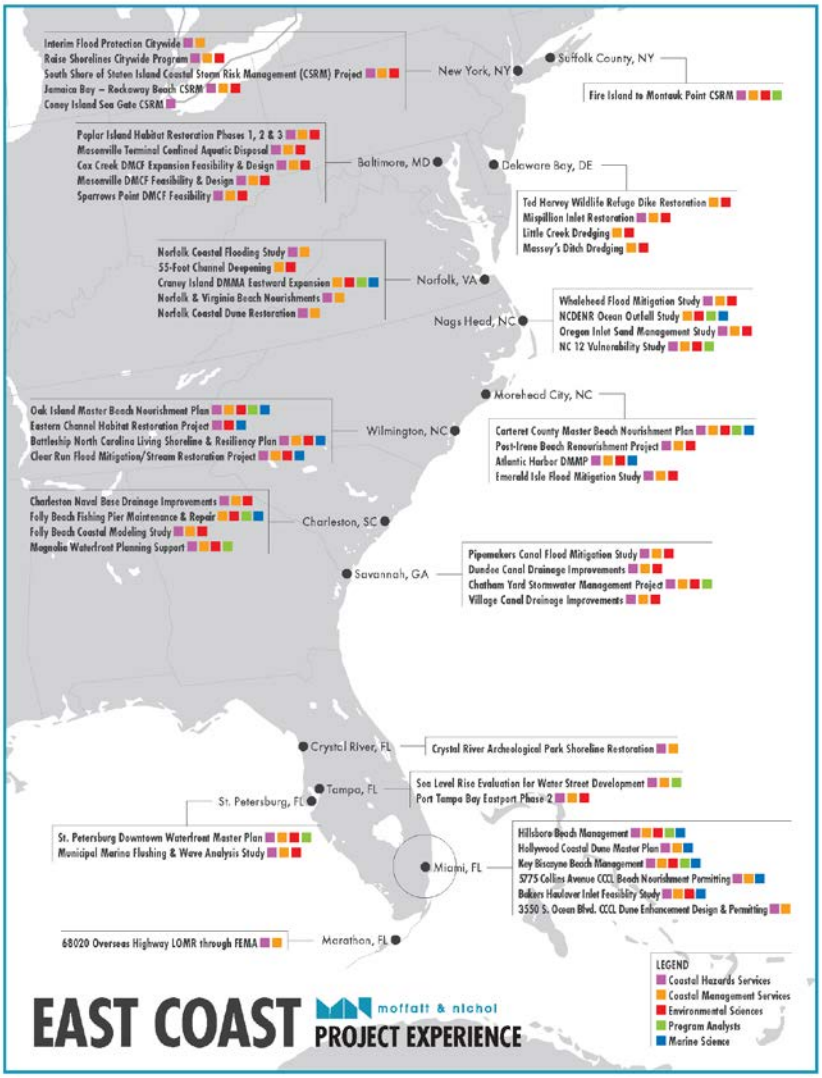
Johnny Martin, PE
Project Manager

A. Corporate Information

Moffatt & Nichol (M&N) has served the East Coast coastal engineering and environmental permitting needs of clients since 1981. For the last 25 years, *proposed Project Manager, Johnny Martin, PE* has been an integral part of building the firm's coastal engineering reputation with municipal governments in North Carolina and Virginia and with state and federal agencies.

Under Johnny's leadership, M&N developed the first North Carolina multi-decadal beach and inlet management master plan, including securing the first 50-year federal and state authorizations to allow dredging and sand placement across 24 continuous miles of oceanfront shoreline in Bogue Banks. In just the past 6 years, M&N has completed planning and design for placement of 6 separate beach nourishment projects in North Carolina with a construction value of over $60 million. We have been actively monitoring over 70 miles of North Carolina oceanfront and inlet shoreline. We developed a comprehensive Beach and Inlet Management Plan (BIMP) for the State of North Carolina that is being used to develop a statewide fund for coastal storm damage reduction projects. We evaluated the economic importance of the Oregon inlet and prepared alternatives for its long-term management. Our experience in coastal engineering and environmental permitting along the North Carolina and Virginia coasts stems from our passion and dedication to serving our coastal neighbors.

Our expertise in both the technical and client service aspects of coastal engineering has been gained through successful, long-term service to many clients at the municipal and state level. The map at right illustrates our experience providing coastal engineering services to similar clients throughout the eastern United States. These services are similar to the types that will be needed on this contract for the Town and are evidence of our ability to complete this type of work.



M&N's Raleigh and Norfolk offices are two of our firm's 36 North American locations. We also have offices in Morehead City and Wilmington, North Carolina. *Our team of 100 professional and technical staff located within our Raleigh, Norfolk, Morehead City, and Wilmington offices* can provide quality service for the Town's coastal engineering needs for the in less than a few hours' drive. *Our team has completed coastal engineering and planning investigations for over 20 municipalities and counties within the States of North Carolina and Virginia.* Through these projects, M&N has used analytical methods and simple models as well as multi-dimensional morphological models to replicate inlet and beach behaviors and evaluate comprehensive management strategies. Many of our beach and inlet management projects have involved high-end numerical hydrodynamic and sediment fate modeling and included permitting and endangered species coordination, long term management strategies, Dredged Material Management Plans, and construction plans, technical specification documents, and construction management oversight. *Our recent staff additions of Sam Morrison (Great Lakes Dredge & Dock) and Doug Huggett (NC Division of Coastal Management) also provides our coastal clients with recent, direct knowledge from the dredging industry and the regulatory community.*

M&N is very familiar with FEMA funding procedures for an engineered beach. We have assisted the Towns of Emerald Isle, Pine Knoll Shores, and Indian Beach in establishing design and planning documents, including maintenance nourishment triggers, to be

eligible for FEMA Public Assistance Category G renourishment funds. We have been successful in helping these communities acquire and administer FEMA federal funds including the most recently constructed Bogue Banks Post-Florence Phase 1 Renourishment Project., which successfully placed over 975,000 cubic yards of beach quality sand along 9 miles of beach in winter 2019. Overall, after all phases are completed, 4 million cubic yards of material will be placed along Emerald Isle, Indian Beach and Pine Knoll Shores.

Subconsultants

M&N has invited Geodynamics (surveying services – Woman-Owned, HUBZone), Athena Technologies (geotechnical services – HUBZone-certified, small business), and CATLIN (geotechnical services – small business) to complete our professional team.

Geodynamics **(Surveying Services – Woman-Owned, HUBZone)**

Principals at Geodynamics have been involved in high-resolution coastal shoreline mapping and analysis for over 20 years. As a firm, Geodynamics has an 15 year track record of successfully performing high-accuracy beach and nearshore surveys and has supported the transition of several long-term beach monitoring programs to a modern seamless topo/bathy approach, including New Hanover County, NC (5 years); Ocean View, VA (11 years) and Bogue Banks, NC (12 years).

Geodynamics' staff reflects the company's priorities of excellence in data quality, safety in all environments, and timely project completion. They bring a wealth of specialized marine mapping and coastal environment experience, including North Carolina Professional Land Surveyors, NSPS-THSOA Certified Hydrographers, certified GIS Professionals, USCG licensed vessel captains, and academically-trained project managers.

Geodynamics is *a woman-owned Historically Underutilized Businesses certified through the State of North Carolina* Statewide Uniform Certification (SWUC) program.

Athena Technologies **(Geotechnical services – HUBZone-certified, Small Business)**

Athena Technologies, Inc. is a *HUBZone-certified small business* incorporated in 1987. Athena is comprised of a tenured staff with each performing multiple functions. Athena has a well-rounded crew of geologists, captains, and technicians with extensive experience collecting environmental and geotechnical vibracore samples in support of navigation, research, remediation, and beach nourishment projects. All personnel are technically oriented and capable of operating, troubleshooting, and repairing equipment in the field. Additionally, Athena has a wide variety of research vessels that can operate in most aquatic environments. Athena's largest vessel, RV Artemis, has a single day operational range of 90 miles, which allows for rapid access to remote locations.

Athena has been providing vibracore and geotechnical reporting services in support of beach nourishment projects throughout the Atlantic and Gulf Coasts for over 30 years. *Athena's North Carolina project portfolio includes* geotechnical projects completed in the following areas: C*arteret County, Bogue Banks, Kure Beach, North Topsail Beach, Oak Island, and Holden Beach.* Athena has also provided geotechnical vibracore services at various inlets along the North Carolina coastline to support dredging for navigation projects and determine beneficial use for beach placement.

CATLIN **(Geotechnical Services – Small Business)**

CATLIN Engineers and Scientists (CATLIN) has provided Geotechnical, Environmental and Civil engineering and consulting services for 34 years. Since 1985, CATLIN has delivered professional engineering, planning and management services to a broad ranging clientele, including Federal, State and Local governments, industrial clients and private companies. They are a l*ocally owned and operated Small Business*, committed to providing our clients with the highest level of total client satisfaction. CATLIN currently has offices in Wilmington, NC (Corporate Headquarters); Raleigh, NC; Washington, NC; and Atlanta, GA.

CATLIN currently has 45 employees. The CATLIN team is comprised of experienced and registered professionals with disciplines in geotechnical, environmental, and civil engineering; hydrogeology; geology; and environmental science. The stability of our team is a benefit to our longstanding clients. CAITLIN has many employees that have been with us 15 to more than 20 years.

B. Team/Org Chart

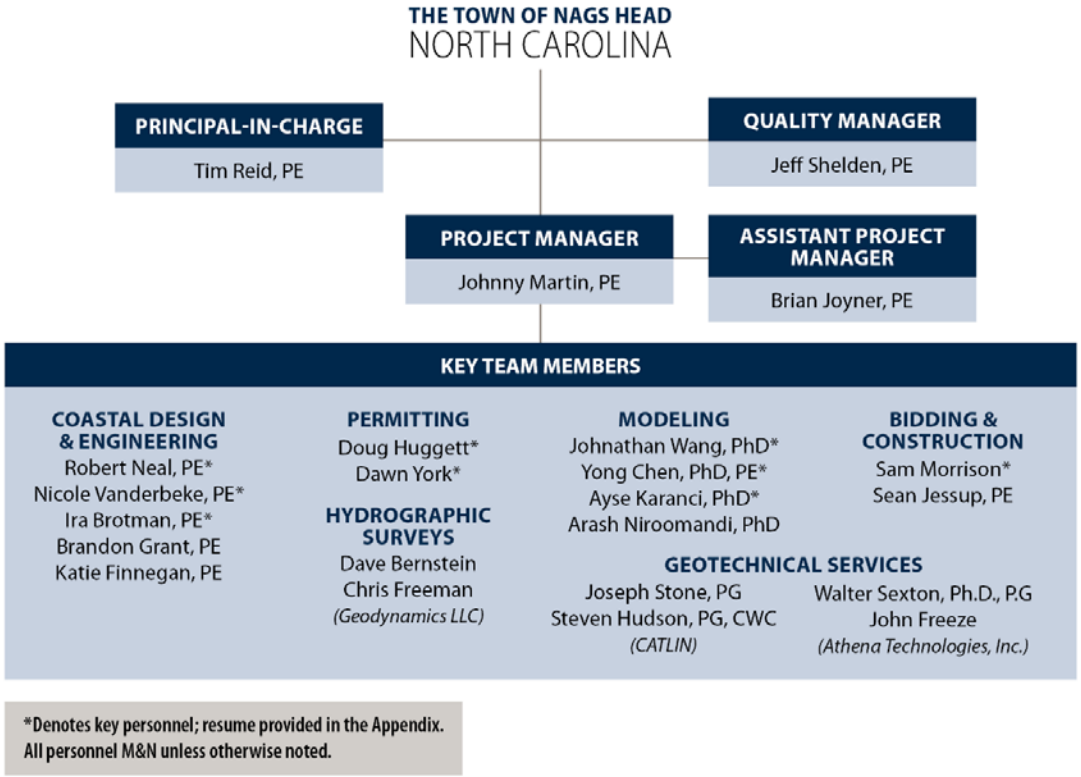
Introduction to Proposed Project Management Team

Johnny Martin, PE, is a Coastal/Hydraulic Engineer in Raleigh and has been intimately involved with coastal projects in North Carolina and Virginia, including leading Master Planning efforts for Bogue Banks, in Carteret County. Mr. Martin, who will serve as project manager for this contract, provides over 25 years of experience – all with M&N - in coastal engineering and water resources planning, analysis, and design including detailed experience with numerical modeling for a variety of coastal and hydraulic engineering projects.

Brian Joyner, PE, is a Coastal/Hydraulic engineer in Norfolk, VA. His 21-year career includes extensive experience in providing shoreline protection assessments and beach nourishment projects in Norfolk, Virginia Beach, and North Carolina. Brian and Johnny have been working together on projects since 2011, and as a team they will provide experienced and consistent project management and technical leadership for the Town's coastal and shoreline protection program. As the project management team, both Johnny and Brian will be intimately involved in providing responsive and consistent service to the Town while providing oversight through M&N's internal Quality Management System (QMS).

Proposed Organizational Chart

A chart of key team members is included below. *Detailed resumes are in the Appendix of this submittal.*



C. Representative Projects

The following are brief descriptions of M&N's experience providing similar services to those requested by the Town of Nags Head. More detailed descriptions can be found in the appendix.

Bogue Banks Master Beach Nourishment Plan

M&N successfully developed and obtained regulatory approval of the multi-decadal programmatic Environmental Impact Statement (EIS) for Carteret County, including beach design template and nourishment triggers, that incorporate all of Bogue Banks' beach nourishment and inlet management needs for the next 50 years. This allows the communities in Carteret County to consistently implement beach renourishment events without extensive re-permitting and re-study. The first project under these permits was completed in 2019 and the second will be constructed in early 2020.

Oak Island Master Beach Nourishment Plan

The Oak Island Master Plan, currently in development, will create a multi-decadal shoreline protection plan encompassing the 9.25 mile ocean shoreline of the Town of Oak Island in Brunswick County, NC. The master plan creates a roadmap for the Town's beach nourishment program. In addition, a maintenance plan for Lockwoods Folly Inlet will be established.

City of Norfolk Coastal Engineering and Management

Under on-call contracts held since 2003, Moffatt & Nichol has completed a wide range of coastal engineering and management tasks along Norfolk's 7 mile Ocean View shoreline. Tasks have included design of four large-scale beach renourishments and three series of detached breakwaters (all constructed); annual monitoring of dune, beach and nearshore profiles and wave climates; dune restoration, vegetation and management; support for the City's involvement with the US Army Corps of Engineers on shore protection and resilience projects; and calculations and consulting related to FEMA coastal floodplain requirements. Services for these projects included planning, permitting, preliminary / final design and construction documents; comprehensive study of historical and present conditions and complex numerical modeling.

City of Virginia Beach Coastal Engineering

Under and on-call contract held for the past 11 years, M&N has provided coastal engineering studies, planning and design services to the City of Virginia Beach to help manage the City's Chesapeake Bay and Atlantic Ocean beaches and inlets. Within the past four years, M&N completed evaluations of beach and dune storm protection capacity, held public information and planning meetings, and prepared construction plans and specifications for nourishment of three City beaches including Chesapeake Beach, Ocean Park Beach and Croatan Beach. Two of the projects are designed for nourishment by hydraulic dredging, while the third, at Croatan Beach, was designed for nourishment by truck haul. All three projects utilized coastal numerical models to evaluate storm protection capacity and post-nourishment shoreline change. These models were critical to the project design as well as evidence to state and federal regulators leading to permit approval. M&N also provided coastal engineering expert witness services on behalf of the City in defense of lawsuits brought by owners of beachfront property claiming riparian rights were severed by a beach nourishment project fronting their properties. M&N's expert testimony primarily dealt with the historical erosion patterns and justification for nourishment at Cape Henry Beach. The case was decided in the City's favor.

North Carolina Beach and Inlet Management Plan & Update, Statewide

For the State of North Carolina, M&N developed a comprehensive beach and inlet management plan identifying potential strategies to maintain beach and inlet characteristics.

NC 12–Ocracoke Island Erosion Hotspots & Hot Spot Update

M&N provided coastal engineering services for a vulnerability analysis of a 5.5-mile-long stretch of NC 12, the principal roadway along North Carolina's Outer Banks. Modeling included predictions for future shoreline positions in 10, 25, and 50 years.

Beach Nourishment, Breakwaters, and Dune Restoration Along Ocean View Beach

M&N assisted the City of Norfolk to stabilize and manage the seven miles of historically eroding shoreline comprising Ocean View Beach. Projects included beach nourishment, dune restoration, constructing nearshore breakwaters, coastal modeling, and periodic surveying and beach change monitoring.

New Hanover County Monitoring

M&N developed the New Hanover County Shoreline Mapping Program, a yearly study which monitors the beach conditions in New Hanover County, evaluating shoreline and volume change trends and optimizing future shoreline maintenance strategies. M&N is responsible for overall project management, survey data analysis, and compilation of the final report and presentation of findings. M&N is supported by Geodynamics, who performs the annual beach profile surveys.

D. Proposed Project Approach

Beach nourishment efforts within the Town of Nags Head began in 1990 with the Dare County Hurricane Protection and Beach Erosion Control Project. Due to significant property damage from Hurricane Isabel (2003), forced abandonment of property, and lack of federal funding, the Town decided to create its own locally funded nourishment project. Beginning in the early 2000's, the Town committed to maintaining 10 miles of their beach via locally funded sand nourishment projects. The two most recent nourishment events in 2011 and 2019 have placed a total of 8.6 million cubic yards (MCY) of material on this highly popular stretch of beach. This significant local investment demonstrates the Town's willingness to commit to long-term protection of the beach as a driver of local tourism and economic productivity, while also providing quality of life benefits and protection from significant storm events. M&N is committed to helping the Town of Nags Head maintain this important

economic driver.

Beyond the normal background erosion rates that occur in the high-energy wave environment of the Outer Banks, large tropical events such as Hurricane Isabel (2003) and Hurricane Matthew (2016) caused significant erosive damage in Nags Head. Hurricane Matthew alone caused over 1.4 MCY of sediment loss along 10 miles of Nags Head's oceanfront shoreline. Additionally, unnamed extratropical cyclones (i.e. nor'easters) have also caused severe erosion and shoreline recession, as seen most recently with the nor'easter in November 2019. Erosion rates along the Town's beach vary from about 2 feet per year of shoreline recession in the northern portions of the beach to about 8 feet per year at the southern end of the beach near the Cape Hatteras National Seashore. The nourishment trigger currently utilized by the Town is set at every 6 years unless less than 50% of the initial nourishment sand remains on the beach as a whole. Based on these erosion rates and the existing nourishment trigger, the next beach-wide renourishment event will likely need to occur within the next 5 or 6 years (2025 – 2026).

The Town is in a unique position to evaluate the course and direction of their ongoing beach nourishment program and to prepare, not just for the next nourishment event, but for a sustainable program for the next 30 to 50 years.

Our experience at successfully developing a 50-year beach nourishment programs at Bogue Banks in Carteret County will help the Town in developing a long-range Master Shoreline Management Plan and Beach Preservation Program. These efforts were completed by the team proposed for this project including Johnny Martin, Brian Joyner, Doug Huggett, Dawn York, Nicole VanderBeke, Brandon Grant, and our surveying partner, Geodynamics.

Other coastal communities in Dare County and Currituck County are also conducting periodic nourishment of their beaches. Given the limited number of dredging contractors that can accomplish the needed dredging work, and the high demand for dredging contractors all along the East and Gulf Coasts, it is possible that Nags Head and its neighboring communities could end up competing for dredging contractors. Based on our experience, we believe that coordinating efforts regionally among other beach communities may prove beneficial to the Town as well as the region.

M&N stands as a willing partner to assist the Town in these efforts, including providing guidance on how to navigate regional partnerships, establish funding mechanisms, develop interlocal agreements and coordinate shoreline protection activities among partners. We have assembled a team of coastal professionals that together provide the full perspective needed on the economic, regulatory, permitting, engineering, and construction feasibility aspects of creating a robust, long-term coordination of activities to the best benefit of the Town of Nags Head.

A regionalized approach may prove successful in streamlining permits across multiple communities, sharing costs of sand source identification, spreading mobilization costs across larger nourishment projects, reducing competition among dredging contractors, and coordinating nourishment efforts to target highest priority areas (i.e. hot spots), without requiring nourishing stable reaches.

While these benefits may flow out of potential regional partnerships, we will work with the Town of Nags Head to help determine if a regionalized approach makes sense. Whether an independent or coordinated approach ultimately proves the most beneficial course for the Town, we will prepare a Master Shoreline Management Plan and Beach Preservation Program (also called Master Beach Maintenance and Monitoring Plan or BMMP) that will reduce uncertainty for the future of the Town's beach management and guide the next 30 to 50 years of nourishment activities.

The M&N team's approach to creating the Town's BMMP is based on proven success creating the engineering and monitoring aspects and obtaining regulatory approval for similar plans in NC. Our recommended approach consists of the tasks and workflow illustrated in Figure 1 and described below:

Planning and Design

Figure 1. Outline of Tasks to Creating and Implementing the Beach Maintenance and Monitoring Program (BMMP)

Task 1: Data collection and review

M&N will review all available engineering and planning data from the Town's initial 2011 shoreline restoration and subsequent 2019 renourishment event, along with annual beach monitoring data. This data includes borrow area assessments, design and monitoring beach surveys, available wave and current data, and design reports. M&N will provide a written assessment of the available data and work conducted to date. M&N will identify any data gaps necessary to complete the Town's 30 to 50-year BMMP. Potential data gaps may include survey coverage of submerged areas, i.e. for numerical modeling and borrow area evaluation; geotechnical and sediment data related to potential borrow areas; and defining and obtaining the necessary easements to nourish the beach over a 30 to 50-year period. While we understand that a separate RFQ has been released for beach monitoring surveying services, the M&N Team includes Geodynamics as our long-term field investigations partner to provide supplemental nearshore and offshore data collection support if the need arises. Our partners, CATLIN Engineers and Scientists and Athena Technologies, Inc. provide geotechnical services and quality data to permit future borrow areas and ensure compatibility of dredged material with State sediment criteria. Easements and other real estate data will be catalogued in a GIS based on existing data sets provided by the Town, supplemented with additional property surveys that may be conducted during this task.

Task 2: Vulnerability Analysis and Design Options Development

M&N will perform a vulnerability analysis to categorize the current level of risk to property and life within the project area from storm surge, waves, and erosion, and will provide design alternatives, including a beach and dune enhancement plan, to reduce the damage potential to upland infrastructure. The Town will benefit from our experience in dune restoration and planting efforts for the City of Norfolk. Our lessons learned in the management of wind-blown sediment transport will be key to keeping the dunes robust and not migrating and encroaching on private property.

The vulnerability analysis will directly inform the formulation of design options for the Town's 30-Year BMMP. M&N will present design options based on modeled storms for a minimum of the 2-, 5-, 10-, 25-, and 50-year return period events along with the background erosion anticipated over the 30 to 50-year project life. M&N will employ standard numerical models such as XBeach and GenCade for the vulnerability analysis. M&N's team of expert modelers has identical and recent project experience with a suite of numerical modeling tools for this type of analysis, including SBeach, XBeach, CSHORE, GenCade, and Delft3D, to provide a sound basis for management decisions.

As the next step in the modeling analysis, M&N will analyze the beach to refine existing reaches or design areas. The design areas will encompass shoreline regions similar in shape and natural characteristics. M&N will use existing data to determine the background erosion rate (erosion anticipated under normal weather conditions with no project in place), the average existing dune elevation / width, and setback distance to categorize the design areas into representative segments for further analysis. This process addresses the need to provide the same relative level of benefit/protection to every parcel along the shoreline. In addition, this process structures the design, so sand is placed efficiently across the entire project area. It is likely that the beach fill template will vary along Town's shoreline so that enough material placement occurs in critical areas while less material could be placed in more stable areas. Efficient material placement will allow longer nourishment intervals by optimizing the manner in which 'hot spots' are addressed.

Using GenCade and XBeach numeric models, M&N will develop an 'engineered beach' template and advance nourishment section that provides relatively equal protection to the project area. M&N will calibrate the model(s) based on offshore wave data collected through NOAA/USACE programs and existing survey data. Calibration of the GenCade model will compare measured shoreline evolution with modeled results for applicable periods. The XBeach calibration will compare measured profile change with simulated results occurring during pervious storm events. The calibration of both numeric models will utilize several combinations of long-term and storm conditions to assure the necessary robustness of the model's applicability for a wide range of conditions.

To determine the overall level of protection afforded the project area, M&N will use the GenCade and XBeach models to simulate the potential effects on the first row of structures. The calibrated and verified models will be run for various storm events (2-year, 5-year, 10-year, etc.) and the shoreline/volume losses calculated by the models will be recorded. M&N will then compare these loss calculations and the long-term erosion rates to the stable vegetation line and the first line of infrastructure to estimate which storm events will likely "reach" the lines and in what future year. The M&N Team will compile and summarize these types of results for design areas or reaches. This type of summary allows the development of meaningful nourishment triggers that can vary by reach, and taking this approach facilitates project monitoring and planning for future nourishment events. The nourishment trigger would most likely be a combination of shoreline position and beach profile volume between two known elevations, as determined from the vulnerability analysis calculations for various levels of protection (i.e., 10-year, 25-year, and 50-year storm events).

M&N expects that the nourishment triggers will vary along the project reach, to provide a consistent level of protection. These types of results allow the project team to develop volume needs and associated cost estimates [e.g., 3 million CY of sand needed every 6 years to provide protection from a 10-yr. event at a cost of $40 million]. M&N will then compare the sediment needs and nourishment intervals to the known sediment sources and their capacities to estimate what sources to utilize under specific scenarios. *Nourishment events would occur based on the reach-based nourishment triggers (not individual transects) and would focus on addressing hotspots more than stable portions of the beach.* The modeling will also be instructive on where sand should be placed so that natural processes can be used to help stabilize the hotspots as well so that more frequent nourishment intervals are not needed for these smaller hotspot areas. The frequency of these events would likely be driven by the occurrence of large tropical or extratropical events.

Figure 2. Potential sand sources.

Task 3: Geotechnical Analysis

The M&N Team will conduct necessary geotechnical data analysis and field investigations to evaluate additional borrow areas to fulfill the requirements of a 30 to 50 year BMMP. The team will also analyze sediment samples to classify the recipient beach characteristics along the northern project limits if recommendations support a project expansion. The M&N Team will conduct all work in accordance with North Carolina's technical standards for beach fill projects. M&N's team includes Geodynamics to perform multibeam and bathymetric surveys in potential borrow areas as well as both CATLIN and Athena to assist with obtaining any geotechnical data that is required in the nearshore or offshore.

Borrow sites authorized during the 2011 nourishment could provide a maximum of approximately 8.0 MCY of beach quality sediment, neglecting potential recharge sediments. The 2011 project placed approximately 4.6 MCY along the project shoreline. The borrow sites authorized during the 2019 nourishment project contained a maximum of approximately 6.4 MCY of beach quality sediment and the 2019 event placed 4.0 MCY. The geotechnical analysis would concentrate on borrow areas within S-1 (see Figure 2), adjacent to the 2011 and 2019 permitted sites. According to USACE investigations, the borrow area S-1 contains approximately 100 MCY of beach compatible material. However, only the portions utilized in the 2011 and 2019 projects were developed in accordance with North Carolina technical standards for beach fill projects.

M&N will review available sediment data utilized by the USACE to designate borrow area S-1 previously and will recommend areas for further study. The team will collect and analyze sediment samples in accordance with state guidelines to develop a sediment source viable for the comprehensive 30 to 50-year BMMP.

Task 4: Alternative Recommendations

M&N will summarize the results of the engineering analysis and provide recommendations for moving forward with the environmental documentation for the preferred alternative in the Town's 30 to 50-year BMMP. M&N would work with the Town to host public information meetings and provide an opportunity for residents to inform the recommendations. Results of discussions with the Town and input received from the residents, stakeholders and environmental agencies will form the basis of M&N's recommendations.

The recommendations will include the design level of protection and applicable sediment sources for the 30 to 50-year BMMP. M&N will also develop a feasibility level cost estimate for each alternative discussed in the report. The Town will then decide what level of protection to propose for all of Nags Head and which alternatives to pursue within the environmental documents.

Because the southern portion of the Nags Head beach has significantly higher erosion rates than the northern portion, the Town has indicated interest in exploring alternatives beyond nourishment, including structural approaches. *M&N's unique combination of coastal structures engineering and regulatory experience can identify the most feasible options and establish realistic expectations of performance, cost, and impact of any soft or structural alternative. Alternatives will be evaluated with a goal of achieving long-term sustainability, including project life-cycle costs, funding.* Leveraging local, state, and federal funding sources is key to a sustainable beach management plan for the Town of Nags Head. Through our efforts in Carteret County and Oak Island, we prepared the necessary design, planning, and documentation to allow the communities to receive not only FEMA Category G funds, but also State and other available funds.

When nourishment event is necessary based on the nourishment triggers, M&N will prepare bid documents for a specific project

including plans, specifications, quantity summary, and Engineer's opinion of probable cost. In just the past 4 years, M&N has produced 4 different sets of plans, specifications and estimates for large beach nourishment projects in North Carolina.

Task 5: Permitting

M&N's environmental permitting team is led by Dawn York, who was the lead technical author of the State's first 50-year Environmental Impact Statement (EIS) for the Carteret County's Bogue Banks Master Plan. Dawn has extensive experience in preparing the necessary state and federal documentation and permit applications to authorize projects on-time and with minimal agency concerns. M&N's team includes Doug Huggett, who recently retired from the N.C. Division of Coastal Management (NCDCM). As Manager of NCDCM's Major Permit Section, Doug was heavily involved with and authorized every CAMA permit in the Outer Banks for the last 20 years. He similarly authorized all nourishment projects located within the rest of North Carolina over that time period. His experience and insight will prove invaluable to Nags Head.

The Town of Nags Head currently has active state and federal permits for the nourishment of the Town's beach. As an initial step in the environmental permit acquisition process, M&N will coordinate with relevant state and federal permit agencies to determine whether new or modified permits will be required. M&N will then complete permit application packages for all required State and Federal permits, leases and authorizations, including a Coastal Area Management Act (CAMA) from the N.C. Division of Coastal Management (NCDCM), a Section 401 Water Quality Certification from the N.C. Division of Water Resources (NCDWR), Section 404 and Section 10 authorizations from the U.S. Army Corps of Engineers, and leases and authorizations from the Bureau of Ocean Energy Management (BOEM) for activities, including geological and geophysical survey work, that involve the use of any potential borrow area(s) within federal waters. The preparation of these various application packages will build upon lessons learned and commitments made during the development of NEPA/SEPA documents, which will include substantial agency and stakeholder involvement.

M&N would also coordinate directly with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) to determine whether existing Biological Opinions would be adequate to satisfy Endangered Species Act (ESA) requirements. Based upon recent experiences with similar projects, M&N would at the least expect that dune planting efforts using mechanical equipment would necessitate at least an update of the existing Biological Opinion. Regardless of whether a new or modified Biological Opinion is required, M&N would use our significant experience in this area to work directly with the necessary federal agencies to ensure any such process is completed in a timely fashion.

M&N would hold pre-application conferences with all relevant permit agencies, prepare and submit all required application packages, and coordinate and resolve any issues that arise during the application review processes. As an additional part of this permit acquisition process, M&N would also obtain authorizations for any required modifications to existing stormwater outfalls within the project limits, and authorizations for managing sand that might migrate from the beaches onto individual properties, similar to approaches the Town has used following its past nourishment events. Given the M&N team's vast experience with permit application processing and in-process problem resolution, the Town can have confidence in the Team's ability to ensure that all approvals are received within a timeframe that meets with bidding and construction timelines.

Task 6: Physical Monitoring Plan

M&N will provide the Town with a project monitoring plan recommending schedules and activities for documenting project performance and FEMA compliance for storm recovery assistance. We believe it is important to perform a yearly beach survey to monitor the state of the beach and evaluate the volume and location reaches relative to the nourishment triggers. The monitoring plan will include measures and procedures for the Town to receive FEMA reimbursement for post-storm event monitoring.

Task 7: Economic Analysis and Long-Term Funding

One of the primary challenges with decadal beach nourishment programs is identifying, securing, and maintaining dedicated funding sources to meet the required cost of funding beach nourishment activities. One important aspect is leveraging local, state, and federal funding sources through establishing and maintaining a FEMA engineered and maintained beach. We keep a pulse on local, State, and Federal grants to identify alternate funding streams that can help defray some of the costs to the Town beyond FEMA post-storm damage recovery dollars. This approach helped us secure $18 million in State funding for two of our coastal clients in North Carolina, the only two communities in the state to receive funding from this source.

One cost-savings approach is to set nourishment triggers by reach to allow placement of sand where and when its needed. Thus, sand could be placed every second or third nourishment event in areas of low erosion, while areas of higher erosion are nourished during every event. While specific reaches may not receive sand during every nourishment event, all areas of the community benefit by having a healthy and sustainable beach that is inviting to tourists. Again, the goal of our plan will be "equal protection" not "equal sand."

During her PhD studies, M&N team member Dr. Ayse Karanci developed a coupled human-nature model in Nags Head that tied the economic viability of the community to the beach width and dune height. Her research suggests certain beach widths and dune heights led to the highest economic development potential and long-term sustainability of the community. According to this modeling experiment, the growth of the coastal community requires a balance between optimal recreational economic benefits gained from wide beaches and adequate protection against storm-driven erosion. The Town may use this research to inform funding and investment decisions.

Bidding, Negotiating and Construction Phase Services

Task 8: Bidding, Negotiating and Construction Phase Services

M&N has successfully bid over $60 million of beach nourishment projects in North Carolina alone in the last 6 years. We maintain close ties with the dredging industry to understand bid timing and strategy. Sam Morrison, M&N's lead on bidding, negotiating, and construction services, brings 29 years of experience in the dredging industry. This will allow us to provide economic and constructability review of designs to optimize the Town's budget for a renourishment project. The experience will also allow M&N to develop specifications that are fair and reasonable for both the Contractor and Town and reduce risk thus ultimately reducing costs. Timing is everything in the procurement of dredging services in the U.S. With Sam on the team we constantly monitor the workloads of all the major U.S. dredging contractors and look for the best opportunities to advertise the projects to provide the best value. We also look at alternate bid strategies to allow the contractors flexibility which also generally results in lower bid prices. From the Construction oversight perspective Sam has managed over US $1B of dredging work in his career which allows him to work seamlessly with the Contractors and have a clear understanding of issues that may arise during the construction phase.

Why Select Moffatt & Nichol

M&N provides the Town of Nags Head with an experienced and dedicated team to create a sustainable, long-term plan that addresses all of the Town's beach management needs.

- Accessible project management team with industry leaders Johnny Martin and Brian Joyner who are dedicated to successful project implementation
- Our track record of developing 50-year beach management plans in North Carolina, securing required permits, and placing sand on the beach allows us to provide the Town with a proven workflow for establishing and maintaining a customized BMMP that achieves the Town's particular goals.
- Our knowledge and project history in completing beach nourishment and coastal engineering projects in North Carolina provides context and vision for the Town's future efforts
- Expert knowledge and experience with navigating permitting on the State and Federal levels that benefits the
- History of successfully securing of alternative funding sources through grant-funding
- Our approach to early engagement with the dredging industry, through open Industry Days and direct personal contacts, will allow the Town to better evaluate the dredging market climate and plan successful, cost-effective bidding strategies.

THE FOLLOWING APPENDIX SECTION INCLUDES KEY PERSONNEL RESUMES, TEAM CAPACITY AND AVAILABILITY, PROPOSED PROJECT SCHEDULE, MORE DETAILED DESCRIPTIONS OF OUR TEAM'S SIMILAR PROJECT EXPERIENCE, AND THE REQUIRED FORMS AND ATTACHMENTS ASSOCIATED WITH THIS REQUEST FOR QUALIFICATIONS.

JOHNNY MARTIN, PE

PROJECT MANAGER

KEY FEATURES

- Managed Teams Including Proposed Key Personnel for Many Similar Projects
- Extensive Knowledge of Numerical Modeling
- Funding Methodologies
- Stakeholder Coordination
- Coastal Analysis, Planning & Engineering Design
- Construction Document Preparation
- Post Construction Award Services

EDUCATION

MS, Civil Engineering (Water Resources), North Carolina State University, 1997

BS, Civil Engineering, North Carolina State University, 1992

REGISTRATION

Professional Engineer:

North Carolina, #23487, 1998

AFFILIATIONS

Board Member, North Carolina Beach & Inlet Waterway Association

American Water Resources Association

National Council of Examiners for Engineering and Surveying, Water Resources Board

North Carolina American Public Works Association, Water Resources Division

Mr. Martin provides project management, planning, analysis, design, construction documents, and post-construction-award services for a variety of coastal and hydraulic engineering projects including several wetland restoration projects. As a part of his coastal engineering experience, Mr. Martin has specialized numerical modeling of the hydrodynamics of flow in coastal, estuarine, and riverine systems. He has extensive knowledge of state-of-the-art numerical models including the MIKE Suite (MIKE 11, 21, 3, and MIKE SHE), as well as specialized models developed by the USACE such as RMA-2 and -4 and the current set of Hydrologic Engineering Center models. In addition, Mr. Martin has completed all stream restoration courses with the North Carolina Stream Restoration Institute. Notable projects include the Flood Mitigation Study for Emerald Isle, North Carolina, which is an innovative wetlands restoration and treatment project.

REPRESENTATIVE PROJECT EXPERIENCE

Master Beach Nourishment Plan for the Town of Oak Island, NC. Project Manager responsible for leading multidiscipline team for project to Determine the Sediment Needs and Locations of Available Sand for the Next 30 to 50 Years. M&N will complete all engineering/environmental studies required to acquire the permits for the Master Plan and will also provide engineering design services for the initial project as well as FEMA documentation for an engineered beach.

Bogue Banks Master Beach Nourishment Plan, Carteret County, NC. Project manager (PM) responsible for the development of a multi-decadal programmatic EIS for shoreline management and infrastructure protection for Carteret County along Bogue Banks. The project will incorporate all of Bogue Banks' beach nourishment and inlet management needs and acquire permits that will cover these needs and the use of required sand sources for the next 50 years. The project will also be used to update and maintain static-line exceptions as well as FEMA engineered beach designation.

Bogue Banks Beach and Nearshore Mapping Program, Carteret County, NC. Project manager who oversees surveys performed each spring along all three stretches of shoreline to document changes in the beach morphology and serve as a baseline before each storm season. After large storm events, surveying is also performed along Bogue Banks to assess damages and to serve as documentation for FEMA reimbursement for sand lost. The survey data is used to compute shoreline change at Mean High Water (MHW) and volume change above MHW, ?5 feet NAVD 88 (wading depth), 12 feet NAVD 88 (outer bar), and 20 feet NAVD 88 (closure).

North Carolina Beach and Inlet Management Plan, NC. Project manager for this statewide study developing a beach and inlet management plan for North Carolina's ocean coastline of over 320 miles and 19 active inlets. Gathered, compiled, and analyzed relevant coastal datasets, including beach nourishment, dredging, and shoreline erosion. Developed management regions and strategies and conducted stakeholder process, including facilitating 10 public meetings. The final comprehensive plan covered beach and inlet management strategies, regional approaches, economic valuation, vulnerability assessment, and funding methodologies.

Hyde County Shoreline Protection and Intertidal Marsh Creation, Ocracoke Island, NC. Assistant project manager and lead coastal and stormwater engineer for stabilization of an eroding shoreline on Ocracoke Island by creating intertidal/upland marsh protected by segmented offshore breakwaters. Led the coastal engineering aspects of planning, permitting, preliminary/final design, and construction documents involving two rows of segmented offshore breakwaters, marsh/upland vegetation plantings, and shoreline reclamation. Also provided permitting and stormwater system design for the proposed parking area and upland development inland of the 30-ft-wide Zone 1 Tar-Pamlico Buffer. Stormwater system included site grading to direct drainage and stormwater management controls including energy dissipation, stormwater treatment, and runoff diffusion.

Shoreline Protection and Engineering Services Contract, Norfolk, VA. Project manager, coastal engineer and modeler for numerous task orders under three consecutive annual services contracts. Provided design of repairs, rehabilitation, upgrades and replacement of existing shoreline protection structures; and engineering and consulting services related to design documents requesting federal or state participation.

IQC: Shoreline Protection Projects, Norfolk, VA. Assistant project manager and lead coastal engineer under this five-year on-call contract for 13 of 21 shoreline protection tasks completed for the City of Norfolk.

- **East Ocean View Beach Nourishment Construction Services, Norfolk, VA.** Assistant project manager and lead coastal engineer who provided review for as-built surveys and authorized pay requests.
- **Ocean View 800 Block Beach Restoration Study, Norfolk, VA.** Assistant project manager and lead coastal engineer for a study to restore an erosion "hot spot." Managed data collection, including new surveys and sediment sampling. Directed sand compatibility analysis and numerical modeling using GENESIS to determine a long-term shoreline change rate and estimate future shoreline changes. Oversaw DELFT3D modeling to analyze sediment transport patterns/morphological changes. Developed beach restoration alternatives. Provided report presenting preferred alternative with opinions of probable costs.
- **West Ocean View Dune Restoration and Central Ocean View Beach Restoration, Norfolk, VA.** Lead coastal engineer for a dune and beach restoration project to repair storm-induced erosion involving planning, permitting, analysis, design, construction documents, and PCAS to restore the beach using approximately 428,000 cy of material obtained two offshore borrow sites and placed along 18,300 lf of beach. Directed sand compatibility analysis and prepared beach profile template, preliminary design, permit application, response to regulatory agency inquiries, final design, and construction documents.
- **Ocean View Permit and Design Sand Borrow Investigation, Norfolk, VA.** Using the results of the earlier survey task, he oversaw the design effort to develop potential borrow sites (develop quantities and sizes) for use in beach nourishment. Directed permit application preparation. During agency review, he directed responses to address agency questions and requests for information and attended meetings with various regulatory agencies to acquire permits.
- **Sand Source Investigation Phase 1, Norfolk, VA.** Assistant project manager and lead coastal engineer who developed and directed vibracoring plan and associated laboratory analysis.
- **Ocean View 800 Block Breakwater Design, Norfolk, VA.** Assistant project manager and lead coastal engineer who completed final design and construction documents for 800 Block breakwater. Provided bid assistance and construction observation as well as review of contractor submittals. Reviewed as-built plans.
- **East Ocean View Breakwater, Norfolk, VA.** Lead coastal engineer for repair of storm-induced erosion involving planning, permitting, analysis, design, and construction documents for full-scale beach restoration. Utilized 359,000 cubic yards of beach fill placed along 5,300 linear feet of shoreline. Oversaw MIKE 21 wave modeling to generate wave climate for Ocean View Beach based on offshore wave data for use in SBEACH and GENESIS. Utilized SBEACH to analyze profile response to numerous storm scenarios and based on those results, completed preliminary design of a beach profile restoration template.

BRIAN JOYNER, PE

ASSISTANT PROJECT MANAGER

KEY FEATURES

- Field Data Collection and Monitoring;
- Detailed Numerical Modeling
- Sediment Transport
- Beach and Dune Design
- Coastal Flooding/Sea Level Rise

EDUCATION

MS, Civil Engineering with Coastal Concentration, North Carolina State University, 1997

BS, Environmental Engineering, North Carolina State University, 1995

REGISTRATION

Professional Engineer:

North Carolina, #039594, 2012

CERTIFICATIONS

FEMA Enter on Deployment (EOD) Status

AFFILIATIONS

American Society of Civil Engineers (ASCE)

Coasts, Oceans, Ports & Rivers Institute (COPRI)

Mr. Joyner is M&N's lead coastal and storm water engineer in Virginia. His 20-year career has focused on determining coastal and stormwater flood hazards at both local and regional scales and designing systems to mitigate or withstand those hazards. His experience includes field data collection and monitoring; detailed numerical modeling of storm surge, waves, and sediment transport; and design of beaches, dunes and coastal structures such as breakwaters to manage shoreline stability. He is responsible for the delivery and quality of the firm's shoreline protection, dune management, coastal flooding/sea level rise, and stormwater projects for Virginia's coastal communities. He regularly participates in community meetings regarding sensitive issues such as balancing coastal flood risk with property owner concerns. Isle, North Carolina, which is an innovative wetlands restoration and treatment project.

REPRESENTATIVE PROJECT EXPERIENCE

Bogue Banks Master Beach and Inlet Management Nourishment Planning and Programmatic EIS, Carteret County, NC. Lead coastal engineer and modeler for analysis of Bogue Inlet morphology and separate beach erosion hot spot analysis on Carteret County's Bogue Banks shoreline, as part of developing a multi-decadal plan and programmatic EIS for long-term beach nourishment and inlet maintenance needs. The inlet and beach management studies use high-resolution, local numerical models of the inlet and barrier island shorefront, driven from a single regional model of historical waves and tidal hydrodynamics. The local models consist of integrated wave, flow, and sediment transport computations. The inlet model also includes continuous computation of bed change (morphodynamics), to develop a more realistic understanding of the inlet channel and shoal behavior. The beach erosion model uses high-resolution sediment transport calculations for a typical year to understand the reasons this particular hot spot exists, for developing mitigation alternatives.

Preliminary FEMA Flood Insurance Rate Map (FIRM) Review and Appeal Support, Carteret County and Incorporated Communities, NC. Coastal engineer and FEMA coastal hazard subject matter expert for review of the preliminary FIRM panels prepared by NC Floodplain Mapping Program (NCFMP) for the County and its various waterfront Towns. Reviewed the underlying numerical modeling data and its input/output analyses and compared the model results and preliminary flood zones to detailed LiDAR topography. Recommended multiple localized revisions to the preliminary VE zones and Limit of Moderate Wave Action (LiMWA), and prepared formal appeals for the communities to submit to NCFMP. Led discussions with NCFMP and obtained their concurrence on technical basis for appeals and presented findings and conclusions to community staff and elected officials.

Ocean View Shoreline Periodic Survey and Analysis, Norfolk, VA. Project manager and lead coastal engineer for ongoing spring and fall surveys and monitoring reports along Norfolk's seven-mile long Ocean View and Willoughby Spit shoreline. Coordinated subconsultants' field data collection. Provided engineering technical review of volume change and shoreline change calculations and documentation. Established reporting methods for monitoring the performance of the USACE's Coastal Storm Damage Reduction Federal beach nourishment project.

Sand, Beach and Dune Management Committee and Technical Investigations, Norfolk, VA. Coastal engineer. Provided data products and technical documents on an on-call basis in relation to Cottage Line dune management and participated actively as a member of the City's Sand, Beach and Dune Management Plan Steering Committee in a process intended to address residents' concerns about sand encroachment on their properties while maintaining storm damage protection afforded by the dunes.

Ocean View Sand Management Pilot Project, Norfolk, VA. Project manager and lead coastal engineer working with City of Norfolk staff, other consultants, and the Cottage Line Civic League to design and coordinate permits for a project to excavate sand encroaching against private structures and place the excavated sand into gaps and narrow reaches in adjacent dunes. The present effort covers a limited extent of shoreline—between Grove Avenue and Cape View Avenue—as a pilot project to work through the technical, financial and regulatory requirements, with a view to applying the process elsewhere in Ocean View.

USACE Project Review, Norfolk, VA. Project manager and lead coastal engineer. Reviewed and commented on preliminary and pre-final Federal beach nourishment project design documents, attended multiple design review meetings with USACE,

their consultants, and City staff, and provided recommendations for refining beach nourishment template design in relation to existing breakwater and stormwater outfalls.

Toler Place Breakwater Modifications, Norfolk, VA. Project manager and lead coastal engineer for design and construction phase support to modify an existing detached breakwater and add a new breakwater to stabilize an erosional hot spot within a Federal beach nourishment project extent. Supervised three-dimensional sediment transport and morphological modeling of the existing and proposed breakwater system, reviewed and approved designs for the modified and new breakwater. Conducted bidding and construction phase support to the City's construction group including responding to contractor RFIs and reviewing contractor submittals.

Chesapeake Beach Nourishment Design and Permitting, Virginia Beach, VA. Lead coastal engineer and project manager for design of a hydraulic dredging and beach nourishment and dune restoration project at Chesapeake Beach between the CBBT and JEB—Little Creek. The nourishment sand is obtained by hydraulic dredging of a nearshore shoal with pipeline to the beach. Designed the nourishment template and prepared basis of design and the Joint Permit Application and supporting documents. Coordinated with federal and state agencies to assist with permit processing and federal Section 408 review.

Croatan Beach Shoreline Protection Assessment, Beach Nourishment Design and Section 408 Review Support, Virginia Beach, VA. Lead coastal engineer and project manager for a study of long-term behavior of the Croatan Beach shoreline and dunes. Determined shoreline, beach and dune change patterns over several decades; estimated the level of protection currently provided by the beach and dune system; and made recommendations on the necessity for and purpose of changes in beach or inlet management. Evaluated annual and seasonal sediment budgets for the inlet and documented impacts of beach management actions on the Federal navigation channel and resort beach nourishment projects. Prepared bidding and construction documents for beach nourishment to create the recommended beach and dune template.

Cape Henry Beach Coastal Engineering Expert Witness, Virginia Beach, VA. Coastal engineer supporting expert witness services on behalf of the City in defense of lawsuits

TIMOTHY REID, PE

PRINCIPAL IN CHARGE

KEY FEATURES

- Decades of Experience Overseeing and Effectively Allocating Personnel and Other Resources
- Practical Design Experience from Ideation through Construction
- Vested Interest in Building Strong Client Relationships through Excellent Service
- Worked with Project Manager, Johnny Martin for More Than 20 Years

EDUCATION

BS, Civil Engineering, North Carolina State University, 1984

REGISTRATION

Professional Engineer:

North Carolina, #15869, 1989

Mr. Reid is currently the M&N's branch manager of our Raleigh, North Carolina office overseeing its day-to-day operations and having responsibility for assigning office resources to furnish timely and accurate project completion. In addition, he routinely provides quality control/assurance, team coordination, and project oversight. In addition to being a vice president, Mr. Reid is a senior civil engineer with 34 years of project management, planning, evaluation, design, construction document preparation, and post-construction award services experience acquired on a wide variety of civil engineering assignments. His project management experience includes team assembly, direction of personnel and subcontractors, client relations, proposal preparation, manpower estimates, project oversight and other administrative duties. In addition, his civil engineering experience also includes planning, design, and construction document preparation for a variety of projects such as stormwater management facilities, drainage systems, military and industrial pavements, traffic staging/control, highways, utilities (water, sewer and fuel), and erosion control plans.

REPRESENTATIVE PROJECT EXPERIENCE

Terminal Groin Study, NC. Principal-in-charge for this study to evaluate the applicability and feasibility of terminal groins as an erosion control device in the State of North Carolina. This study led to aiding the North Carolina General Assembly to develop terminal groin guidelines.

Canal Del Dique Phase I Conceptual Design Review, Bolívar Department, Colombia. Civil engineer for review, modeling, and validation of the conceptual design of a series of three constriction structures intended to improve environmental and navigational conditions in Canal del Dique.

Fire Island to Montauk Point Breach Contingency Plan, Long Island, NY. Civil engineer for evaluation of barrier island breach potential and development of alternative corrective actions should a breach occur. Provided reach delineation for a 50-mile-long segment of shoreline. Developed borrow area locations from which to obtain emergency fill material including evaluation of different breach closure methods, including dredging, trucking from upland, and stockpiling material near "hot" spots. Determined detailed quantities as input to cost estimate.

Westhampton Beach Storm Damage Protection Interim Plan, Long Island, NY. Civil engineer for detailed planning study for interim shore protection, which examined improving the shoreline using a combination of existing groin modification, beach fill placement, and new groin construction. Provided planning and design for groin modification, new groin construction, and beach fill including groin details and beach fill layout. Developed groin field-beach fill transition schemes and provided quantity determinations as input to detailed cost estimate.

JEFFERY SHELDEN, PE

QUALITY MANAGER

KEY FEATURES

- Analysis of Shoreline Evolution
- Analysis of Inlet and Channel Morphology
- Preparation of Construction Documents for Beach Restoration Projects
- Numerical Models Such As GENSIS, LITPACK, MIKE 21, and DELFT3D

EDUCATION

MS, Civil Engineering, North Carolina State University, 1985

BS, Civil Engineering with Highest Distinction, University of Virginia, 1984

REGISTRATION

Professional Engineer:

North Carolina, #15470, 1989

Virginia, #0402 044560, 2009

AFFILIATIONS

American Shore and Beach Preservation Association

American Society of Civil Engineers

Chi Epsilon, the National Civil Engineering Honor Society

Tau Beta Pi, the National Engineering Honor Society

Mr. Shelden has served as a coastal engineer with M&N for 33 years and is experienced in the analysis of coastal processes and hydraulics, including shoreline evolution and inlet and channel morphology modeling. These models include GENESIS, LITPACK, SBEACH, MIKE 11, MIKE 21, MIKE 3, RMA-2, RMA-4, and DELFT3D. He has also analyzed and designed several beach restoration projects, prepared construction documents and provided construction services.

REPRESENTATIVE PROJECT EXPERIENCE

North Carolina Beach and Inlet Management Plan, NC. Senior coastal engineer who developed a comprehensive beach and inlet management plan (BIMP) identifying potential strategies to maintain beach and inlet characteristics at levels determined from analysis of historic, current, and forecasted future positions and composition. Provided oversight and QA/QC for the studies five main tasks: formation of a centralized database of available beach and inlet data, definition of management regions, development of draft management strategies, prioritization for state funding of beach and inlet management projects, and the project final report.

North Carolina Terminal Groin Study, NC. Senior coastal engineer who participated in the terminal groin study to evaluate their applicability and feasibility as an erosion control device in the state. This study led to aiding the North Carolina General Assembly to develop terminal groin guidelines.

NC 12 - Ocracoke Island Hotspots Update, Ocracoke, NC. Senior coastal engineer who provided updates to existing coastal erosion analysis for a vulnerability analysis of a 5.5-mile-long section of NC 12 located within Cape Hatteras National Seashore Recreation Area. Effort included the review of potential project alternatives to prevent the highway from damage during the near future.

IQC: Shoreline Analysis and Protection Services, Norfolk, VA. Senior coastal engineer who provided oversight and QA/QC for several tasks under this open-end contract, including the following:

- **East Ocean View Beach Nourishment Phase II, Norfolk, VA.** Senior coastal engineer who provided QA/QC for planning and design of beach nourishment for a mile-long section of beach. Provided input to and review of a detailed sand compatibility analysis of potential material borrow sources, along with detailed analysis of project wave climate, historical shoreline change, and subsequent SBEACH and GENESIS modeling to determine project design life. Reviewed permit drawings and documentation along with final construction documents for beach fill placement.

Figure Eight Island Dredging and Beach Nourishment, Figure Eight Island, NC. Coastal engineer who prepared plans and monitored construction of a dredging and beach nourishment project, providing on-site consultation during the fill placement.

B-2500 Herbert C. Bonner Bridge Replacement Coastal Processes Modeling, Oregon Inlet, NC. Assistant project manager who provided evaluation of coastal processes at Oregon Inlet, including inlet migration, shoreline changes, and the effects of dredging and construction of a terminal groin as part of determining the alignment of a new bridge. Used GENESIS, a shoreline evolution model, to project future shoreline conditions in response to a new terminal groin and future conditions considering the possibility of major jetty construction at the inlet. Conducted investigations to describe historic and existing coastal conditions and forecasted future shoreline positions as well as future location and orientation of inlet's principal and main subsidiary channels for a 50-year project life. Evaluated various bridge replacement alternatives with consideration given to secure approach and abutment locations, navigational channel requirements, and anticipated scour impacts.

ROBERT NEAL, PE

COASTAL ENGINEER

KEY FEATURES

- Dynamic modeling studies,
- Environmental Restorations
- Inlet Relocations
- Storm Protection Analysis
- Budget Management
- 10 Years of Public Sector Experience

EDUCATION

MS, Civil Engineering, Old Dominion University, VA, 2011

BS, Civil Engineering (Water Resource Planning & Coastal Engineering), North Carolina State University, Raleigh, NC 1997

Coastal Engineering Certificate, Old Dominion University, Virginia, VA, 2006

REGISTRATION

Professional Engineer:

North Carolina, #39470, 2012

AFFILIATIONS

Board of Directors, North Carolina Beach, Inlet & Waterway Association

American Society of Civil Engineers

Society of American Military Engineers

2019 NCBIWA Member of the Year

Mr. Neal joined M&N in August 2015 as a coastal engineer. With over 18 years of experience specializing in coastal and water resource initiatives, Mr. Neal has provided long-term management solutions to complex beach and shoreline projects, including inlet relocations and environmental restorations. Mr. Neal has conducted storm protection analyses, borrow source determinations, and hydro-dynamic modeling studies, and is familiar with North Carolina permitting requirements for coastal projects, including the National Environmental Policy Act (NEPA) process. Mr. Neal has provided cost effective engineered alternatives for private and governmental entities. to achieve project goals while consistently remaining within budgetary constraints. Mr. Neal's decade of experience as a county government leader, prior to joining M&N enables him to blend his private and public-sector experience to offer a unique dual perspective of coastal engineering and shoreline management that will aid in development of a unified plan.

REPRESENTATIVE PROJECT EXPERIENCE

North Carolina Beach and Inlet Management Plan, NC. Mr. Neal assisted with the stakeholder involvement and community meetings for this statewide study developing a beach and inlet management plan for North Carolina's ocean coastline of over 320 miles and 19 active inlets. Mr. Neal worked with the M&N Team to collect and analyze dredging and beach renourishment records to develop historical use trends. Mr. Neal also evaluated the historical results to estimate future needs for dredging along the North Carolina coast. The final comprehensive plan covered beach and inlet management strategies, regional approaches, economic valuation, vulnerability assessment, and funding methodologies.

Oak Island Master Beach Nourishment Plan Feasibility Study, Oak Island, NC. Project manager for a consulting team to provide a 30-year plan for managing the Oak Island shoreline. Mr. Neal assisted junior staff to interpret numerical molding results and provide estimates of annual volumetric quantities necessary to maintain a stable shoreline and acceptable storm protection buffers. Mr. Neal also conducted a sediment compatibility analysis to determine the most economical borrow site(s) for the 30-year project.

Bogue Banks Master Beach Nourishment, Carteret County, NC. Project engineer for this team that was selected by Carteret County to complete a three-year project to develop a multi-decadal programmatic Environmental Impact Statement (EIS) that will incorporate all of Bogue Banks beach nourishment and inlet management needs and acquire permits that will cover these needs and the use of required sand sources for the next 30 to 50 years. Provided a forecast of future financial requirements expected for the continued management of the Bogue Banks and Carteret County shoreline.

New River Inlet Channel Realignment and Beach Restoration, North Topsail Beach, NC. Project manager who developed a monitoring plan to demonstrate compliance with Federal Emergency Management Agency requirements for public assistance to restore the engineered beach in the event of a major storm event. Conducted sampling and testing procedures to verify the project was compliant with the US Army Corps of Engineers and North Carolina Division of Coastal Management sediment compatibility standards. Provided oversight and coordination with the contractor, client, and interested parties to accomplish the design intent and inform all parties of the construction status. Responsible for the design of a dune and beach system that mitigated the effects of Hurricane Sandy, which impacted the project during the early phase of construction.

IRA BROTMAN, PE

COASTAL/GEOTECHNICAL ENGINEER

KEY FEATURES

- Beach Restoration Design
- Sediment Sourcing /Investigations
- Design Permit Acquisition
- Dredging Design

EDUCATION

MS, Civil Engineering, Virginia Polytechnic Institute and State University, 1991

BS, Civil Engineering, Virginia Polytechnic Institute and State University, 1990

REGISTRATION

Professional Engineer: Virginia, #0402028530, 1998

AFFILIATIONS

American Society of Civil Engineers (ASCE)

Geo-Institute

Mr. Brotman joined M&N in 2003 and has more than 25 years of experience in the design, construction, and rehabilitation of waterfront civil engineering projects. This experience includes analysis, design, permit acquisition, and preparation of final design documents for municipal waterfront projects He has served as both project manager and project engineer on a wide range of projects involving waterfront structures, marinas, bridges, and stormwater outfalls.

REPRESENTATIVE PROJECT EXPERIENCE

On-Call Coastal Engineering Contract, Virginia Beach, VA. Project manager for task orders including scoping, planning, preparation and management of profile monitoring along Sandbridge and Big Beach. These large scale periodic topographic and bathymetric surveys included the collection and evaluation of over 48 linear track miles of survey data used to evaluate the condition of the beach dune and near shore and need for nourishment. Using GIS analysis methods, comparisons to prior surveys were made to evaluate erosion bathymetric changes along the ocean floor. Other task orders included evaluation and recommend repairs to waterfront structures including Rudee Inlet jetty system, and repairs to Owl Creek boat ramp and First Landing Park piers.

Ocean View Beach 800 Block Beach Restoration Study, Norfolk, VA. Project manager for a detailed study of the shoreline erosional hotspot at the 800 Block of Ocean View Beach and the development of a recommended alternative for beach restoration at this location. Incorporated survey data and sediment information collected during the Central Ocean View project, transformed offshore wave data to the site, modeled the existing system at the 800 Block hotspot area to determine the cause of erosion, and developed a list of alternatives for beach restoration. The selected alternatives for beach restoration were also modeled to determine the impact and effectiveness of each alternative. Construction documents were prepared for the recommended alternative.

East Ocean View Dune Restoration and Beach Nourishment, Norfolk, VA. Project manager for the design, planning, permitting, and engineering services related to the restoration of approximately 1 mile of previously eroded shoreline adjacent to the East Beach community, and 3.5 miles of dune restoration along Central Ocean View. This beach nourishment project provided protection for property, creation of recreational beach area, and increased coastal dune habitat as part of the city's larger neighborhood revitalization plan for Ocean View. Services included coastal modeling and analyses, as well as sediment compatibility analysis in order to determine the suitability of proposed borrow areas.

Study of Sediment Sources for Future Beach Nourishment Projects, Norfolk, VA. Project manager for collecting and reviewing sediment data within the lower Chesapeake Bay to determine the availability of beach-quality sand for future beach nourishment projects along Ocean View beach. The first phase involved a literature search, mapping of previous investigations, and development of a GIS database to summarize the information, as well as an initial coordination with regulatory agencies. The second phase included investigation, sampling of forty vibracores, and analysis of sediment compatibility based on existing sand along Ocean View and that within the borrow areas of two potential sources of sand, Willoughby Bank and Thimble Shoal Channel. Prepared permits for the dredging of areas determined from the investigations to be good borrow sources and placing a beach berm and dune along the entire Ocean View shoreline.

Chesterfield Heights Shoreline Protection, Norfolk, VA. Project engineer for the inspection of existing conditions and visible structures and preparation of a concept design report to mitigate the eroding shoreline at Chesterfield Heights. Concept alternatives included revetments, bulkheads, and a riprap sill with re-vegetated shoreline. Each concept design included development of sufficient design details to prepare estimated quantities and concept-level opinions of probable cost.

NICOLE VANDERBEKE, PE

COASTAL ENGINEER

KEY FEATURES

Beach Nourishment

Master Plan Development

Coastal Modeling

Shoreline Monitoring

GIS Database Development and Management

EDUCATION

BS, Civil Engineering, North Carolina State University, Raleigh, 2003

REGISTRATION

North Carolina, #37991, 2011

AFFILIATIONS

American Shore and Beach Preservation Association

North Carolina Beach, Inlet and Waterway Association.

Ms. VanderBeke provides engineering support for water resources and coastal engineering projects including numerical modeling and GIS analysis. Ms. VanderBeke has been involved in shoreline and beach volume change analysis, development of shoreline stabilization and beach nourishment projects, analysis of borrow area and native beach sediment data, wave environment analysis, coastal flooding studies, and coastal floodplain mapping. Her coastal modeling experience has involved the use of SBEACH and GENESIS.

REPRESENTATIVE PROJECT EXPERIENCE

Bogue Banks Master Beach Nourishment Plan, Carteret County, NC. Coastal engineer responsible for long-term shoreline change modeling using GENESIS. Developed a calibrated and verified GENESIS model using historical data from which future project scenarios were modeled based on project template results from cross-shore SBEACH model simulations. Developed a GIS database of existing data for the study area including shorelines, beach profile surveys, inlet/offshore multi-beam surveys, and vibracores. Assisted in developing the plan for offshore borrow area geotechnical data collection required for the project. Compiled historical volume change data from previous monitoring efforts dating back to 1999 and calculated volume changes, where absent, using BMAP for analytical analysis to determine future beach volume needs based on prior history.

North Carolina Beach and Inlet Management Plan, Statewide, NC. As coastal EIT, she assisted the development of a comprehensive beach and inlet management plan (BIMP) identifying potential strategies to maintain beach and inlet characteristics at levels determined from analysis of historic, current, and forecasted future positions and composition. Gathered data (beach profile & bathymetric surveys, wave, tide, storm, aerial photography, historic shoreline positions, geologic (sediment), sediment budgets) and created and populated a statewide beach nourishment GIS database providing nourishment location, date, extent, quantity, source, total project cost, project sponsor, and method of material delivery to site (pipeline, hopper dredge, etc.). Also created and populated a statewide coastal structures GIS database recording location, orientation, and structure type. Using these data, she analyzed erosion rates, potential offshore sediment sources, shoreline development and beach management practices. For the project's final report, she wrote multiple sections of final report.

Post-Irene Beach Renourishment Project, Carteret County, NC. Coastal engineer responsible for determination of the amount of material lost during Hurricane Irene. Assisted in determination of beach reaches in most need of nourishment material and development of the nourishment template for these reaches based on the amount of material the County and Towns could afford. Participated in and led weekly construction meetings and site visits. Assisted with verification of material placement quantities based on BD and AD surveys using BMAP and adjustments to the design template given changes in the beach since the plans were created and imprecise placement of material common in nourishment projects. Authored final report.

Lockwood Folly Habitat Restoration – Dredging of the Eastern Channel, Oak Island, NC. Coastal engineer tasked with construction administration for the dredging of Eastern Channel, placement of beach compatible material on Oak Island, and disposal of non-compatible material on Horse Island. Helped develop the front end documents, technical specifications, and construction plans for the project. Led weekly progress meetings at the project site with the dredging contractor and Town of Oak Island officials to facilitate discussion on work completed and upcoming work as well as address any questions or issues from the contractor or Town and discuss any changes to the original construction plans (i.e. changes in beach fill or dredging template) that needed to be made based on daily dredging reports and progress surveys from the contractor. Also, in charge of developing the final project report for the Town of Oak Island.

DOUG HUGGETT

PERMITTING

KEY FEATURES

- Environmental Permitting Process
- Agency Coordination
- Problem Resolution
- Project Management
- Beach Master Plan Development
- Permit Compliance
- Rule Analysis and Interpretation

EDUCATION

MA, Biological Oceanography, Virginia Institute of Marine Science (College of William and Mary), 1987

BS, Biology, Florida Institute of Technology, 1983

AFFILIATIONS

American Shore and Beach Preservation Association

North Carolina Beach, Inlet and Waterway Association.

Mr. Huggett, an environmental permit specialist and project manager for M&N, has 30 years of experience in environmental permitting in North Carolina. He served as the manager of the North Carolina Division of Coastal Management's Major Permit Section for more than 20 years. During this time, Doug managed all aspects of permitting all beach nourishment, inlet dredging, beneficial use and terminal groin projects for North Carolina's oceanfront shoreline. He oversaw permitting and problem-resolution for transportation, port expansion, marina and subdivision development, navigational dredging, living shoreline, docks, and shoreline stabilization projects taking place within North Carolina's coastal zone.

REPRESENTATIVE PROJECT EXPERIENCE

- **Nags Head Beach Nourishment Projects, Dare County, NC.** As CAMA Major Permits Coordinator for the N.C. Division of Coastal Management, was responsible for permit processing and coordination for Town of Nags Head's initial 2011 nourishment event, as well as the 2019 follow-up nourishment event. Responsibilities included problem-resolution and coordination between sponsor and state and federal agencies on issues such as borrow area selections, sediment compatibility analysis, and other project design components. Responsibilities also included working with Town of Nags Head to develop acceptable process for removing nourishment sand that migrated onto adjacent properties. Since 2017, was also responsible for supervising permit compliance before, during, and after project construction.
- **Bogue Banks Master Beach Nourishment Plan, Carteret County, NC.** As CAMA Major Permits Coordinator for the N.C. Division of Coastal Management, was responsible for coordination between sponsor and state and federal agencies of issues such as borrow area selections, nourishment triggers, project frequencies and other project design components for Carteret County's 30-year master nourishment plan for the Towns of Atlantic Beach, Pine Knoll Shores, Indian Beach, Salter Path and Emerald Isle. Also responsible for initial CAMA permit issuance and the development of a new CAMA permit authorization process, in lieu of permit modifications for each separate event, for future nourishment actions.
- **Village of Bald Head Island Terminal Groin, Brunswick County, NC.** As CAMA Major Permits Coordinator for the N.C. Division of Coastal Management, was responsible for permit processing and coordination of the permitting of a terminal groin for the Village of Bald Head Island, the first terminal groin permitted and constructed under the North Carolina General Assembly's 2011 terminal groin legislation Responsibilities included ensuring compliance with all legislatively mandated requirements, coordination and management of the development of the required Environmental Impact Statement, coordination of an inlet management plan including monitoring plan and mitigation triggers to ensure that down-drift properties or communities were not adversely impacted by the groin structure, coordination of permit conditions with applicant's engineer, and issuance of the CAMA permit.
- **Ocean Outfall Repairs, Replacements and Extensions, Dare County, NC.** As CAMA Major Permits Coordinator for the N.C. Division of Coastal Management, was responsible for permit processing and coordination of ocean outfall repairs, replacements and extensions that were necessitated by beach nourishment events. Responsibilities involved coordinating design and timing requirements with the N.C. Department of Transportation (owner/manager of the outfalls), permit issuance, and when required, coordinating variance requests with the N.C. Department of Justice and the N.C. Coastal Resources Commission.

DAWN YORK

PERMITTING

KEY FEATURES

- 17 years of coastal NC experience
- Led the NEPA process for 12 large-scale beach and inlet management projects
- Knowledgeable of State and Federal permit process

EDUCATION

MS, Marine Science, University of North Carolina at Wilmington, 2003

BSc, Biology and Environmental Studies, Minor in Chemistry, 1999

Visiting Scholar, 2001

CERTIFICATIONS AND TRAINING

TogetherGreen, 2008, Conservation Fellow (National Audubon Society)

Intermittent and Perennial Stream Identification for Riparian Buffer Rules, 2006, (Department of Forestry and Environmental Resources, North Carolina State University)

Wetland Determination and Delineation, 2004, (Department of Forestry, North Carolina State University)

Rare Plant Identifications, 2003 (USFWS and NCNHP)

Trained in Wetlands Rapid Assessment Procedure (WRAP)

Professional Training and Experience in Shorebird Surveys and Wetland Delineations

CPR/First Aid, 2008

Certified Boat Operator (< 20 feet), UNC-Wilmington

Ms. York, a senior coastal scientist and project manager for M&N, has been involved in the design, preparation, coordination, and adaptive management of large-scale, multi-disciplinary coastal monitoring, environmental assessment, and comprehensive natural resource management programs for over 16 years. Her experience is associated with environmental permitting requirements for large-scale beach nourishment programs including the management and direction of environmental documentation and permit authorizations in accordance with the State Environmental Policy Act (SEPA) and the National Environmental Policy Act (NEPA). Ms. York received her Bachelor of Science and Master of Science degrees from the University of North Carolina at Wilmington where she conducted three years of extensive sea level rise research on the Cape Fear and Northeast Cape Fear Rivers under the direction of Dr. Courtney Hackney for the US Army Corps of Engineers (USACE) Wilmington Harbor Deepening Project.

In addition to her position as a Coastal Scientist, Ms. York currently serves as the Coordinator for the Cape Fear River Partnership, a coalition of federal, state, industry, private, non-profit organizations working towards the restoration of anadromous fish species in the Cape Fear River watershed. She works closely with fisheries scientists from National Oceanic and Atmospheric Administration (NOAA), US Fish and Wildlife Service (FWS), NC Division of Marine Fisheries and NC Wildlife Resources Commission to implement the goals and targets for restoring fisheries populations in the Cape Fear River. Ms. York has currently raised $3.4 million for the construction of a rock arch ramp at Lock and Dam 2 and 3 in the Cape Fear River to allow fish passage of endangered and federally managed anadromous fish species.

REPRESENTATIVE PROJECT EXPERIENCE

Oak Island Master Beach Nourishment Plan - Environmental Impact Statement (EIS), Brunswick County, NC. Environmental technical lead for the preparation of an EIS for the development and design of the Master Beach Nourishment Plan, a 50-year study to manage and protect the shorelines and inlets of Oak Island. Directly coordinates with the USACE and BOEM as federal lead agencies. Serves as the lead coordinator for the Project Review Team and public involvement during the scoping process.

Environmental Impact Statement (EIS) for the North Topsail Beach Shoreline Protection Project, North Topsail Beach, NC. Environmental project manager and environmental technical lead for the preparation of an EIS for the construction of a five-phased beach nourishment and inlet realignment project. Conducted biological assessments of coastal shorebird and colonial water bird as baseline analysis for permit compliance.

Oak Island Pre-Feasibility Study in Support of a Comprehensive Beach Management Plan, Brunswick County, NC. Project manager and environmental technical lead for the evaluation and documentation of federal and state permitting requirements for a long-term beach renourishment and dune restoration program.

Bogue Banks Master Beach Nourishment Plan - Environmental Impact Statement (EIS), Carteret County, NC. Project manager and environmental technical lead for the preparation of an EIS for the development and design of the Master Beach Nourishment Plan, a 50-year study to manage and protect the shorelines and inlets of Bogue Banks. Directly coordinates with both the USACE and Bureau of Ocean and Energy Management as federal lead agencies. Served as the lead coordinator for the Project Review Team and public involvement during the scoping process. In addition to the preparation of an EIS, Ms. York has assisted in the assessment of direct and indirect cumulative impacts as it relates specifically to the project and within the State of NC.

ZHANXIAN "JONATHAN" WANG, PHD

MODELING

KEY FEATURES

- Data analysis
- Shoreline change modeling
- Cross-shore profile change modeling
- Wave modeling
- Storm surge modeling
- Surface water/groundwater modeling
- Tidal hydraulics:
- Numerical modeling
- Coastal flooding risk analysis

EDUCATION

PhD, Coastal Engineering, University of Florida, 2004

MS, Offshore Engineering, Tianjin University, China, 1997

BS, Ocean Engineering, Tianjin University, China, 1995

AFFILIATIONS

American Society of Civil Engineers

American Shore and Beach Preservation Association

Dr. Wang provides a strong academic background and work experience in coastal hydrodynamics, sediment transport, shoreline change, beach nourishment, coastal structures, and numerical modeling techniques. This experience includes both surface water and groundwater hydraulics. Since joining M& N, he has acquired extensive experience in riverine, estuarine and coastal hydraulics and regularly uses state-of-practice numerical models to analyze those. These models include Delft3D, MIKE Suite, and USACE models (e.g., ADCIRC, RMA-2, RMA-4) to analyze water movement processes.

REPRESENTATIVE PROJECT EXPERIENCE

New Hanover County (NHC) Shoreline Risk Reduction Plan, NC. Lead coastal modeler for the refined modeling of the risk reduction analysis and complete assessments of existing and proposed NHC Coastal Storm Damage Reduction (CSDR) templates. Developed DELFT3D models to provide long-term hydrodynamics, wave, sediment transport and morphological change modeling of each CSDR alternative over five years to support developing optimal beach nourishment templates for NHC beach communities.

Oregon Inlet Sand and Navigation Management Feasibility Study, NC. Lead coastal modeler for the hydrodynamics, wave, sediment transport, morphological change as well as larval transport modeling of Oregon Inlet sand and navigation management plans. Delft3D modeling suite was utilized to provide numerical modeling analysis of proposed Oregon Inlet sand and management alternatives (including but not limited to jetties, groins, optimal dredging, sand bypassing system, and a combination of above) to develop recommendations for feasible options that warrant further study.

Port of Wilmington, Section 203 Navigation Channel Improvement Integrated Feasibility Study and Environmental Impact Statement, Wilmington, NC. Lead coastal modeler for the hydrodynamics, wave, sediment transport, channel and shoreline morphological change as well as water quality modeling of navigation channel deepening impacts on estuarine and coastal environments within Cape Fear River estuary and surrounding area. DELFT3D modeling suite and GENCADE were among the engineering tools utilized to support the formulation and evaluation of channel deepening alternative plans at the site.

NC 12 Interim Highway Improvements, Ocracoke Island, NC. Coastal hydraulic scientist for vulnerability analysis of a 5.5-mile-long section of NC 12 within the Cape Hatteras National Seashore Recreation Area. Performed beach profile changes under storm waves using SBEACH. Forecasted probabilistic future shoreline positions using the U.S. Army Corps of Engineers' Empirical Simulation Technique (EST) model with a risk and frequency-based approach.

Master Beach Nourishment Plan, Town of Oak Island, NC. Lead coastal modeler for numerical modeling of Lockwoods Folly Inlet and adjacent Holden Beach and Oak Island shorelines. Developed DELFT3D models to provide long-term hydrodynamics, wave, sediment transport and morphological change modeling for inlet and shoreline management. The objectives of the project include determining the sediment needs and locations of available sand for the next 30 – 50 years, completion of all engineering and environmental studies required to acquire the permits for the Master Plan, and providing engineering design services for the initial project as well as FEMA documentation for an engineered beach.

YONG CHEN, PhD, PE

MODELING

KEY FEATURES

- 30+ years of coastal engineering project experience
- Coastal numerical and physical modeling for preliminary navigational channel design, harbor layout design, marina and beach protection design in China, U.S. and international
- Beach nourishment design for more than 10 beach nourishment projects in U.S. and international
- Preliminary marina design for more than 10 marina projects in U.S. and international
- Jetty/groin and breakwater design for 8 coastal engineering projects in China, U.S. and international
- Coastal project management in China and U.S.

EDUCATION

PhD, Civil and Structural Engineering, Hong Kong Polytechnic University, 2001

MS, River and Coastal Engineering, Nanjing Hydraulic Research Institute, 1990

BS, Harbor and Waterway Engineering, Hohai University, 1984

REGISTRATION

Professional Engineer:
Florida, #82318, 2017

Dr. Chen's consulting experience in all phases of coastal engineering projects involving planning of field investigations and processing of field data from hydrographic surveys, geotechnical and wave/current gauges; navigation channel planning; port and harbor planning and sediment dredging analysis; FEMA coastal floodplain mapping; wave statistical analysis, wave transformation, storm surge analysis and sediment transport analysis; structural design projects involving riprap shore protection, breakwaters, jetties, single point mooring systems, marina basins, dredging, and beach nourishment and management.

Dr. Chen has extensive experience in developing and applying software packages for numerical model simulations of coastal processes. He has applied the DHI MIKE21 modules, Delft3D modules and other two-dimensional and three-dimensional coastal numerical models for wave transformation, hydrodynamics, sediment transports, flushing analysis, dredging plume, coastal processes and morphology, and shoreline change evaluation. The 3-dimentional coastal sediment transport model (3DCSTM) developed by Dr. Chen has been successfully applied for challenging coastal engineering projects in China and USA.

REPRESENTATIVE PROJECT EXPERIENCE

Town of Sunset Beach, 2016 Shoreline Management & Pre-Dredged Analysis, 2D Hydraulic Modeling, Town of Sunset Beach, NC. Lead coastal modeler. Coastal engineering responsible for hydraulic estimation to show that the proposed dredging work in Jinks Creek will not create additional shoaling in the Atlantic Intracoastal Waterway crossing, and not create additional scour to alter the creek's historical alignment after project construction.

Chesapeake Beach Nourishment Template Design, Virginia Beach, VA. Lead coastal modeler. Coastal engineering responsible for 300,000 cubic yard beach nourishment project. Conducted beach nourishment template conceptual design. Analyzed sediment transport, shoreline performance and beach renourishment intervals.

Ocean Park Beach and Cape Henry Beach Nourishment Template Design – Conceptual Engineering Designs, Virginia Beach, VA. Coastal engineer responsible for beach nourishment template conceptual design, longshore sediment transport and shoreline evolution.

Munden Point Shoreline Stabilization, Virginia Beach, VA. Coastal engineer responsible for design and construction documents for shoreline stabilization along select reaches of the Munden Point Park. Alternatives developed include a living shoreline with rock sill and a riprap revetment, with consideration to permitting, constructability, schedule, availability of materials, subsurface conditions and cost.

Ocean View Shoreline Periodic Survey and Analysis, Norfolk, VA. Coastal engineer for twice-yearly spring and fall surveys and monitoring reports along Norfolk's seven-mile-long Chesapeake Bay shoreline. Conducted volume change and shoreline change calculations on survey profile data and provided technical reports summarizing the beach condition for each monitoring period, including post-construction monitoring of Norfolk's Coastal Storm Damage Reduction federal beach nourishment project.

Croatan Beach Sediment Budget Analysis, Virginia Beach, VA. Coastal engineer responsible for providing a study of the sediment budget at Croatan Beach, and assessment of impacts on current inlet practices and beaches north of the Inlet.

Toler Place Breakwater Modifications, Norfolk, VA. Lead coastal engineer. Performed conceptual alternative development, wave transformation modeling, shoreline/morphological modeling using Delft3D model and 3DCSTM model. JPA permit application.

AYSE KARANCI, PhD

ECONOMIC ANALYST

KEY FEATURES

- Coupled human-nature systems
- Climate change
- Resiliency
- Soft-engineered coastal protection

EDUCATION

PhD, Civil Engineering, North Carolina State University, 2017

MSc, Coastal Engineering, Middle East Technical University, Turkey, 2011

BS, Civil Engineering, Middle East Technical University, Turkey, 2008

Dr. Karanci provides engineering and GIS support for morphological storm impact analysis, shoreline and beach volume change analysis, development of shoreline stabilization and beach nourishment projects, analysis of borrow area and native beach sediment data. Her coastal modeling experience has involved the use of XBeach, SBEACH, BMAP, and ADCIRC.

Before joining Moffatt & Nichol, Dr. Karanci earned her PhD from North Carolina State University. During her PhD studies, she developed an agent-based coastal town model that can simulate coupled evolution of coastal landforms and housing dynamics. She implemented this model to evaluate the impacts of sea level rise, nourishment design options and possible shoreline management policies using the Town of Nags Head as study area.

REPRESENTATIVE PROJECT EXPERIENCE

Oak Island Master Beach Nourishment Master Plan - Year 1: Initial Project and FEMA Engineered Beach, Town of Oak Island, NC. Coastal scientist responsible for compatible sand search and storm impact analyses. Analyzed data from a combination of sediment sources (including offshore sites, AIWW sites, and upland sites) that would meet the nourishment needs for the design alternatives. Carried out SBEACH and XBeach calibrations for storm impact estimations. 1

New Hanover County - FY 18 Wrightsville Beach Coastal Storm Damage Reduction Project, Wrightsville Beach, NC. Coastal scientist assisting the storm impact analysis. Examined profile response to various storm scenarios using SBEACH.

Post-Matthew FEMA Emergency Dune Restoration Project, Town of Oak Island, NC. Coastal scientist assisting the field investigations to nourish beaches impacted by Hurricane Matthew. Aided with material placement verification using AD and BD surveys. Carried out temperature and sand color monitoring studies.

Bogue Banks Beach Nourishment Master Plan - Optional Tasks, Carteret County, NC. Coastal scientist responsible for preparation of beneficial dredge material placement proposal submitted to USACE.

Research Assistant, Teaching Assistant at North Carolina State University, Raleigh, NC. (August 2012 - December 2017). Projects:

- Developed agent-based model for coastal resort town and provided its integration with geospatial data.
- Conducted storm impact simulations to evaluate alternative dune designs for development of dune design criteria.
- Explored the influence of land cover on storm impact vulnerability of the dunes to enhance resilience of the coasts.

Decision Making Coaching Team Member, Southeast Climate Center, US Geological Survey (May 2013 - Feb. 2014). Aided the decision-making coaching team during the decision framework development and elicitation process.

SAM MORRISON

BIDDING & CONSTRUCTION

KEY FEATURES

- Contract Creation & Negotiation
- Strategic Planning & Implementation
- Project Management
- P&L Management
- Cultural Awareness
- Team Building

EDUCATION

BS, Construction Management, Purdue University, Indiana, 1989

CERTIFICATIONS

OSHA 40-Hour
HAZWOPER

AFFILIATIONS

American Shore and Beach Preservation Association (ASBPA)

Western Dredging Association (WEDA)

Mr. Morrison is a dynamic construction project manager with history of leading multi-million-dollar projects to timely and effective completion. Mr. Morrison's 29-year career has involved expertly managing profit & loss (P&L), project resources, and engineering staff in US-based and overseas operations. Excellent track record of managing multiple operations, including project planning, estimating, bidding, and administration. Cultivate and maintain effective business relationships with key executive stakeholders across enterprise accounts. Enforce quality control and adherence for private and municipal clients.

REPRESENTATIVE PROJECT EXPERIENCE

Hillsboro/Deerfield Beach Renourishment Project, Hillsboro/Deerfield Beach, FL. Area Manager responsible for overall construction and compliance for the renourishment of Deerfield Beach and Hillsboro Beach in the early spring of 2011. The project involved the renourishment of approximately 1.2 miles of shoreline with some 340,000 CY of sand borrowed from a nearshore borrow area. The project was complete utilizing a Cuter Suction Dredge (hydraulic dredge) that pumped the material directly to the beach. Responsible for overall estimating, procurement, contract management, contract and environmental compliance, and overall P&L of the project. Project value $5.5M

Beach Erosion Control and Hurricane Protection Project, Dade County Florida, Beach Renourishment 2011, Miami Beach – Contract E, Miami Beach, FL. Area Manager and Project Sponsor for the renourishment of approximately 1 mile of beach comprising of three segments. The primary segment involved the placement of approximately 250,000 CY of material from an offshore borrow site 11.2 miles from the placement site. This portion of the project was executed utilizing a hopper dredge. The other two smaller segments, 1,000 feet and 55,000 CY each, were done with what was identified as back-passing. Material was taken from an accreted area of South Beach and removed from the beach by mechanically excavating the material then slurrying it to pump it hydraulically to the renourishment site. Responsible for the proposal process, the back-passing plan and methodology, contract and environmental compliance. Also led all effort with regard to the tender and procurement process up to where the project was awarded based on "best value" to our team. Project Value $16M

South County Beach and Dune Restoration Project, St. Lucie County Hutchinson Island South, FL. Area Manger & Project Sponsor for the beach Nourishment project that involved the placement of approximately 500,000 CY of material from an offshore borrow areas with placement along over 3 miles of beach. The material was obtained from an offshore borrow source and transported to the placement site utilizing a hopper dredge. There were strict environmental constraints on the project especially with endangered species and hard bottom protection. Responsible for overall project compliance and adherence to the contract and environmental requirements. Project Value $6.5M

Miami Harbor Deepening Phase III, Port Miami, Miami, FL. Area Manager and Project Sponsor for the development of the dredging plan and RFP tender for the $205M Phase III deepening project. This project involved the deepening of the Entrance Channel and South Harbor to -50' to accommodate post panama class vessels. This project had very strict environmental controls which called for ingenuitive measures on maintaining those controls and liaising with the Agencies. Led effort to develop a project specific Environmental Management team to oversee and QC the environmental controls that were put in place for the project. Also led all effort with regard to the tender and procurement process up to where the project was awarded based on "best value" to our team. The project ultimately was successfully completed on time and within budget.

DAVE BERNSTEIN, CH, PLS, GISP

SURVEYOR

KEY FEATURES

- Hydrographic & Shoreline Surveys
- Acting Lead Hydrographer on Over 100 Independent Task Orders For USACE, US Navy, NOAA and the USGS
- Instrument Expertise Includes Multibeam, Singlebeam, Sidescan Sonar, Sub-Bottom and Magnetometer, RTK-GNSS Survey Positioning and Topographic Survey

EDUCATION

MS, Marine Geology, NC State University, 2002

BA, Environmental Geo-Science, West Virginia University, 1999

REGISTRATION

Professional Land Surveyor:

North Carolina Professional Land Surveyor (#L-5151)

GIS Professional (GISP)

Mr. Bernstein is a geospatial mapping specialist, NSPS-THSOA Certified Hydrographer, Professional Land Surveyor, and GIS Professional. He excels in the field of coastal geographic information science including the collection, processing, and analysis of high-density spatial data derived from sophisticated marine, airborne, and land-based instrumentation systems. Dave is actively involved in all stages of hydrographic and topographic survey: design, implementation, processing, and reporting. His specialized background in coastal geology and beach morphology ensures that surveys are planned and executed with the highest data quality standards in place.

REPRESENTATIVE PROJECT EXPERIENCE

Hydrographic Surveying IDIQ for USACE Wilmington District, NC. Geodynamics is contracted by the USACE Wilmington District for hydrographic survey services including topo/bathy beach profiles at Rodanthe, Fort Fisher, Carolina Beach, and Ocean Isle. Surveys have also included multibeam, singlebeam, and topographic data acquisition for inlets including Oregon Inlet, Carolina Beach Inlet, and Cape Fear River with creation of seamless topo/bathy elevation models of these complex nearshore shoaling environments Mr. Bernstein was responsible for hydrographic survey design & acquisition, advanced hydrographic data processing in CARIS HIPS/SIPS, QA/QC of instrument calibration and patch test. Lead GIS analyst, metadata author and QA/QC of all data processing routines. Geodynamics has served the District under this contract since 2006.

Multibeam Hydrographic & Geophysical Surveys: Oak Island Master Beach Nourishment Plan (2019), Oak Island. NC. Geodynamics performed three phases of high-resolution surveys of the seafloor surface and sub-bottom for several areas in Long Bay, North Carolina as part of a large-scale effort to locate potential sand resources for future beach nourishment projects. Surveys included multibeam with acoustic backscatter, sidescan, sub-bottom sonar and magnetometer; data were analyzed for object detection and archaeological analysis, and sub-bottom profiles were assessed to determine sediment distribution and volume available. Mr. Bernstein was responsible for survey planning, oversight of GIS deliverables.

Topo-Bathy Beach Profiles of Carteret County, NC. Geodynamics has completed comprehensive annual shoreline surveys of Bogue Banks, Bear Island, and Shackleford Banks since 2008 with Moffatt & Nichol to support regional sediment management, beach nourishment, and coastal engineering needs. Post-storm surveys are initiated following a natural disaster declaration to measure volumetric change for FEMA reimbursement. Data is acquired on stationed profiles and extend to approximately -30' MLLW. Accurate change data is captured across the entire profile; especially offshore where large volumes of sand movement are observed in this beach environment. Mr. Bernstein was responsible for survey design, data QA/QC, data processing, report and GIS deliverables.

Shoreline Mapping and Monitoring of New Hanover County Beaches, NC. Geodynamics has completed annual beach profile surveys for New Hanover County as part of a five-year annual erosion monitoring program that includes Wrightsville Beach, Kure Beach, Masonboro Island, Ft. Fisher and Carolina Beach. Surveys measure volumetric rates of change, track movement of sand in the longshore and cross-shore direction and compare beach conditions for purposes of evaluating beach nourishment efforts. He was responsible for survey design, data QA/QC, data processing, report and GIS deliverables.

CHRIS FREEMAN, PLS

SURVEYOR

KEY FEATURES

- 21 Years of Experience in Coastal Geology in Data Acquisition and Analysis
- Hydrographic & Coastal Surveys Offshore & Dynamic Tidal Inlet Environments
- Has Completed Over 100 Independent Task Orders For USACE, U.S. Navy, NOAA, and the USGS
- Managed 10 Hydrographic Survey Projects for State Government Agencies

EDUCATION

BS, Environmental & Earth Science, UNC-Wilmington, 1995

MS, Marine Geology, UNC-Wilmington, 2001

REGISTRATION

Professional Land Surveyor:

NC Professional Land Surveyor

(#L-5119

TRAINING

USGS Advanced ADCP Applications Training

AAUS & NOAA Research Diver

Mr. Freeman has managed coastal and nearshore studies throughout the Atlantic and Gulf of Mexico, including high-resolution hydrographic mapping for sediment transport modeling, coastal change analyses and habitat classification, inlet and headland-related tidal hydrodynamics, and the quantification of shoreline processes through 4D shoreline change analyses. As President and co-founder of Geodynamics, he has provided technical oversight and project management for all hydrographic and topographic survey projects, using interferometric, mulbeam, singlebeam, and sidescan sonar and 3D beach/nearshore mapping techniques using RTK-GPS and topographic survey.

REPRESENTATIVE PROJECT EXPERIENCE

NC 12 - Ocracoke Island Hotspots Update, Ocracoke, NC. Senior coastal engineer who provided updates to existing coastal erosion analysis for a vulnerability analysis of a 5.5-mile-long section of NC 12 located within Cape Hatteras National Seashore Recreation Area. Effort included the review of potential project alternatives to prevent the highway from damage during the near future.

Hydrographic Surveying IDIQ for USACE Wilmington District, NC. Geodynamics is contracted by the USACE Wilmington District for hydrographic survey services including sand resource surveys at Rodanthe and Topsail Island, and channel deepening survey of Charleston Harbor, SC. Surveys have also included multibeam, sidescan, singlebeam, and topographic data acquisition. Deployed sound velocity probe, tide gauges, and geophysical equipment. He provided project management, survey design, technical oversight.

Engineering & Hydrographic Survey IDC for USACE Norfolk District, VA. Geodynamics provides hydrographic and geodetic surveying under an ongoing long-term contract for the Norfolk District. Task orders included hydrographic surveys and tidal studies of federal navigation channels, multibeam surveys, and shoreline monitoring surveys for NASA Wallops Island facility. He provided project management, survey design, and technical oversight.

Shoreline Mapping and Monitoring of New Hanover County Beaches, NC. Geodynamics has completed annual beach profile surveys for New Hanover County as part of a five-year annual erosion monitoring program for Wrightsville Beach, Kure Beach, Masonboro Island, Ft. Fisher and Carolina Beach. Surveys measure volumetric rates of change, track movement of sand in the longshore and cross-shore direction and compare beach conditions for purposes of evaluating beach nourishment efforts. He provided project estimation and management, survey design and oversight.

Multibeam Hydrographic & Geophysical Surveys: Oak Island Master Beach Nourishment Plan, Oak Island, NC. Geodynamics performed three phases of high-resolution surveys of the seafloor surface and sub-bottom for several areas in Long Bay, North Carolina as part of a large-scale effort to locate potential sand resources for future beach nourishment projects. Surveys included multibeam with acoustic backscatter, sidescan, sub-bottom sonar and magnetometer; data were analyzed for object detection and archaeological analysis, and sub-bottom profiles were assessed to determine sediment distribution and volume available. Mr. Freeman was responsible for project estimation and management, BOEM reporting and permit management.

Hydrographic Surveys for Dredge Clearance Planning & Verification, Atlantic Beach, NC. Geodynamics completed multibeam and singlebeam surveys in a network of navigable access channels to establish accurate pre- and post-dredge clearance depth maps and calculate dredge volumes to verify contractor payment amount. He was responsible for project estimation and management, topo/hydro data collection, survey design, GIS and technical oversight.

WALTER SEXTON, PhD, PG

SENIOR GEOLOGIST/SEDIMENTOLOGIST

KEY FEATURES

- Shoreline Erosion
- Coastal Mapping
- Marine Sedimentation
- Pre-Dredge Environmental and Geotechnical Studies
- Modern Stratigraphic Studies
- Groundwater Contamination Assessment
- Coastal Geomorphology
- Mineral Exploration

EDUCATION

PhD, Sedimentology, University of S. Carolina 1987

MS, Coastal Geology, USC (1981), B.S., Marine Science, USC 1977

REGISTRATION

Professional Geologist:

North Carolina, #678

South Carolina, #569

Florida, #PG2594

AFFILIATIONS

American Association of Petroleum Geologists

Society for Sedimentary Geology

National Ground Water Association

Dr. Sexton has over 30 years of experience in providing geological expertise and vibracore expertise in support of similar projects throughout the Atlantic and Gulf Coasts. His areas of expertise include marine sedimentation, pre-dredge environmental and geotechnical studies, modern stratigraphic studies, groundwater contamination assessment, coastal geomorphology, mineral exploration, shoreline erosion, oil spill response and contingency planning, and coastal mapping. Dr. Sexton has extensive experience studying marine sedimentation and performing pre-dredge environmental studies. He has conducted groundwater investigations evaluating contaminant concentrations for metals, PCBs, creosote, hydrocarbons and radionuclides. He has conducted research and managed projects associated with oil spill mapping and assessment, three-dimensional geologic modeling of modern sediments, and sand source evaluations for beach nourishment. He has also conducted numerous mineral surveys to evaluate the economic value of sand and gravel, coquina, heavy minerals, limestone, and peat resources.

Since 1987, Dr. Sexton has led, or co-led, over 250 field courses for geoscientists from both industry and academia. Dr. Sexton's most renowned field course is the week-long Modern Clastic Depositional Environments course, which focuses on the depositional processes associated with fluvial, deltaic, shoreface, and estuarine settings along the South Carolina and North Carolina coastlines.

REPRESENTATIVE PROJECT EXPERIENCE

Subsurface Investigation and Geotechnical Laboratory Testing, Bogue Banks Coastal Storm Risk Management Project Borrow Areas Q2, U, and Y Investigation, Carteret County, NC. Athena collected 190 vibracore samples for a geotechnical evaluation of sediments in 3 offshore borrow areas in Carteret County; Athena provided all vessel support using the company-owned research vessel Artemis, which was outfitted with all vibracore equipment, navigation systems, and RTK instrumentation. Athena was then responsible for geotechnical reporting, including core logging, photography, laboratory oversight for grain size and carbonate, and final reporting of results. Dr. Sexton provided QA/QC guidance and oversaw final report production.

Geotechnical Vibracore Sampling, Folly Beach, Folly Beach, SC. Athena collected 170 vibracore samples for a geotechnical evaluation of sediments offshore of Folly Beach, SC. Athena provided all vessel support using the company-owned research vessel Artemis, which is outfitted with all vibracore equipment, navigation systems, and RTK instrumentation. Athena was then responsible for geotechnical reporting, including core logging, photography, laboratory oversight for grain size and carbonate, and final reporting of results. Dr. Sexton provided project management and oversight and oversaw all aspects of vibracore processing and geological reporting.

Carteret County Navigation Project Sediment Collection & Testing, Carteret County, NC. Athena collected a total of 60 vibracore samples for a geotechnical and environmental evaluation of sediment from 5 separate project areas in Carteret County, Athena provided all vessel support using the company-owned research vessel Artemis. Athena was also responsible for subsequent reporting of environmental results and for preparing a geotechnical report, which included: core logs, core photographs, and laboratory analytical results. Dr. Sexton provided QA/QC guidance and oversaw final report production.

Geotechnical Vibracore Sampling, Nassau Sound, Florida, Amelia Island, FL. Athena collected 53 vibracore samples for a geotechnical evaluation of sediments at Nassau Sound. Athena provided all vessel support using the company-owned research vessel Artemis, which is outfitted with all vibracore equipment, navigation systems, and RTK instrumentation. Athena was also responsible for subsequent geotechnical core processing and reporting; Dr. Sexton provided project management and oversight and oversaw all aspects of vibracore processing and geological reporting.

John Adam Freeze

GEOLOGIST

KEY FEATURES

- Sediment Sampling Project Management
- Geological Data Evaluation and Reporting
- Field Equipment Operation
- In-depth understanding of coastal and fluvial processes

EDUCATION

B.A., Geology and Environmental Geosciences, College of Charleston, 2005

CERTIFICATION

OSHA 40-Hour HAZWOPER Training/ w 8 Hour Refresher

OSHA 30-Hour Construction Safety Training

First Aid/CPR/AED

PADI Open Water Certification

Mr. Freeze joined Athena Technologies, Inc. (Athena) as a geologist in 2009. Prior to joining Athena, Mr. Freeze worked for 3 years as a staff geologist for Golder Associates, Inc. and Handex Consulting & Remediation – SE, LLC. Since 2009, Mr. Freeze's role at Athena has evolved from a purely scientific role to a broader role which now includes directing and coordinating field crews ensuring compliance with health and safety requirements, managing sediment sampling projects with contract values up to $400,000, conducting quality assurance reviews of project deliverables, and geological data evaluation and reporting. Mr. Freeze's project management experience includes projects located throughout the Atlantic and Gulf Coasts, as well as Puerto Rico.

Mr. Freeze has provided project management roles for recent projects in North Carolina at Bogue Banks, Carteret County, Oak Island, and Holden Beach. He has also provided project geologist services for projects at: Kure Beach, Bald Head Island, and North Topsail Beach.

REPRESENTATIVE PROJECT EXPERIENCE

Oak Island Multi-Decadal Master Plan, Sediment Collection and Testing, Brunswick County, NC. Athena collected 27 vibracore samples and 143 surface grab samples for a geotechnical evaluation of sediments in the waters adjacent to Oak Island. Athena provided all vessel support using the company-owned research vessel Artemis, which was outfitted with all vibracore equipment, navigation systems, and RTK instrumentation. Athena was then responsible for geotechnical reporting, including core logging, photography, laboratory oversight for grain size and carbonate, and final reporting of results. Mr. Freeze was responsible for project management, pre-project planning, laboratory coordination, core logging, and geotechnical report preparation.

Subsurface Investigation and Geotechnical Laboratory Testing, Bogue Banks Coastal Storm Risk Management Project, Borrow Areas Q2, U, and Y Investigation, Carteret County, NC. Athena collected 190 vibracore samples for a geotechnical evaluation of sediments in 3 offshore borrow areas in Carteret County. Athena provided all vessel support using the company-owned research vessel Artemis, which was outfitted with all vibracore equipment, navigation systems, and RTK instrumentation. Athena was then responsible for geotechnical reporting, including core logging, photography, laboratory oversight for grain size and carbonate, and final reporting of results. Mr. Freeze was responsible for project management, pre-project planning, laboratory coordination, core logging, and geotechnical report preparation.

Folly Beach and Sullivans Island, Subsurface Investigation and Geotechnical Laboratory Testing, Folly Beach, Charleston County, SC. Athena collected 140 vibracore samples for a geotechnical evaluation of sediments in 2 offshore borrow areas in Charleston County at Folly Beach and Sullivans Island. Athena provided all vessel support using the company-owned research vessel Artemis. Athena was then responsible for geotechnical reporting, including core logging, photography, laboratory oversight for grain size and carbonate, and final reporting of results. Mr. Freeze was responsible for project management, pre-project planning, laboratory coordination, core logging, and geotechnical report preparation.

Carteret County Navigation Project Sediment Collection & Testing, Carteret County, NC. Athena collected a total of 60 vibracore samples for a geotechnical and environmental evaluation of sediment from 5 separate project areas in Carteret County. Athena provided all vessel support using the company-owned research vessel *Artemis*, which is outfitted with all vibracore equipment, navigation systems, and RTK instrumentation. Athena was also responsible for subsequent reporting of environmental results and for preparing a geotechnical report, which included: core logs, core photographs, and laboratory analytical results. Mr. Freeze was responsible for pre-project planning, laboratory coordination, core logging, and geotechnical and analytical report preparation.

STEVE HUDSON, PG, CWC

SENIOR GEOLOGIST

KEY FEATURES

- Drilling
- Geotechnical Testing and Soil Classifications
- NC Certified Well Contractor – Level A
- CPT, DPT, SPT, Vibracore
- Coastal NC Expertise

EDUCATION

BS, Geology UNC Wilmington, 1993

REGISTRATION

Professional Geologist:

North Carolina #1583, 1997

NC Certified Well Contractor - Cert. No. 2161-A

AFFILIATIONS

Association of Environmental & Engineering Geologists (AEG)

Mr. Hudson is well versed in conducting geotechnical investigation operations at NCDOT facilities. Project responsibilities have included performing drilling, geotechnical testing and soil classifications, soil and groundwater sampling techniques, and construction of groundwater monitoring well networks. Mr. Hudson is extremely knowledgeable of drilling operations including hollow-stem auger methods, Direct Push Technology (DPT), CPT, vibracoring, mud and air rotary methods, rock coring, and Shelby Tube sampling, to name a few. He is manager of all CATLIN North Carolina drilling operations. Mr. Hudson prepared subsurface and surface field mapping, technical reports, geotechnical sampling and testing, and other field activities necessary for the completion of these projects. He is proficient in Microstation and gINT for the preparation of accurate project drawings. Steve has completed hundreds of projects in the NC Coastal Plain physiographic province and has served as project manager/field supervisor for NCDOT Geotechnical projects since 1997.

REPRESENTATIVE PROJECT EXPERIENCE

Sunset Beach Pre-Dredge Analysis, Sunset Beach, NC. Project Manager/Senior Geologist, Steve oversaw the project from start to finish including soil laboratory analysis. CATLIN crews conducted pre-dredge sediment sampling and analysis for the proposed dredging project near Sunset Beach, NC. Steve coordinated field crews and equipment to advance 22 vibracore borings (cores) and collect 15 benthic samples along six (6) proposed dredge areas near Sunset Beach including Mary's Creek, Turtle Creek, Jinks Creek, North Shore Drive Feeder Canal, Canal Street Feeder Canal, and Finger Canals A, B, C, and D. Steve prepared the report including boring logs in gINT, site plans and subsurface inventory.

Sloops Channel Sediment Sampling and Analysis, Dare County, NC. Project Manager/Senior Geologist, As Project Manager, Steve prepared the cost estimate, oversaw all project activities and prepared the report documenting our subsurface investigation. CATLIN assisted NCDOT by providing sedimental sampling and characterization in the Pamlico Sound near the town of Hatteras. CATLIN provided Vibracore sediment sampling, laboratory analysis and reporting. Project activities included, boring layout, property owner contacts, advancement of Vibracore Soundings at five locations, geotechnical laboratory testing and reporting.

B-2500B - Bridge on NC 12 (-2014B-) over the Pamlico Sound, Dare County, NC. Project Manager/Senior Geologist, Steve oversaw all activities and prepared the investigation report. Design Build Investigation Report conducted by CATLIN consisted of the installation of the advancement of over 3,000 feet of SPT borings and 2,700 feet of Cone Penetration Testing (CPT) borings along the proposed bridge over the Pamlico Sound. Borings depths averaged approximately 150 feet deep and were advanced from jack-up and spud barges.

Ocean Isle Beach Terminal Groin, Ocean Isle Beach, NC. Lead Geologist, Steve led the subsurface exploration performed for the proposed new sheet pile wall tie in portion of the terminal groin on the east end of Ocean Isle Beach. CATLIN collected and evaluated subsurface geotechnical information from the project site in order to determine the soil parameters and recommendations to be used in design of the proposed terminal groin sheet pile wall.

NCDOT Hatteras and Ocracoke Floating Docks, Dare and Hyde County, NC. Project Manager/Senior Geologist, Steve oversaw all project activities from cost estimate preparation to final report delivery. CATLIN conducted a Subsurface Geotechnical Investigation and Inventory Report for a proposed floating dock at two ferry terminals. Activities included boring layout, advancement of SPTs, geotechnical laboratory analysis and reporting.

Joseph Lee Stone, PG

SENIOR GEOLOGIST

KEY FEATURES

- Significant Coastal NC Experience
- Knowledgeable in all aspects of Coastal Drilling

EDUCATION

MS, Geology, University of North Dakota, 2002

BS, Geology, UNC Wilmington, 1999

BS, UNC Wilmington, Environmental Science, 1999

REGISTRATION

Professional Geologist:

North Carolina #2007, 2005

AFFILIATIONS

Association of Environmental & Engineering Geologists (AEG), Carolina Geological Society (CGS)

Mr. Stone has over 15 years of experience in planning, coordinating and overseeing simple to very complex geotechnical investigations. Lee has completed numerous subsurface investigation projects for roadway and structure foundations and retaining walls. He is an experienced senior geologist and project manager. He worked for the NC Department of Transportation, Geotechnical Engineering Unit for 13 years as a Transportation Engineering Geologist and Project Geological Engineer. He supervised a team of Geologists and Engineering Technicians in the collection of geotechnical data along project corridors, developed investigation guidelines in order to insure the appropriate collection of data and applied sound geological and engineering principles in order to develop subsurface inventory and design recommendation reports. He is proficient in preparing project cost estimates and meeting project schedules and budgetary requirements. He has a broad range of experience conducting subsurface investigations for projects.

REPRESENTATIVE PROJECT EXPERIENCE

R-5014 - SR 1217 from End to US 158, Kill Devil Hills, NC. Senior Engineering Geologist, Lee provided the subsurface inventory and analysis for this NCDOT project, Roadway Inventory and Foundation Design Recommendations investigation and reporting for the proposed widening and realignment of a roadway located in the Outer Banks of North Carolina near Kitty Hawk. Field investigation included the advancement of approximately 100 SPT and Hand Auger borings along the proposed alignment resulting in over 1,000 linear feet of borings. A Retaining Wall Inventory and Foundation Design Recommendations investigation and reporting were also conducted during the completion of this project.

NCDOT Hatteras and Ocracoke Floating Docks, Dare and Hyde County, NC. Senior Engineering Geologist, Lee assisted with preparation of the subsurface investigation report. CATLIN conducted a Subsurface Geotechnical Investigation and Inventory Report for a proposed floating dock at two ferry terminals. Activities included boring layout, advancement of SPTs, geotechnical laboratory analysis and reporting.

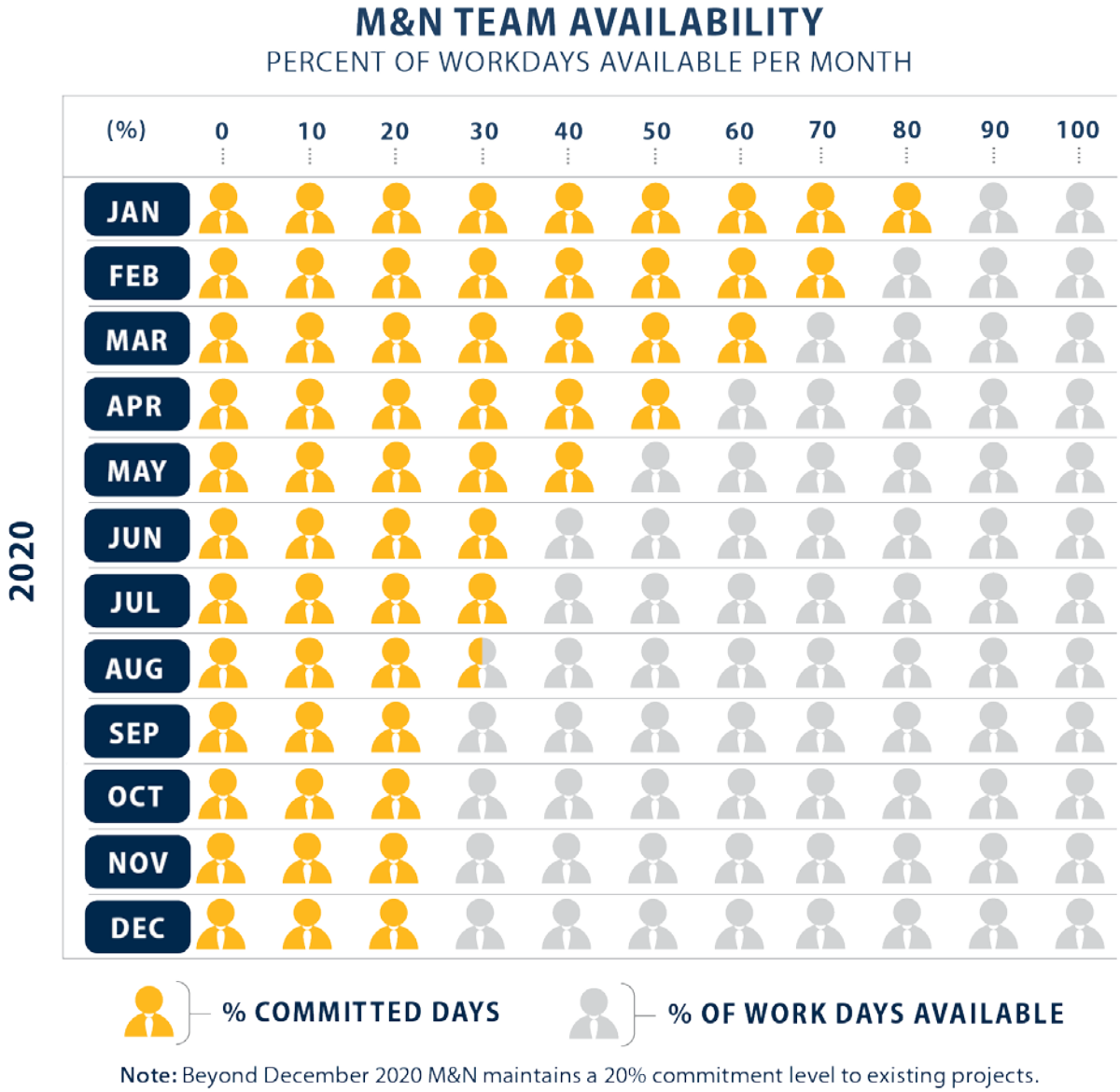
P 1387F – Onslow Beach Bridge Replacement, Onslow County, NC. Project Manager/Senior Engineering Geologist, Lee oversaw all project activities from scope development, preparation of a cost estimate to scheduling and project reporting. CATLIN prepared a Geotechnical Site Characterization Report that summarized the findings of the subsurface investigation, particularly those that may influence the design and construction of the planned bridge replacement and approaches at Onslow Beach aboard Marine Corps Base (MCB), Camp Lejeune.

P 1505F – Railroad Trestle Replacement, Onslow County, NC. Project Manager/Senior Engineering Geologist, egin the resume entry for this project by describing your role, for example Civil engineer, Project manager followed by what you did (your primary responsibilities) on this project. Include additional responsibilities as appropriate. Conclude with a brief project scope. Ideally try and connect your role and primary work to the overall project's scope. (Body Copy).

B-2500B - Bridge on NC 12 (-2014B-) over the Pamlico Sound, Rodanthe, NC. Senior Engineering Geologist, Lee assisted with the structure subsurface field investigation and reporting. The project included Design Build Geotechnical Subsurface Investigation for approximately 0.4 miles of roadway and 2.5 miles of bridge across the Pamlico Sound extending from the Pea Island National Wildlife Refuge to the town of Rodanthe. The structure subsurface field investigation included the advancement of 20 SPT and 18 CPT borings within the Pamlico Sound to depths ranging from approximately 80 to 150 feet below the sound bottom. All structure borings were advanced from floating platforms including sectional and jack-up barges. The roadway subsurface investigation included the advancement of seven (7) SPT borings to depths ranging from 50 to 150 feet below land surface. Reports included the submittal of SPT and CPT borings logs and boring plans along the proposed project.

TEAM CAPACITY & AVAILABILITY

Although we have assigned a highly specialized, local team with unique technical expertise from our more than 100 professional and technical staff located within our Raleigh, Norfolk, Morehead City, and Wilmington offices we have access to more than *800 employees, including more than 700 marine and civil engineers and scientists to meet your needs.* Our staff has completed or assisted in shoreline evaluation and mapping, coastal planning, design, and inlet management studies for cities and counties throughout the region including the U.S. Navy, multiple U.S. Army Corps of Engineers (USACE) Districts, and state Departments of Transportation. Through these projects, we have effectively monitored and assisted communities to manage their coastal systems. Our subconsultants also provide additional support with more than 50 additional personnel. The chart below reflects our team's availability to provide the Town of Nags Head with coastal engineering and design services under this contract



Note: Beyond December 2020 M&N maintains a 20% commitment level to existing projects.

PROPOSED PROJECT SCHEDULE

M&N has developed a proposed project schedule for the Town of Nags Head Coastal Engineering and Design Services contract. Our proposed schedule was developed as a result of the requested scope and our experience providing similar services. The proposed schedule is as follows:

Town of Nags Head
Master Beach Maintenance and Monitoring Plan
Project Schedule

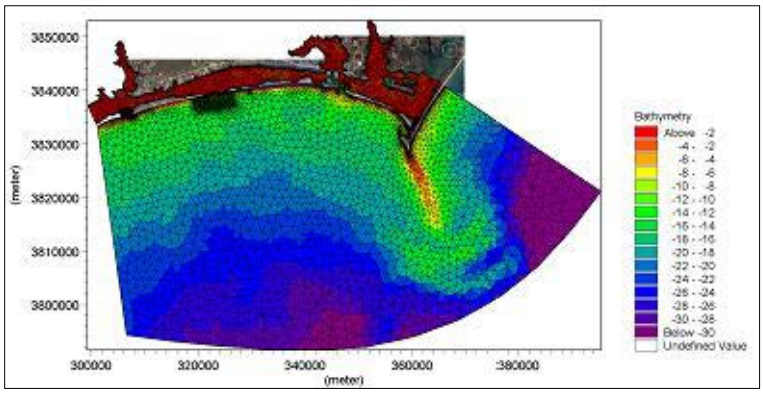
Task	Months From Notice To Proceed																										
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27+
Project Coordination																												
1-Data Collection and Review																												
Data Review																												
Reach Development																												
2-Vulnerability Analysis and Design Options Development																												
Calibrate GenCade/XBeach																												
Anlaysis of Loss Calculations																												
Develop Level of Protection Alternatives																												
Develop Nourishment Needs & Thresholds																												
3-Geotechnical Analysis																												
Borrow Area Evaluation																												
Recipient Beach Evaluation																												
4-Alternative Recommendations																												
Draft Report																												
Final Report																												
5-Permitting																												
Scoping and Coordination																												
Prepare Preliminary & Draft Programmatic EIS																												
Essential Fish Habitat (EFH) Analysis																												
Biological Assessment (BA) - Endangered Species Act																												
Prepare Final Programmatic EIS																												
6-Physical Monitoring Plan																												
7-Economic Analysis and Long-Term Funding																												
8-Bidding, Negotiating, and Construction Phase Services (As-needed)																												

SIMILAR PROJECT EXPERIENCE

The following project descriptions offer additional information regarding M&N's project experience mentioned in the project approach section.

BOGUE BANKS BEACH NOURISHMENT MASTER PLAN

Client: County of Carteret, NC



M&N developed a multi-decadal programmatic Environmental Impact Statement (EIS) that incorporated all of Bogue Banks' beach nourishment and inlet management needs for the next 50 years. In addition to the EIS, the necessary permits were secured to address Bogue Banks' needs and to use specific sand sources for the beach nourishment.

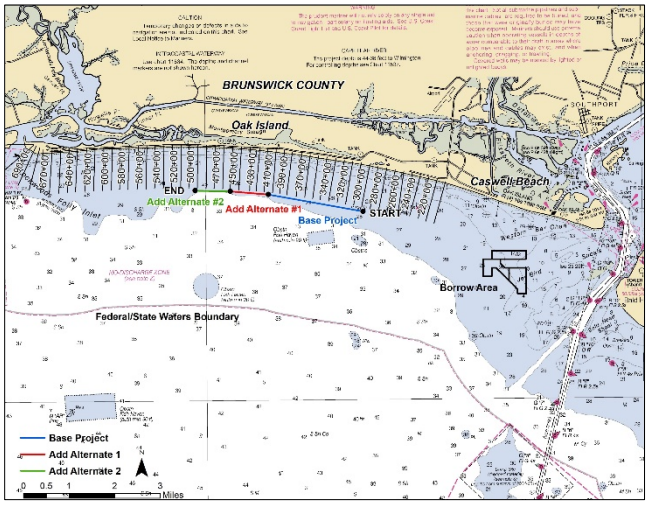
M&N also completed an engineering report to outline the historical regional sediment budget, including the response of shorelines and inlets to natural long-term erosion, storm-induced erosion, and man-made dredging and beach nourishment. The report also determined the desired overall level of protection to be provided across the island and the appropriate nourishment volumes, benchmarks, and reach-based triggers that should be used for the various regions of Bogue Banks to achieve that outcome. To create the protection itself, M&N considered potential U.S. Army Corps of Engineers' short- and long-term local navigation dredged material management plan strategies, as well as work efforts completed by the Corps as part of its long-term project study.

The Bogue Banks Beach Nourishment Master Plan was formulated to meet FEMA requirements for post-storm reimbursement, which required M&N to coordinate with FEMA. The master plan was also designed to comply with NCDCM static line exception requirements.

The first nourishment project under the 50-year permits was implemented in 2019, immediately following Hurricane Florence. The second nourishment event will take place in early 2020.

OAK ISLAND MASTER PLAN

Client: Town of Oak Island, NC



The Oak Island Master Plan (Master Plan), in development, will create a multi-decadal shoreline protection plan encompassing the 9.25 mile ocean shoreline of Oak Island in Brunswick County, NC. In addition, a maintenance plan for Lockwoods Folly Inlet will be established.

The Master Plan will include a comprehensive review of current beach conditions, a review of past County and USACE beach nourishment and beneficial use projects, and the development of a multi-decadal plan based on volumetric need and minimum thresholds for protection along various reaches of shoreline.

The Master Plan will: (a) establish the volume requirement for the initial project based on a selected level of protection, (b) establish minimum beach volumetric triggers for nourishment events to maintain the selected level of protection, (c) provide a basis for future FEMA reimbursement qualifications, (d) conform to the North Carolina DCM rules for static vegetation line and DCM sediment criteria exceptions, and (e) establish a programmatic approach facilitating the authorization and scheduling of Oak Island nourishment/maintenance events.

OCEAN PARK BEACH NOURISHMENT PERMITTING AND DESIGN

Client: City of Virginia Beach

The City of Virginia Beach sought to construct a beach nourishment project along Ocean Park Beach to enhance coastal storm protection and the recreational beach. M&N provided preliminary and final design, permitting support and prepared bid documents for beach nourishment along Ocean Park Beach, approximately between Rookery Way and the western abutment of the Lesner Bridge. The City's intent was to design the project to be constructed through hydraulic dredging of an area of the Chesapeake Beach Shoal with pipeline placement of dredged sediment on the beach.

NORTH CAROLINA BEACH AND INLET MANAGEMENT PLAN & UPDATE, STATEWIDE

Client: North Carolina Department of Environment and Natural Resources (NCDENR)

For the State of North Carolina, M&N developed a comprehensive beach and inlet management plan identifying potential strategies to maintain beach and inlet characteristics at levels determined from analysis of historic, current, and forecasted future positions and composition. Developed for coastal regions defined by physiography, vulnerability, and natural processes, management strategies were focused on the allocation and stewardship of available sediment resources in an attempt to maintain and prolong the character of North Carolina's shorelines. Specific aspects of the project included:

- Data identification & acquisition
- Beach & inlet management region definition
- Draft management strategy development
- Public review and input
- Final report development

At the conclusion of the project, M&N produced a report presenting study elements and process, proposed management strategies by region, identified potential funding sources, and provided background data supporting the study.

NC 12–Ocracoke Island Erosion Hotspots & Hot Spot Update

Client: North Carolina Department of Transportation

As a subconsultant to the team preparing an Environmental Impact Statement for short- term alternatives for protecting a transportation corridor on Ocracoke Island, M&N provided coastal engineering services for a vulnerability analysis of a 5.5-mile-long stretch of NC 12, the principal roadway along North Carolina's Outer Banks. This erosional "hot spot" is subject to frequent overwashing and damage to the roadway due to high surges and waves experienced during hurricanes and northeasters. The protective dune system has been rendered ineffective by significant losses over time.

M&N completed a complex, risk- and frequency-based numerical modeling approach to predict future shoreline positions in 10, 25, and 50 years using the U.S. Army Corps of Engineers' Empirical Simulation Technique model. This model incorporated both long-term average annual shoreline erosion rates, which were estimated using digitized shoreline positions from aerial photography, and short-term storm-induced shoreline erosion rates, which were estimated using the Corps' SBEACH model. M&N ran the SBEACH model for approximately 35 hurricane and 21 northeaster events to account for the range of storms that Ocracoke Island has experienced. The inputs required by the SBEACH model included surge, wave, and wind hydrographs, which were gleaned from various data sources and previous studies. The results of the modeling were used to develop viable alternatives for near-term sustainability of NC 12, including highway realignments, small-scale beach nourishment, large-scale beach nourishment, and combinations of these.

For the beach nourishment alternatives, M&N completed a thorough review of area sediment sources to identify borrow sources for both small- and large-quantity projects by reviewing U.S. Army Corps of Engineers dredging records and ongoing research. M&N identified two main sediment sources: Hatteras Inlet Channel dredging and offshore sediment near either

Ocracoke Island or Cape Hatteras. M&N also developed opinions of probable costs for both the small- and large-scale nourishment alternatives based on the beach fill volume, borrow site, and necessary dredging equipment.

Following the initial report, Hurricane Isabel crossed the North Carolina coastline immediately southwest of Ocracoke Island. Extensive beach and dune erosion occurred, and significant sections of NC 12 were damaged, covered with sand, or completely destroyed. M&N was asked to evaluate the effects of the hurricane on the island and NC 12 and to update the vulnerability analysis and report accordingly.

City of Norfolk (VA) Indefinite Quantity Contract for Shoreline Protection and Coastal Engineering

Client: City of Norfolk

Under an on-call type contract, M&N has completed shoreline protection tasks including:

East Ocean View Beach Nourishment: Completed planning, preliminary/final design and construction documents for placement of 355,000 cy of sand along 5,300 lf of shoreline. Tasks included optimization of the beachfill template using SBEACH and GENESIS.

Central Ocean View Beach Re-Nourishment: M&N completed planning, permitting, preliminary / final design and construction documents for placement of 428,000 cy of sand along 18,300 lf of shoreline. Tasks included a sand compatibility analysis and SBEACH numerical modeling of several representative beach profiles.

Beach Restoration, 800 Block, Ocean View Beach: For this study, M&N performed a comprehensive study of historical and present conditions at the 800 Block area of Willoughby Spit to determine the cause of erosion and to develop a recommended alternative for future erosion control. The work included complex numeric modeling of the existing system to determine the causes of erosion.

This study involved an intensive review of historical data and engineering activities at the 800 Block area followed by complex numerical modeling of the existing system, all of which aided in the determination of the probable cause of erosion at the study area. The calibrated model was used to evaluate alternatives to mitigate erosion in this area. The recommended alternative included removal of the groin spur and addition of a new breakwater located further offshore. M&N worked with the City during a public outreach effort with the local civic leagues to explain the recommend alternative and the expectations of the project. With the public satisfied, M&N prepared permits and project plans and specifications.

Bay Oaks Hot Spot Beach Restoration Design, Norfolk: Upon completion of a comprehensive study of the Bay Oaks erosional hotspot along the City's Ocean View Shoreline, M&N developed a fully permitted final design for the breakwaters using offshore segmented breakwaters that were 125 feet long and set 140 feet apart to allow sufficient wave energy to penetrate and move sand along the shore. This optimal configuration helped smooth the transition from existing breakwater field while increasing stable beach width along Bay Oaks.

Willoughby Spit Beach Restoration Study

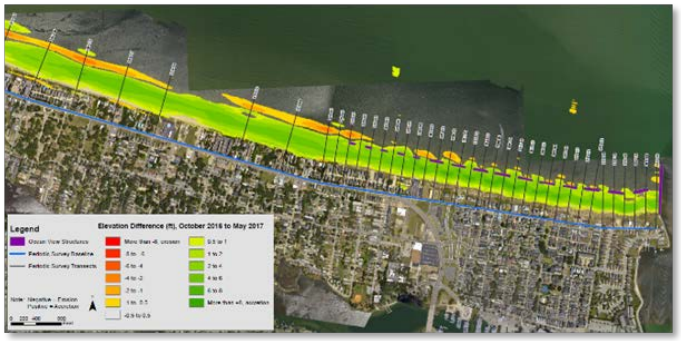
Client: City of Norfolk

M&N performed a detailed study of shoreline erosion at the Willoughby Spit area of Ocean View Beach and developed a recommended alternative for beach restoration and stabilization. The study focused on a terminal groin and the area near 12th View Street, both of which were expected to require solutions. M&N compiled and reviewed existing shoreline, survey, sediment, and shoreline trend data using GIS and analyzed existing wave data. The firm also conducted field reconnaissance of the groins and breakwaters to assess their condition from a structural and coastal performance perspective. The compiled data supported the development of models of the Willoughby Spit system using GENESIS-T, SBEACH, and Delft3D. These models allowed M&N to assess the performance of current shoreline stabilization projects, examine multiple structural and non-structural alternatives for beach restoration, and determine the potential impacts these alternatives would have on the stability of the beach. M&N worked with the city to evaluate the list of alternatives based on a practical application of the alternatives to the site and narrowed the list to a number of selected alternatives for further evaluation. Order-of-magnitude cost estimates were prepared for the selected alternatives. Based on cost estimates for construction and management, potential environmental and shoreline impacts, and potential aesthetic impacts, a recommended alternative was selected. M&N presented its findings and recommendations in a final report.

Beach Nourishment, Breakwaters, and Dune Restoration Along Ocean View Beach

Client: City of Norfolk

M&N assisted the City of Norfolk to stabilize and manage the seven miles of historically eroding shoreline comprising Ocean View Beach. Projects included beach nourishment, dune restoration, constructing nearshore breakwaters, coastal modeling, and periodic surveying and beach change monitoring.



Ocean View Beach, Dune and Nearshore Monitoring: Since 2005, M&N, with Geodynamics as a subconsultant, has provided survey, data analysis, and reporting services to monitor and document the condition the entire shoreline. While working with the USACE Norfolk District, the City succeeded in obtaining Congressional approval, funding, and construction of a Federal Coastal Storm Damage Reduction beach nourishment project. The construction of this project provides very significant storm protection and recreational benefit. The beach and nearshore monitoring data were utilized in designing the Federal project.

Toler Place Emergency Dune Restoration: A section of residential beachfront between 11th View and 12th View Streets was heavily eroded by a series of storms in 2015. The erosion left the homes along Toler Place at a greater than typical risk of damage from storm surge and waves that occur nearly every winter on this shoreline. M&N worked quickly, both before and after the storms to inspect the condition of the beach, to prepare engineering plans and a bid package for an emergency restoration of beach and dune volume.

In collaboration with City staff and Toler Place residents, M&N designed a beach berm and dune restoration project that could be constructed above the Mean High Water (MHW) contour using sand available from a nearby accretional location on the beach. These design features were intentionally included so that no state or federal permits would be required, allowing the emergency project could proceed more quickly.

M&N's coastal engineers supported the City through bidding and construction of the project which was successfully completed in time to mitigate against winter storms that occurred in early 2016.

Ocean View Dune and Sand Management: M&N helped the City evaluate, permit, and communicate with beachfront residents about strategies for managing the dunes in the Cottage Line reach of Central Ocean View, including a short extension into East Ocean View. M&N also participated on the City's Sand, Beach, and Dune Management Plan Steering Committee and prepared additional technical materials as needed to facilitate discussions on managing dunes in Cottage Line. M&N presented the findings of technical studies and provided recommendations to Norfolk City Council, and actively participated in discussions with residents, City staff, and regulatory agencies including VMRC, FEMA, and USACE, in a process intended to address residents' concerns about sand encroachment on their properties while maintaining storm damage protection afforded by the dunes.

Central Ocean View Dune Restoration: M&N provided planning, permitting, and engineering services for beach nourishment, breakwaters, and dune restoration for a 3.5 mile reach of Ocean View Beach which was severely damaged by Hurricane Isabel in 2003. Services included: evaluating sand source alternatives to provide interim property protection, recommending an emergency truck haul using an upland borrow source for interim protection of critical areas, attending Civic League meetings to educate residents about the benefits of the project, planting due grass to stabilize the dune, preparing a dredging alternatives analysis to compare the cost and feasibility of using a hydraulic pipeline and/or mechanical dredge with a hopper dredge within Thimble Shoal Channel, and preparing contract documents.

Borrow material was dredged from Thimble Shoal Channel. Permits for dredging were prepared on an accelerated schedule in order to complete the project prior to the ensuing hurricane season. Extensive coordination with USACE, VMRC, DEQ and the National Marine Fisheries Service was required to deal with sea turtle time-of-year restrictions.

East Beach Restoration: M&N provided planning, permitting, and engineering services to stabilize a one-mile area of the beach which was undergoing redevelopment by the City. Services included: preparing permit applications and drawings on an accelerated schedule, coastal modeling and analyses to determine design life and maintenance cycles, sediment compatibility analysis to determine suitability of proposed borrow areas, attending Civic League meetings to educate residents about the benefits of the project, planting 10 acres of dune grass planting to stabilize the dunes, and preparing contract documents.

Croatan Beach Shoreline Protection Assessment

Client: City of Virginia Beach

After residents expressed concerns that inlet and beach management practices have caused increased beach and dune erosion along the Croatan Beach shoreline resulting in diminished protective and recreational beach width and elevation, M&N studied the long-term behavior of the Croatan Beach shoreline and dunes. M&N determined shoreline, beach, and dune change patterns over time for Croatan Beach, estimated the level of protection currently provided by the beach and dune system to the upland, and made recommendations on the necessity for and purpose of a beach nourishment project. The study also included an evaluation of impacts of Sea Level Rise (SLR) on the dune and the protection it offers. Our team evaluated annual and seasonal sediment budgets for Rudee Inlet and documented impacts of beach management actions on the Federal navigation channel and resort beach nourishment projects. M&N participated in scoping meetings with City and community leaders to develop criteria to guide the analysis and presented study results to neighborhood residents.

Chesapeake Beach Nourishment Template Design

Client: City of Virginia Beach

The City of Virginia Beach retained M&N to provide a study and conceptual engineering designs of alternative beach profile templates for sand nourishment at Chesapeake Beach. Chesapeake Beach is part of the 4.9-mile shoreline segment between Little Creek Inlet and Lynnhaven Inlet, extending from the City's boundary with Joint Expeditionary Base (JEB) Little Creek/Fort Story, past the southern end of the Chesapeake Bay Bridge-Tunnel to Joyce Avenue. M&N assisted the City to prepare for sand nourishment of Chesapeake Beach by providing a recommended beach profile template for nourishment construction that effectively balances shoreline advancement (with associated recreational beach width) with dune height and dune volume for a realistic total nourishment volume.

The study evaluated historical beach volume change and shoreline position change trends, longshore transport rates and gradients, and published data on potential sediment borrow area properties. A numerical shoreline evolution and storm-induced beach profile erosion model was used to evaluate alternative design beach profiles. The study culminated in the recommendation of a design beach and dune profile to provide a level of protection to existing structures from a coastal storm similar to the November 2009 Nor'easter. That storm had peak water levels equivalent to approximately a 40-year return period (2.5 percent annual chance), with depth-limited waves impacting the project area.

The recommended conceptual design for the proposed beach nourishment includes advance nourishment to allow for the expected typical annual shoreline retreat over an estimated four-year interval between planned renourishment events.

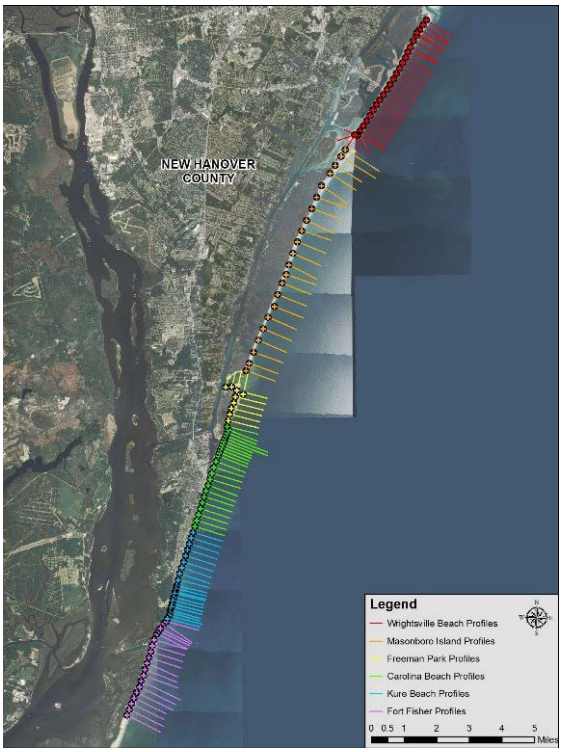
New Hanover County Shoreline Mapping

Client: New Hanover County, NC

M&N developed the New Hanover County Shoreline Mapping Program, a yearly study which monitors the beach conditions in New Hanover County, helping to establish shoreline and volume change trends and optimize future shoreline maintenance strategies. M&N is responsible for overall project management, survey data analysis, and compilation of the final report and presentation of findings. M&N is supported by Geodynamics, who performs the annual beach profile surveys.

This study involved intense analytical analysis of the survey data provided by Geodynamics each survey period. Both shoreline change and volume change are calculated at multiple elevations between subsequent surveys, reflecting the movement of sediment in both the longshore and cross-shore directions. These calculations indicate the erosion and accretion patterns which occur along the New Hanover County shoreline on a yearly basis. Due to multiple CSDR projects performed by the USACE in this region, careful consideration was taken into account for any engineering activities (i.e. sand placement) which take place between surveys and greatly influence results. This consideration allowed for the calculation of background erosion rates along each reach of shoreline, indicating trends which may be expected if shoreline maintenance (i.e. CSDR projects) was not performed.

The following pages include examples of our subconsultants similar project experience, required statements forms and attachments.

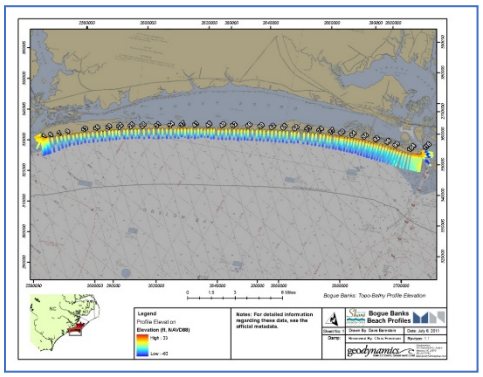


The following project examples reflect our subconsultants previous, similar experience.

Geodynamics Similar Experience

Bogue Banks Nearshore Monitoring Project Topographic and Hydrographic Profiles

Client: Carteret County, NC



Geodynamics was contracted by **Moffatt & Nichol,** through the Carteret County Shore Protection Office for the collection of topographic and hydrographic profile data for Bear Island (18 profiles), Bogue Banks (122 profiles), and Shackleford Banks (24 profiles). The project is part of a 5-yr ongoing annual and post-storm effort to help monitor baseline and post-storm conditions. Tasks include acquiring profile elevation data in a timely manner, with spatial and data-density constraints, and RTK-GPS accuracy requirements.

Geodynamics' willingness to develop a successful monitoring program has included post-storm survey work after Hurricanes Irene, Matthew, Florence, and Dorian providing quick and thorough comparison of pre- and post-storm conditions on which the County has based their FEMA claims. Additional products include developing digital elevation models (DEMs), QA/QC assessments, and calculating volumetric changes alongshore. This project has just been renewed for its third 5 year cycle. Geodynamics has provided services under this contract since 2008 to present.

Athena Technologies Similar Project Experience

Folly Beach and Sullivan's Island Subsurface Investigation and Geotechnical Laboratory Testing

Client U.S. Army Corps of Engineers, Wilmington District

Athena was contracted by the U.S. Army Corps of Engineers, Wilmington District (USACE) to collected 140 vibracores up to 10 feet below sediment surface in borrow areas offshore of Folly Beach and Sullivan's Island in Charleston County, South Carolina. Athena was tasked with vibracore collection, geological logging, photomosaic compilation, oversight of geotechnical laboratory services, and producing a geotechnical report.

R.V. Artemis, Athena's company-owned research vessel, was utilized as the primary sampling platform. This vessel, which was piloted by a U.S. Coast Guard-certified 100 Ton Master Captain, included all necessary vibracore equipment, DGPS and RTK systems, and U.S. Coast Guard mandated safety gear.

CATLIN Similar Project Experience

Sloops Channel Sediment Sampling and Analysis

Client: North Carolina Department of Transportation; Geotechnical Engineering Unit

CATLIN was retained by the NCDOT to provide sedimental sampling and characterization in the Pamlico Sound near the town of Hatteras. CATLIN provided Vibracore sediment sampling, laboratory analysis and reporting. Project activities included, boring layout, property owner contacts, advancement of Vibracore Soundings at five locations, geotechnical laboratory testing and reporting. Boring locations and depths were provided by the NCDOT.

Laboratory testing was performed at CATLIN's NCDOT certified laboratory facility in Wilmington, NC to confirm the field geologist's observations and soil classifications. At selected intervals, Atterberg Limits, Grain Size Analysis with NCDOT modified hydrometer, organic content, and moisture content were performed on selected samples. The samples selected were representative of the predominant lithologic units encountered spatially across the site. CATLIN personnel determined the horizontal and vertical location of proposed and -advanced sounding locations and elevations utilizing a Real Time Kinematics (RTK) Global Positioning System (GPS). All units were recorded and submitted in United States (US) feet to a horizontal accuracy of one foot and vertical accuracy of one-tenth of a foot and referenced horizontally to the North Carolina State Plane (NCSP) North American Datum (NAD) 1983 and vertically to Mean Low Low Water (MLLW). Final deliverables included electronic files of all information used to generate the Final Report including Site Plan, gINT logs, Laboratory Summary Tables, and Graphs.

STATEMENTS & FORMS

Moffatt & Nichol's Anti-Discrimination Statement

M&N maintains a policy of non-discrimination with all employees and applicants for employment. The Company attempts at all times to provide a work environment free from discrimination, harassment, and retaliation. M&N is an Equal Opportunity Employer (EOE) and makes employment decisions on the basis of merit, competence, and qualifications, and prohibits unlawful discrimination based on race/color; national origin/ancestry; citizenship; gender; religion; age; mental or physical disability; veteran status; medical condition including genetic characteristics; marital status; sexual orientation; gender perception or identity; political affiliation; pregnancy; family or medical leave status; or any other consideration made unlawful by federal, state, or local laws. Company policy also prohibits unlawful discrimination based on the perception that anyone has any of those characteristics or is associated with a person who has or is perceived as having any of those characteristics. All such discrimination is unlawful. Equal Opportunity Employer.

M&N acknowledges receipt of addendum 1 and attachment 2 as part of the RFP. The required forms with signature sections associated with the RFP have been included in the following pages. Please note Attachment 1 has an additional statement following the signature page.

Attachment 1

RESPONDENT'S CERTIFICATION FORM

THIS PAGE MUST BE COMPLETED AND INCLUDED WITH THE SUBMITTAL CERTIFICATION

The undersigned hereby certifies, on behalf of the Respondent named in this Certification (the "Respondent"), that the information provided in this proposal submittal to Town is accurate and complete, and I am duly authorized to submit same. I hereby certify that the Respondent has reviewed this RFQ in its entirety and accepts its terms and conditions. I certify that all information contained in this proposal is truthful to the best of my knowledge and belief. * Please see following page with proposed modification

I further certify that I did not either directly or indirectly enter into any combination or arrangement with any person, firm or corporation, or enter into any agreement, participate in any collusion, or otherwise take any action in the restraint of free competition in violation of the Sherman Anti-Trust Act, 15 USCS Sections 1 et seq.; the North Carolina General Statutes Sections 133-24 through 133-31.

I further certify, under oath, that this proposal is made without prior understanding, agreement, connection, discussion, or collusion with any other person, firm or corporation submitting a proposal for the same product or service; no officer employee or agent of the Town of Nags Head or any other respondent is interested in said proposal; and that the undersigned executed this Respondent's Certification with full knowledge and understanding of the matters therein contained and was duly authorized to do so. This is an acknowledgement that FEMA financial assistance will be used to fund the contract only. The Respondent will comply with all applicable federal laws regulations, executive orders, FEMA policies, procedures, and directives. It is distinctly understood that the Town of Nags Head reserves the right to reject any or all proposals

Moffatt & Nichol, Inc.

(Name of Respondent)

(Signature of Authorized Representative

Timothy R. Reid, PE

(Typed Name of Authorized Representative)

Vice President/Business Unit Leader

(Title)

11/25/19

(Date)

moffatt & nichol

4700 Falls of Neuse Road, Suite 300
Raleigh, NC 27609

101 W. Main Street, Suite 800
Norfolk, VA 23510

*** Town of Nags Head's Contract Terms and Conditions**

Moffatt & Nichol (M&N) has reviewed the Town of Nags Head's contract terms and conditions and generally complies. The indemnification requirements, however, are broad and would most likely not be covered by Moffatt & Nichol's insurance. Moffatt & Nichol proposes the language markups below, and at the Town's convenience and if necessary, we are available to discuss these terms in more depth.

U. INDEMNIFICATION AND INSURANCE REQUIREMENTS

1. The Consultant(s) shall ~~defend,~~ indemnify~~,~~ and hold harmless the Town, its officers, employees, agents, and representatives from any and all liability or loss of any nature whatsoever arising out of or relating to the Consultant(s) negligent operations under the Scope of Services and any contract entered into including, without limiting the generality of the foregoing coverage, any negligent act or omission of the Consultant(s), its agents, servants, employees, or invitees in the execution of performance of said contract.

Certification for Contracts, Grants, Loans, and Cooperative Agreements

(To be submitted with each bid or offer exceeding $100,000)

The undersigned Moffatt & Nichol, Inc. [insert name of Contractor] certifies, to the best of his or her knowledge, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

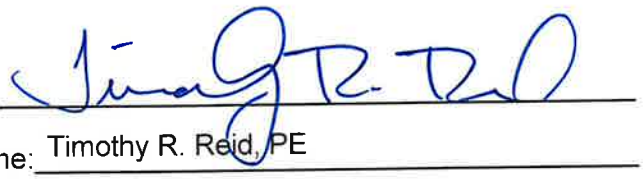
2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form- LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The Contractor, Moffatt & Nichol, Inc. [insert name], certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

Moffatt & Nichol, Inc. [Insert name of Contractor]

By: 

Name: Timothy R. Reid, PE

Title: Vice President / Business Unite Leader

Date: November 25, 2019

REQUEST FOR QUALIFICATIONS FOR

BEACH SURVEYING SERVICES

SUBMITTED TO:

TOWN OF NAGS HEAD | 5401 S CROATAN HIGHWAY | NAGS HEAD, NC
252.441.5508

SUBMITTED BY:

MCKIM & CREED | WILMINGTON, NC
910.343.1048 | MCKIMCREED.COM

McKIM&CREED
ENGINEERS SURVEYORS PLANNERS

McKIM&CREED
ENGINEERS SURVEYORS PLANNERS

November 21, 2019

Mr. Cliff Ogburn, Town Manager
Town of Nags Head
5401 S Croatan Highway
Nags Head, NC 27959

RE: REQUEST FOR QUALIFICATIONS FOR BEACH SURVEY SERVICES

Dear Mr. Ogburn:

McKim & Creed has the largest group of surveyors and geospatial professionals, technicians and specialists in the southeastern US. Our hydrographic survey group located in Wilmington, NC includes hydrographers, boat operators, technicians and surveyors. Beach profile surveys are a large part of the work that this group performs along the East coast. We have completed hundreds of miles of profiles annually in the last 22 years, including performed beach profile surveys throughout the Outer Banks including Nags Head. As a Task Order for the USACE, McKim & Creed established a control network from Oregon Inlet, north to Kitty Hawk that consists of roof top control base station points and calibration points throughout the area. We have three dedicated vessels, capable and ready to perform offshore and nearshore surveys. All data collected and delivered under this contract will be reviewed and checked by a surveyor licensed in the state of North Carolina and by an ACSM/THSOA Certified Hydrographer.

Since 1997, we have been performing beach profile surveys for public and private clients and have constantly and continuously improved our processes and procedures. Today, we can provide a very accurate product at a very competitive fee. Our knowledge of the North Carolina coast, as well as access to the beaches and tidal ranges, means we can be more efficient in getting the project up and running and completed on time. We have been performing annual monitor beach profile surveys, and successfully meeting deadlines for Bald Head Island, Ocean Isle Beach, Debordeau Island and Daufuskie Island for more than 10 years.

Finally, safety is the utmost importance to McKim & Creed, Inc. We have rigid safety procedures developed from thousands of hours of experience working offshore and in the surf zone. Our hydrographic survey team specializes in this type of work and their time is 100% dedicated to hydrographic projects. Our boat operators complete 12 months of observation and training before they are allowed to operate the vessel in the nearshore environment.

Sincerely,
MCKIM & CREED INC

David Jones, CFS, PLS
Regional Manager/Vice President

TABLE OF CONTENTS

McKIM&CREED
ENGINEERS SURVEYORS PLANNERS

FIRM GENERAL BACKGROUND

McKim & Creed, Inc. is a committed team of talented professionals who improve the quality of life for businesses and communities by providing world-class engineering and geomatics solutions. As one of the largest and most comprehensive geomatics firms in the U.S., McKim & Creed understands that complete and accurate data is the foundation—the building block—of every project.

McKim & Creed was founded in 1978 by Herbert P. McKim, Jr, PE, PLS, and Michael W. Creed, PE, Ph.D. The firm began as a two-person company providing structural engineering services to architects. Today, McKim & Creed is a 600-person, employee-owned firm with 23 offices in seven states and licensed surveyors in 21 states. The firm provides geomatics and engineering services to public and private clients throughout the country, and its geomatics business unit provides approximately 40 percent of McKim & Creed's annual revenue.

For four years, the company has been recognized as the No. 1 Surveying and Mapping Firm in the Southeast by Engineering News-Record Southeast. McKim & Creed has also been ranked among the Top 100 Land Surveying, Mapping and Geospatial Firms by Point of Beginning magazine, and one of the Top 25 Trenchless Design Firms by Trenchless Technology magazine.

McKim & Creed's depth of local resources offers the flexibility to provide experienced staff at your disposal to keep your project on track. Our solid background and experience have resulted in the method and controls being in place to balance staff requirements while maintaining quality, schedule and budget for our clients. McKim & Creed is committed to meeting budget and schedule requirements.

STRENGTH IN NUMBERS

41

600+

23

250+

LOCATIONS

PENNSYLVANIA

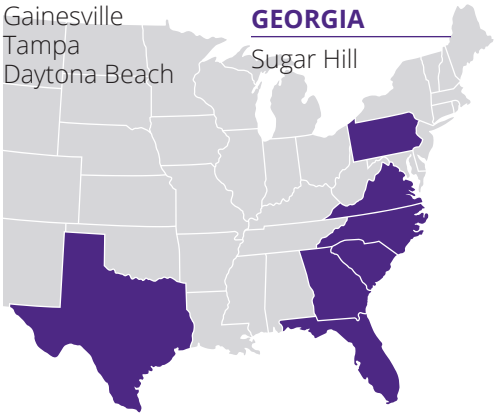
Pittsburgh
Harrisburg

FLORIDA

Clearwater
Gainesville
Tampa
Daytona Beach
Orlando
Deland
Palm Coast
Fort Myers
Sarasota

GEORGIA

Sugar Hill



N. CAROLINA

Asheville
Charlotte
Raleigh
Wilmington

S. CAROLINA

Charleston

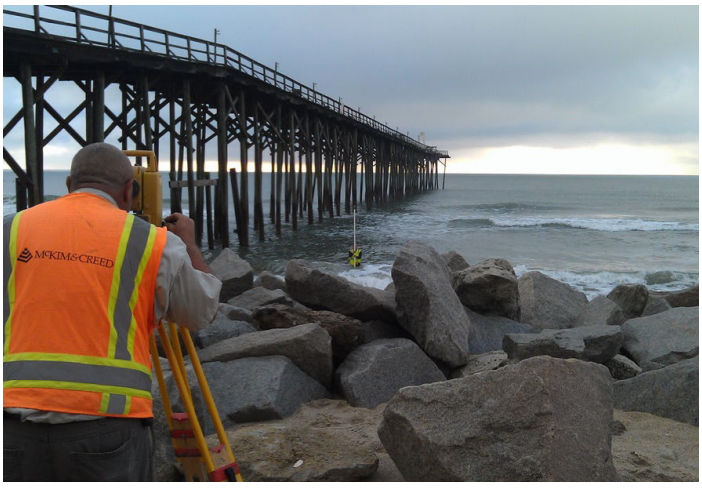
TEXAS

Austin
Dallas-Fort Worth
Houston
San Antonio

VIRGINIA

Hampton Roads

McKim & Creed offers a comprehensive Geomatics division to meet the topographic, hydrographic, and mapping needs of our customers using a combination of conventional surveying, hydrographic surveying and Global Positioning System (GPS) technology. Whether it is new design, construction, infrastructure monitoring, inspection, or understanding the existing physical conditions of an area, the ultimate success of any project relies on comprehensive and accurate data and analysis. We also understand that every project is unique and has its very own special requirements and conditions.



EXPERIENCE WITH GOVERNMENT ORGANIZATIONS

McKim & Creed has performed hundreds of miles of beach renourishment and beach monitoring surveys throughout the East Coast from Connecticut to the Caribbean for both public and private sector clients. For example, in 2001, while working with the USACE Wilmington District, we helped develop the methods and procedures for using RTKGPS in coastal inlets and near-shore environments that are being used today.

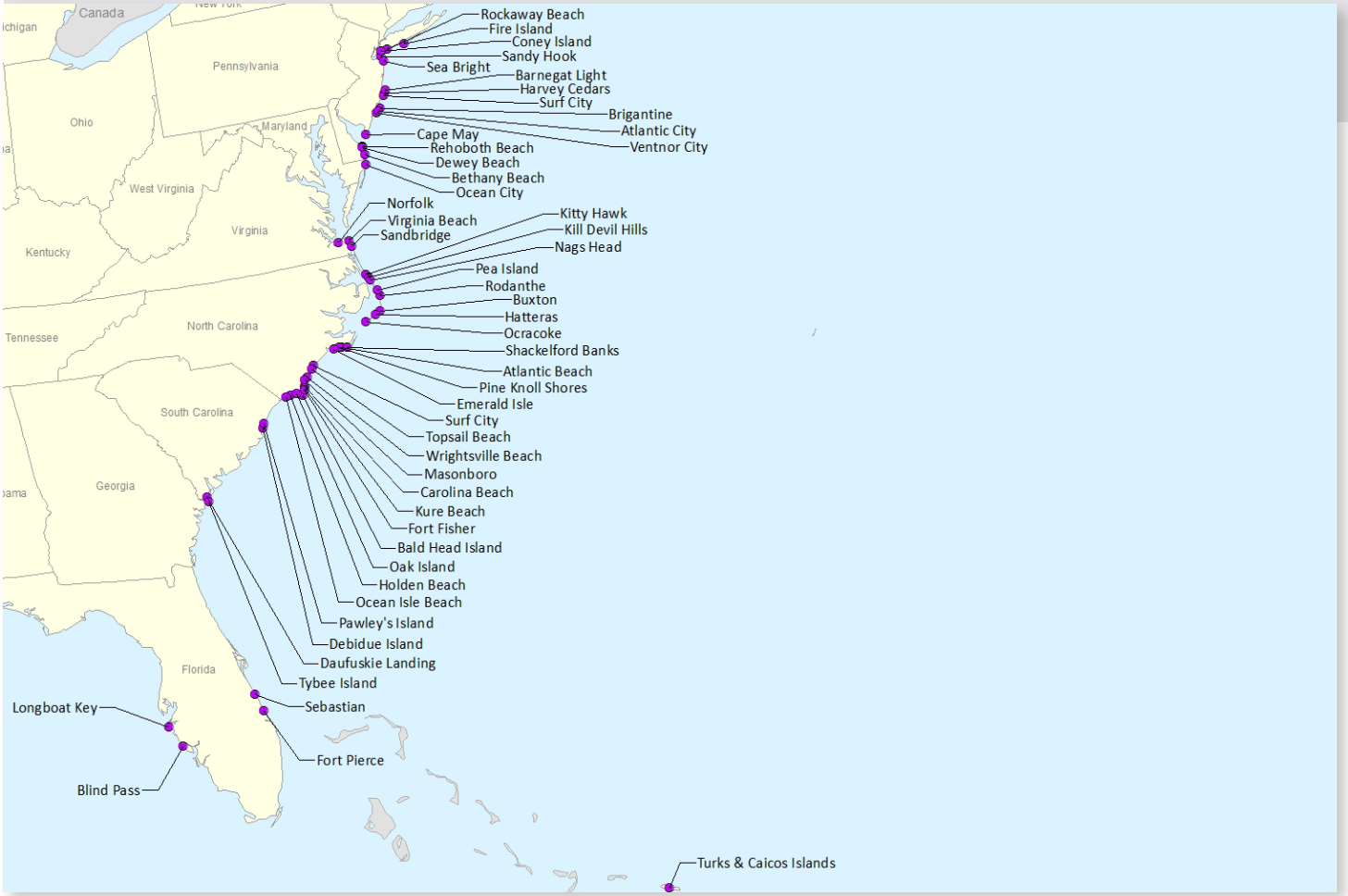
PAST PERFORMANCE

One way we measure past performance is by the amount of repeat work we receive. McKim & Creed has been successful in obtaining repeat contracts with both the public and private work sector. We have had repeat contracts with the Department of Defense for the Savannah COE, Wilmington COE and at military installations such as Camp Lejeune Marine Base, Fort Bragg and Seymour Johnson AFB. We have completed 12 indefinite delivery contracts in the past 10 years. Current beach monitoring projects include:

BALD HEAD ISLAND / McKim & Creed has been performing beach monitoring profile surveys at Bald Head island since 2002. Profiles are surveyed at 67 stations on the south, east, and west facing beaches. The surveys commence at the inland toe of the primary dune system and extend seaward to a depth of -20' NGVD29 or 2500' from the baseline, whichever is greater. Lines at stations 46+80, 50+00, 52+64, 56+56 extend as needed to cross the exiting Federal Cape Fear River Shipping Channel. Included are detailed topo surveys on 16 existing geo-tube groin structures. The profiles are surveyed along the centerline and each side (toe) of each structure. Surveys are performed approximately every 6 months. In addition, McKim & Creed has performed several Post-Storm surveys on the beaches after a hurricane or other major storm event.

OCEAN ISLE / McKim & Creed has been performing beach monitoring profile surveys at Ocean Isle Beach annually since 2012. Beach profile and hydrographic surveys are performed in 35 lines adjacent to the USACOE monitoring lines and include overlap between hydrographic and landside portions of beach profiles. Onshore beach profile elevations are obtained at maximum 20'

BEACH PROFILE SURVEYS PROJECT EXPERIENCE



intervals and at top and toe of all noticeable breaks in grade (greater than 1' vertically such as scarps, toe of dune, bulkheads, etc.). Surveys commence at the inland toe of the primary dune and extend seaward to -21' NAVD88 or 2500' from the baseline, whichever is less. The offset tolerance from azimuth is no more than 30ft. either side on offshore segments of the profile line and no more than 5' either side of the azimuth on the onshore segments of the profile line. Soundings for hydrographic portions of beach profiles are obtained at maximum 25' intervals. Survey results are provided in digital XYZ format. A digital AutoCAD drawing and two signed sealed hardcopies depicting bathymetric elevations and soundings are provided.

USACE / We are currently under contract with the New York, Philadelphia and Wilmington USACE Districts to perform hydrographic survey services and are currently negotiating rates with the USACE Jacksonville District for the same. Although these services are not exclusively for beach profile surveys we have received task orders from all 3 Districts to perform monitoring or pre-placement surveys. A task order for the Wilmington District included beach profile surveys for Wrightsville Beach, Carolina Beach, Kure Beach, Fort Fisher and Ocean Isle Beach. For the Philadelphia District we have successfully completed dozens of beach profile surveys directly and indirectly while working with dredging contractors. The Philadelphia District requires a 50' overlap between the hydrographic and topographic portions of the lines and that each portion is surveyed no more than 48 hours apart.

PROJECT EXPERIENCE

2005 -2015 BEACH MONITORING DEBORDIEU ISLAND, SC

McKim & Creed performed annual beach profile and hydrographic surveys at 30 control points along the shore at Debordieu Island, SC for 10 years. Hydrographic and landside portions of the beach profiles overlapped by approximately 50 feet. Onshore beach profile elevations were obtained at a maximum of 20 foot intervals and at top and toe of all noticeable breaks in the grade. Surveys were performed from the monument seaward along the specified azimuth to a distance not less than 1,500 feet. Soundings for hydrographic portions of the beach profiles were obtained at a maximum 25 foot intervals.

Debordieu Colony Community Association, Inc.
181 Luvan Boulevard
Georgetown, NC 29440
Blanche Brown
(832) 527-4436 / dcabrown@sccoast.net

BEACH MONITORING PROGRAM MAY 2002-2018, BALD HEAD ISLAND, NC

McKim & Creed has provided hydrographic surveying services for the annual beach monitoring program for Bald Head Island for over ten years. In addition to the regular monitoring and the extensions and additions of lines from previous survey events, McKim & Creed performed x-sections at each of the newly installed groin structures. Three sections were surveyed for the exposed areas of each groin, one section on the top and down the center of the groin, and one section on either side of the groin.

McKim & Creed performed beach profile surveys at 67 stations on the south, east and west facing beaches. The surveys commenced at the inland toe of the primary dune system and extend seaward to a depth of -20' NGVD29 or 2500' from the baseline, whichever was greater. Lines at stations 46+80, 50+00, 52+64, 56+56 were extended as needed to cross the exiting Federal Cape Fear River Shipping Channel. We performed profile surveys on 16 existing geo-tube groin structures. The profiles ran along the centerline and each side (toe) of each structure.

Village of Bald Head Island
106 Light House Wynd (PO Box 3009)
Bald Head Island, NC 28461
Chris McCall, Village Manager & Shoreline Protection Manager
(910) 457-9700 / cmccall@villagebhi.org

BEACH RENOURISHMENT HYDROGRAPHIC SURVEYS, FIRE ISLAND, NY

Surveying in 19-degree air temperatures and 35 to 42-degree water temperatures, McKim & Creed surveyors performed pre-construction beach profiles on 11 miles of beach on Fire Island. The team surveyed from the primary dune to negative 8-feet mean sea level. Hydrographic surveyors obtained survey measurements from several thousand feet offshore to approximately negative 4-feet mean sea level. McKim & Creed also gathered sand samples from two borrow sites, using equipment specially fabricated for this purpose. The surveyors retrieved one pound of sand from two different areas in each of the borrow sites.

Weeks Marine, Inc.
901 Protcentre Parkway, Suite 3
Portsmouth, VA 23704
Ronnie Rhodes, Survey Operations Manager
(985) 875-2500 / rrhoades@weeksmarine.com

BLOODY POINT BEACH ANNUAL MONITORING SURVEY 2004-2014

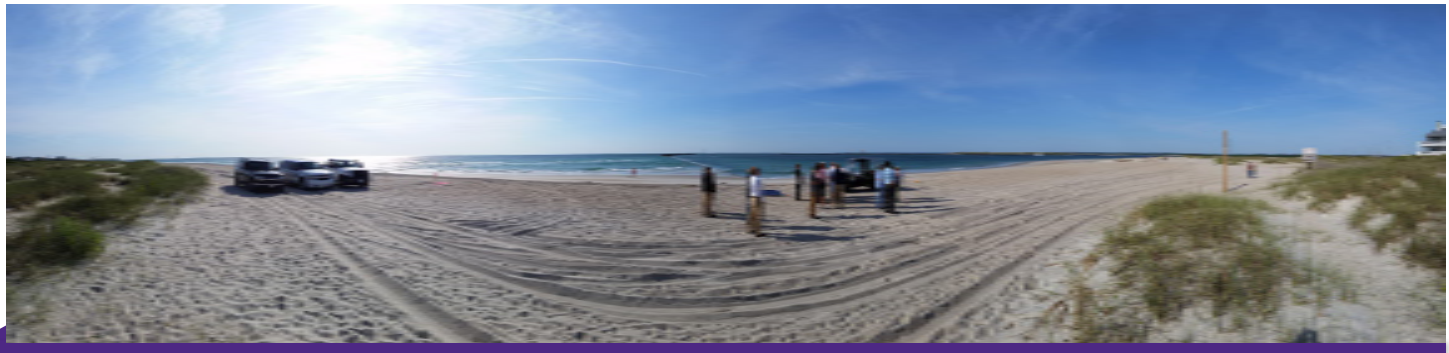
McKim & Creed has performed beach profiles on 25 historical lines on the south end of Daufuskie Island in the early Spring of each year from 2004 through 2014. Additional hydrographic and topographic surveys were performed in the vicinity of the T-Groin structure. Access to the Island is by boat only.

Bloody Point Property Owners Association
30 Fuskie lane
Daufuskie Island, SC 29915
Mike Loftus
(914) 760-1889 / mikeloftus@loftuscontracting.com

MANASQUAN INLET TO BARNEGAT INLET BEACH FILL PROJECT

The U.S. Army Corps of Engineers, Philadelphia District pumped approximately 11 million cubic yards of sand onto 13.7 miles of New Jersey coast to repair the dune and berm system, reduce risk and protect vulnerable beaches. As the hydrographic surveyor for the ~$100-million project, McKim & Creed provided pre- and post-placement condition surveys using single-beam technology. Additionally, monthly deliveries of beach profiles were provided in AutoCAD Civil 3D and USACE Beach Morphology Analysis Package (BMAP) softwares. McKim & Creed provided single beam, wade and land surveys of more than 700 beach profile lines. Between summer and mid-winter 2018, McKim & Creed had two boats, two hydrographic surveying crews, two 3-person land crews and one 2-person land crew on site at all times. Hydrographic data was collected using an Odom CV100 and CV200 echosounder with a 200KHz transducer, as well as an SBG Ekinox 2 Inertial Navigation system, TSS-DMS-05 motion sensor and Trimble SPS 865 heading system. Both survey vessels operated with the latest Hypack Navigation software versions. All land and wade data was collected using a variety of GPS-RTK and conventional survey methods.

Weeks Marine, Inc.
901 Beach Street
Camden, NJ 08102
Chris Champigny
(856) 963-0963 / cjchampigny@weeksmarine.com



PROOF OF CONCEPT TESTS UAS FEASIBILITY FOR COASTAL SURVEYS

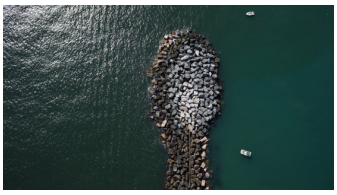
On May 16, 2016, during National Hurricane Preparedness Week, Esri, the world's largest geographical information systems (GIS) company, and McKim & Creed, a nationally recognized surveying and engineering company, hosted a proof of concept (POC) event to test the feasibility of using UAS to perform coastal surveys. The event was arranged by Esri to showcase its new Drone2Map software.

McKim & Creed performed the UAS data acquisition using 3DR's Solo platform and SiteScan software. Esri processed the data using its Drone2Map software, which processes imagery collected by UAS into an accurate, usable dataset that can be seamlessly imported into Esri's GIS mapping platform.

PROOF OF CONCEPT PREMISE

Hurricane season officially started June 1; however coastal communities prepare for a land-falling storm event year round. Most municipalities that have oceanfront assets have a beach management plan. These plans are a requirement for those communities that have or are seeking federal funds to help maintain their beaches. Included in the plans are beach monitoring surveys, which are performed twice per year, once in the spring prior to hurricane season and once in the winter. These surveys capture the current, existing conditions of the beach and are compared to previous surveys to help analyze the beach's performance in terms of erosion and accretion, and to plan and predict maintenance and renourishment events. In the case of a storm event where significant loss of beach occurs, these surveys can be used to help secure emergency funding for restoration. Esri, McKim & Creed, and 3DR conducted the POC to compare the potential cost savings, time savings and value of using UAS methods over conventional, traditional surveying methods.

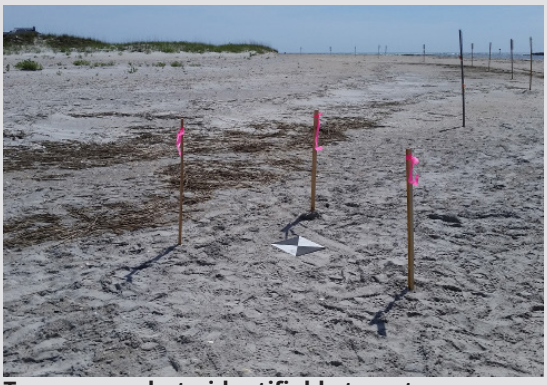
THE SITES



Two sites were chosen along the North Carolina coast: Wrightsville Beach and Eagle Island. In Wrightsville Beach, the test site extended south from Crystal Pier to Masonboro Inlet and included both the north and south rock jetties. This covered approximately 100 acres. There were a total of four flights that took a combined flying time of less than 30 minutes.

Eagle Island is a major disposal area for material that accumulates from maintenance and new work dredging for the Wilmington Harbor project, the Port of Wilmington, and a number of projects along the Cape Fear River. The site is divided into three cells for a total acreage of approximately 800 acres. The site is heavily used, and surveys are performed regularly to determine capacity. The size of the site and the wet conditions that occur in the interior of the site make conventional methods both timely and costly.

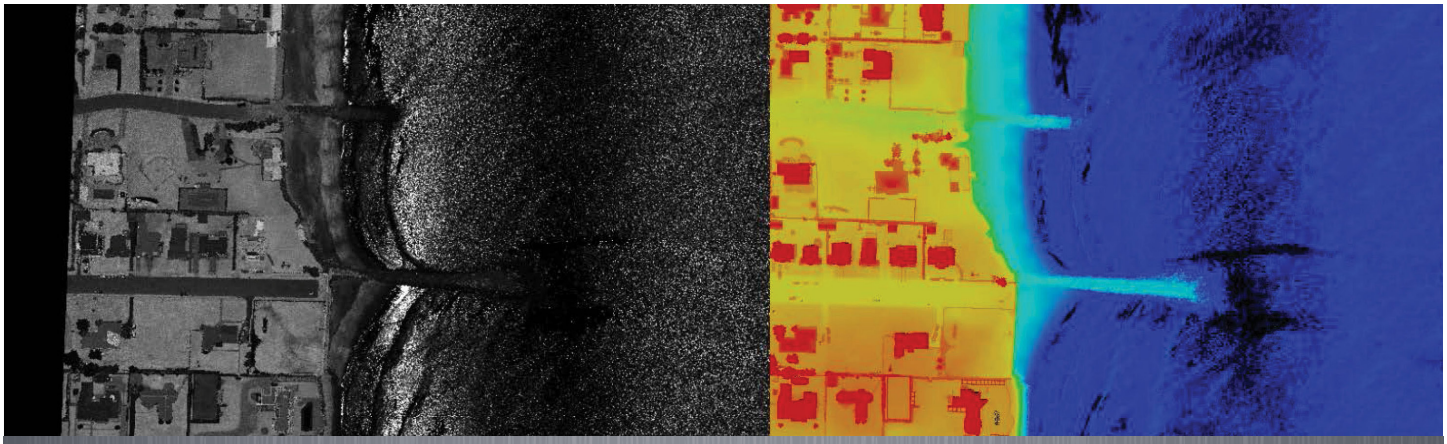
McKim & Creed ground crews set control points along the area to be surveyed.



Temporary photo-identifiable targets were placed on the beach and surveyed to georeference the UAS flight. Blind checkpoints were also collected at the site to independently verify the accuracy.

THE RESULTS

The processed data from both sites was compared to conventional land surveying technologies for accuracy, cost and delivery time, and was shared with the local, state and federal officials who were present at the data acquisition event. The data comparison from both sites showed that, in the correct environmental conditions such as open beaches or moderately vegetated berms and basins, UAS outperforms conventional services by producing a more detailed digital elevation model (DEM) more quickly and at a lower cost.



Sea Bright to Manasquan Profile Survey

In 2012, Hurricane Sandy made landfall near Atlantic City creating a coastal impact of devastating proportion. Since that time, the New York District, U.S. Army Corps of Engineers (District) has been working to repair and restore damaged beaches to their pre-storm conditions, as allowed by statutory authorities. As part of this effort, McKim & Creed was commissioned by the District to provide existing condition beach profile and groin surveys for a nine-mile segment of the Sea Bright to Manasquan area. The project involved a combination of conventional, hydrographic, and airborne LiDAR techniques to map 145 beach profiles and performed detailed topographic surveys above and below the water surface for 29 stone groins and revetments.

One of the main objectives of the project was to get accurate data and locations where rock material from the groins intersected with the natural sandy bottom beach. By using multiple data collection technologies McKim & Creed was able to survey the area quickly and accurately without putting workers in harm's way. Surveyors used conventional GPS on the beach and into waist-deep water. Bathymetric single-beam sonar aboard McKim & Creed's 28-ft. survey vessel was used to capture profile line data out to the depth of closure. Side scan and multi-beam sonar, also attached to the boat and angled sideways, enabled surveyors to collect data points along the sides of the groins, which allows the District to determine rock/sand interface. A fixed wing aircraft was used to capture aerial LiDAR of all abovewater topography. The very dense LiDAR data, approximately 30 points/square meter, provided such an accurate and detailed surface that the size and configuration of the boulder or rock materials from which the groins were constructed could be determined. Most of the groins were unsafe for land surveying. The project supports the repair and restoration of the largest beachfill project ever, by volume, and helps the New York District, U.S. Army Corps of Engineers return the beaches to their pre-storm condition and restore them to their full, original design level of protection.

PROJECT DETAILS

OWNER:

USACE New York District

LOCATION:

Sea Bright, NJ

COMPLETION:

2014

Wilmington Inner Harbor & Carolina Beach & Kure Beach Maintenance Dredging

McKim & Creed provided survey services for the maintenance dredging and beach nourishment for Wilmington Inner Harbor, Carolina and Kure Beaches. Hydrographic and land surveys were provided for the entire project from pre-placement, borrow areas, beachfill and post-placement phases at each of the three separate locations. Approximately 2 million cubic yards of material were dredged from the borrow sites and utilized for beach renourishment at the three locations. Both land and hydrographic surveys were conducted with overlapping data to ensure a seamless profile was delivered. When field surveys were completed, data were processed and delivered to our project surveyors for review, analysis and responsive delivery of data files to the client.

PROJECT DETAILS

CLIENT:

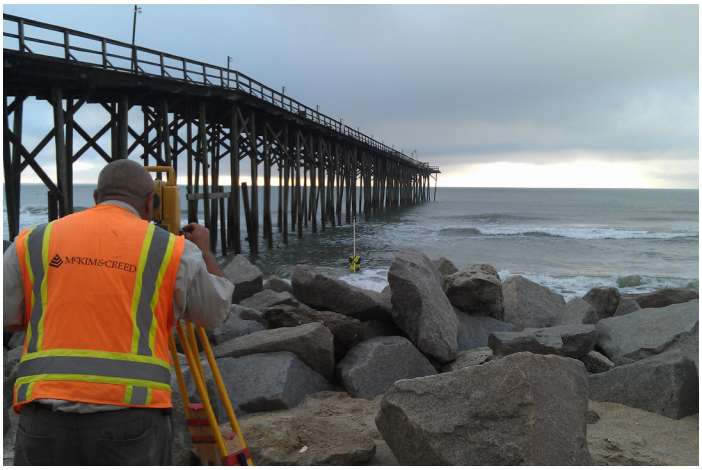
Weeks Marine, Inc.

LOCATION:

New Hanover County, NC

COMPLETION:

2013



A McKim & Creed surveyor uses conventional survey techniques to capture topographic data in the near-shore wading portion of the beach profile.

Survey operations are underway on the beach.

Bald Head Island Beach Monitoring Surveys

McKim & Creed is under contract with the Village of Bald Head Island to perform biannual beach monitoring surveys of Bald Head's west, south and east facing beaches. The project involves beach profiles and groin field monitoring surveys every spring and fall. There are 68 historical profile lines that extend off the beach from 3,000 ft. to over 5,500 ft. The profile lines on the west-facing beach extend westward to cross the newly aligned Cape Fear River Channel. The profile lines on the south-facing beach extend to 3,000 ft. offshore. Profile surveys begin at the inland toe of the primary dune and run seaward to the offshore extent of the line. The upland and surf zone portions of the profiles are surveyed using a combination of RTK GPS and conventional survey methods, while the offshore areas are surveyed using one of McKim & Creed's dedicated hydrographic survey boats. The groin field survey includes surveying profiles on 16 sand-filled groins. Three survey lines are run, one down the centerline of the groin and one down each side on the groin. These profiles are mapped and compared to previous surveys. Deliverables for this project include plan view with contours, beach profiles, groin profiles and xyz point files. All data are delivered both in digital and hardcopy formats.

PROJECT DETAILS

CLIENT:

Village of Bald Head Island

LOCATION:

Bald Head Island, NC

COMPLETION:

Ongoing

McKim & Creed monitors survey lines on the south and east facing beaches covering nearly five miles. Surveys are performed every six months.

PROJECT APPROACH

MCKIM & CREED HAS PERFORMED SURVEYS RELATED TO BEACH MONITORING, COASTAL EROSION AND RENOURISHMENT FOR BOTH THE PUBLIC SECTOR AND THE PRIVATE SECTOR FOR MORE THAN 20 YEARS.

McKim & Creed's beach profile survey experience includes projects with the USACE Wilmington, Philadelphia and New York Districts. Additionally, we have performed beach profile surveys on Ocean Isle, Holden Beach, Oak Island, Bald Head Island, Fort Fisher, Kure Beach, Carolina Beach, Masonboro Island, Wrightsville Beach, and Bogue Banks, from Emerald Isle to Fort Macon, Shackleford Banks, Hatteras Island, Nags Head, Kill Devil Hills, and Kitty Hawk. Currently, we perform ongoing beach monitoring survey services for Bald Head Island, the Town of Ocean Isle Beach, Debordeau Island, and Daufuskie Island for which we provide beach monitoring surveys annually or semi-annually.

DATA COLLECTION AND PROCESSING

For the onshore upland portions of the surveys, we use a combination of Virtual Reference Network (VRN) and Real Time Kinematic (RTK) GPS techniques with conventional survey methods, as needed, to produce a high-quality, cost-effective product. For the offshore and nearshore surveys, we use 22-foot to 28-foot survey vessels equipped with INS's (Inertial Navigation Systems), RTK-GPS, single beam and multibeam echosounders, and Hypack® as the hydrographic software. Our hydrographic data collection methodology follows the USACE Hydrographic Surveying Manual EM 1110–2–1003. In the surf/wade zone, bathymetric data is collected during high tide and wade data is collected during low tide to allow enough overlap data to compare both methods, remove artifacts, and merge the two datasets to produce a clean profile (critical QC component of the survey). Meanwhile, the land portion of the profiles can be collected at any tide cycle.

SURVEY METHODS | HYDROGRAPHIC - OFFSHORE AND NEARSHORE

Our survey vessels are equipped with INS (Inertial Navigation System) RTK-GPS, single beam and multibeam echosounders, speed of sound profilers, digital compass, and Hypack® hydrographic software. Our INS/RTK-GPS/Echosounder systems - the most advanced, state-of-the-art units available today - are permanently installed on our vessels. Our GPS antenna, IMU (Inertial Motion Unit, part of the INS) and sonar transducer are mounted as close to the Center of Gravity (CG) of the boat as possible to reduce the pitch, roll, and yaw effects in the units. Our hydrographic surveying software is the latest Hypack® version, currently 2019.

We use the vertical component of RTK-GPS to provide a real-time water-level correction and the horizontal component for x,y positioning of every sounding.

Our Inertial Navigation System (INS) is a navigational system capable of calculating the relative position of the IMU on the survey vessel. The INS is composed of three gyros and three accelerometers enabling the system to derive a navigation solution. This navigation solution contains the position (latitude, longitude), heading, heave, pitch, and roll of the vessel. The basic concept behind an INS system is the measurement of changes in relative motion (through the measurement of acceleration)

to project a changing position in some inertial reference frame over time.

Next, Hypack combines the corrections from the RTK and INS with the echosounder depth reading to produce and record an accurate measurement of the seafloor, even in the highly dynamic area within the surf zone. This entire system produces highly accurate and consistent results.

SURVEY METHODS | LAND – TOPO AND WADE

We perform all the upland topography and 95% of the wade nearshore surveys using RTK-GPS. For this project we will use the NC-VRS network with our Trimble R-8 and R-10 Rovers connected to TSC-3 data collectors via Bluetooth.

For the upland topo surveys a team of two, each with a GPS rover and a 4x4 John Deere Gator or similar all-terrain vehicle, will collect profile shots from the inland-most point, origin of the profile to approximately the HWL (high water line). This work can be done at any tide cycle. At low tide, the two-person team will be surveying the wading sections of each profile with one person carrying the R-8 antenna on the pole and the other person using the data collector.

We use this method for three reasons: safety, efficiency and protection of the equipment. All our GPS rover poles are custom-built to a fixed height with topo boots, eliminating the human error of the wrong rod height being entered into the data collector.

HYDROGRAPHIC SURVEY EQUIPMENT

McKim & Creed has three dedicated survey vessels, ranging from 22 feet to 28 feet, that are used for beach monitoring and nourishment projects, and multiple smaller vessels or platforms for use in unique or special situations. Our dedicated vessels have permanently installed equipment and often more than one system.

SURVEY VESSEL CLOCK DETAILS

EQUIPMENT	MAKE AND MODEL	MEASUREMENT
Boat	1999 28 ft. Thomas Marine (welded aluminum) 28 ft. x 10 ft. (11 ft. house)	platform
Engines	2x250HP Yamaha Four-Stroke Outboard Motors	propulsion
Singlebeam Sonar	Odom CV 200 and Odom Transducer (Dual frequency 33/200kHz)	depth
RTK-GPS	Trimble SPS 855, Trimble SPS 555H for both RTK-GPS and DGPS	position (X, Y, heave and tide)
DGPS	Trimble SPS 351	position (X, Y), speed and course
IMU	Teledyne DMS-05 Motion Sensor	heave, roll and pitch
Computer	Small PC Custom Ruggedized and water-resistant w/SSD	data collection and storage
Software	Hypack 2019	SB acquisition, processing
Sound Velocity	AML CTD Base X Profiler	speed of sound through water
GPS Gyro	Trimble SPS 555	heading (0.1-degree rms), position
Bar Check	Custom made	Calibrate Echosounder
Digital Compass	Honeywell HMR 3000	heading

SURVEY VESSEL SOUNDS DEEP DETAILS

EQUIPMENT	MAKE AND MODEL	MEASUREMENT
Boat	2004 24' Gray Marine (welded aluminum) 24'x 8' (8' house)	platform
Engines	2-115hp Yamaha Four-Stroke Outboard Motor	propulsion
Singlebeam Sonar	Odom CVM and Odom Transducer (Dual frequency 33/200kHz)	depth
RTK-GPS	SBG Ekinox 2 Inertial Navigation System with GNSS receiver	position (X, Y, heave and tide)
DGPS	Trimble DSM 212 (10Hz update)	position (X, Y), speed and course
IMU	SBG Ekinox 2 Inertial Navigation System with GNSS receiver	heave, roll and pitch
Computer	SmallPC Custom Ruggidized w/SSD	data collection and storage
Software	Hypack 2019	SB acquisition, processing
Sound Velocity	AML CTD Base X2 Profiler	speed of sound through water
GPS Gyro	INS2	heading (0.1 degree rms), position
Bar Check	Custom made	Calibrate Echosounder

SURVEY VESSEL BOTTOM LINE DETAILS

EQUIPMENT	MAKE AND MODEL	MEASUREMENT
Boat	24' Scully Boat with Trailer	platform
Engines	2-115hp Yamaha Two-Stroke Outboard Motor	propulsion
Singlebeam Sonar	Odom CV 100 and Odom transducer (Dual frequency 33/200kHz)	depth
Multibeam Sonar	R2Sonic 2022	Depth (100% coverage)
RTK-GPS	Pos-MV Inertia Navigation System I2NS	position (X, Y, heave and tide)
DGPS	Trimble SPS 351	position (X, Y), speed and course
IMU	Pos-MV Inertia Navigation System I2NS	heave, roll and pitch
Computer	SmallPC Custom Ruggidized w/SSD	data collection and storage
Software	Hypack 2019	SB acquisition, processing
Software	Hysweep 2019	MB acquisition, processing
Sound Velocity	AML CTD Base X2 Profiler	speed of sound through water
GPS Gyro	INS2	heading (0.1 degree rms), position
Bar Check	Custom made	Calibrate Echosounder

LAND SURVEY EQUIPMENT

McKim & Creed has continued to make significant improvements in our equipment and technology. Our survey crews run TDS software on CE Ranger Data Collectors and Trimble software on TSC-3 Survey Controllers. These collectors allow us to better utilize feature codes, line codes, and the Geopak SMD files. We added Trimble Access software with sync options which automatically uploads survey data to the cloud every 15 minutes if the survey crew has cell phone coverage. This allows for office staff to perform near real-time QA/QC, which helps reducing overall project schedule by allowing for the office mapping work to start immediately. Point files and other supporting files can also be transferred directly to the field through the data collector. These enhancements have significantly increased our productivity and helped to eliminate errors and return trips. We are also running robotic total stations and digital levels to increase productivity and reduce human error.

McKim & Creed has 60 survey grade Trimble (R8's and R10's with GNSS) available to provide sub-centimeter accuracies and uses the NCGS Virtual Reference System (VRS) throughout North Carolina, when available, for RTK-GPS observations. These units, combined with the VRS, have allowed us to be more efficient in collecting real-time coordinates.

CALIBRATION

All land and hydro RTK-GPS units are calibrated by checking local known and verified control monuments prior to and after each survey day.

For echosounder calibration, we use both bar-checks, latency and squat tests, and speed of sound velocity probes. Echosounders calibrations are performed at least twice daily, at the beginning and end of each survey event.

Using an RTK-GPS system different from the one installed on the survey vessel we check local control monuments using land survey techniques. With the separate RTK-GPS unit we check the water surface elevation against the elevation provided by the system installed on the vessel.

Once on the project site, a sound velocity probe is deployed in the deepest location. The sound velocity cast is then downloaded and incorporated to the echosounder software to correct for the speed of sound through the water column. A large aluminum bar is then lowered from the boat under the echosounder's transducer to a specific measured depth to calibrate and verify that the echosounder's depth reading is true. These procedures are repeated at the end of the survey day and whenever conditions, such as tide cycles, and job location, change.

DATA PROCESSING

All hydrographic data collection and processing are accomplished using Hypack software. Detailed logs are kept onboard during survey operations. Logs include all relevant information about the survey, including vessel and crew details, sensor offsets, speed of sound measurements, weather conditions, etc. Each survey line is logged with line number, direction of line and any comments useful for the technician who processes the data back at the office. At the end of each day and prior to leaving the site, the field crew does a preliminary review in Hypack to check for complete coverage, missing lines or gaps.

Overlap elevation differences between hydrographic work and wade crew work are accepted if within a couple of 10ths of a foot. If the difference is larger, the line is re-run by both, hydro and land surveyors to ensure accuracy of profile data. In addition, Hydro surveys are typically performed two hours either side of high tide to achieve maximum coverage and ensure overlap with land survey data.

For RTK-GPS we use the newest NGS Geoid model 12b unless specified otherwise by the scope of work to correct ellipsoidal heights to project datum. A custom Geoid or KTD file or NOAA's V-Datum program files can be used for tidal datum's with zoning and can be used with RTK-GPS to get real-time project datum results. McKim & Creed implements a variety of different software as analysis tools to work with the data, including: TerraModel, Hysweep, Hypack, Excel, AutoCAD, MicroStation, BMAP and Arcview.

DATA ACCURACY

All surveys performed under this contract will be referenced to the North Carolina State Plane Coordinates System horizontal datum, NAD 83 (2011), vertical datum NAVD88 as specified in the statement of work (SOW). Hydrographic surveys will be performed to meet or exceed the Class 1 criteria as defined in EM1110-2-1003 (Hydrographic Surveying) latest version.

All data will be corrected for heave, roll, pitch and tidal influences. Topographic data will be accurate to within 5cm (0.16-ft.) vertically and be within 5-feet of the profile line. Hydrographic data will be accurate to within 15cm (0.49-ft.) vertically and be within 20-feet of the profile line.

Hydrographic and wade data for the same profile will be collected normally within 48 hours. If data between the hydrographic and wade data cannot be collected within what has been specified in the SOW, the surveys will be rerun. Data between the hydrographic and land data will be checked for accuracy compliance.

QUALITY ASSURANCE/ QUALITY CONTROL

The appropriate skilled professional and technical staff will be assigned to this project. There will be advance planning of the project phases and scheduling resources with anticipation of potential problem areas and advanced discussion of solutions.

It takes sound logistical planning to make sure you have good weather conditions, appropriate tide stages and access to remote areas.

A project "kick-off" meeting and periodic progress meetings will be held to ascertain that the project is running smoothly and to head off any issues before they become problems. The goal of each McKim & Creed project team is to accelerate the schedule for the survey and mapping work effort and deliver the data correct in the first time, to expressly follow any client-specific requirements, and to present the work in a manner that will allow quick and effortless client reviews.

QUALITY CONTROL IN THE OFFICE

Each project area that is delivered will be subject to a quality control review prior to its submittal by one or more survey professionals and a certified hydrographer. Each individual review is routed through the project manager, who is responsible for assigning the project quality reviewers. The project manager will oversee the quality review process to ensure that the proper McKim & Creed review and checking procedures were followed. Reviewers have access to tools such as Hypack, AutoCAD, TerraModel, and BMAP that allow them to look at the Digital Terrain Model and profiles.

Upon completion of each quality control review, the individual reviewers will return the reviewed drawings or maps, along with their mark-ups and/or comments, to the project manager. The appropriate revisions are then made to the drawings or maps.

QUALITY CONTROL IN THE FIELD

McKim & Creed has developed the following QA/QC elements that are specific to beach profile monitoring surveys:

- Daily RTK-GPS calibration
- Daily echosounder bar-checks and SOS (speed of sound) profiles
- Detailed field notes and log book
- Digital pictures
- Tides from multiple sources
- Redundant positioning systems (RTK-GPS and INS)
- Redundant heave corrections (RTK-GPS and IMU)
- Software graphical tools (3D viewing and contouring of data)
- Final data review by PLS (Professional Land Surveyor) and Hydrographer
- 30-feet data overlap between inshore and offshore data on at least 75% of all transect lines
- Detailed comparison with historical data (when available)
- Fixed height prism poles

In the case that we lose RTK-GPS (offshore) we can post-process the data using the INS data files recorded during the survey through POSPac software, which also provides an additional QA/QC tool.

ENVIRONMENTAL CONDITIONS AND TIMING

The beach and the nearshore surf zone are extremely dynamic. Waves, longshore currents and even wind can displace a lot of sand in a short amount of time. We understand the importance of performing the upland and nearshore surveys as close in time to one another as possible. We do a lot of beachfill work in the Northeast and monitor stations immediately before and after pumping sand. The US Army Corps, Philadelphia District requires that upland and nearshore surveys be completed with 24 hours of each other, so we are aware of the processes to accomplish this.

Safety is important to us and working in the surf zone has the potential of serious injury or worse. Over the years we have developed safety protocol for a number of circumstances.

For example, if the sea conditions are greater than 2-feet, we will survey all our lines from inshore to offshore. The vessel gradually approaches the shoreline at roughly a 30-degree angle from being parallel to the beach. At the right time, the captain turns the vessel onto the survey line and begins recording data. The purpose of this method is that it allows the helmsman to get the bow of the vessel into an oncoming, unusually large or rough wave. All our surveyors that are wading lines wear inflatable life vests.

We are also mindful of the sea turtles, piping plovers, and other wildlife species that cohabitate along our shorelines and beaches, with special attention to their mating seasons.

DELIVERABLES

All deliverables as required in the RFQ will be delivered on a DVD, external hard drive (or other acceptable storage device) within 30 days of the completion of the field survey for each beach. These will include:

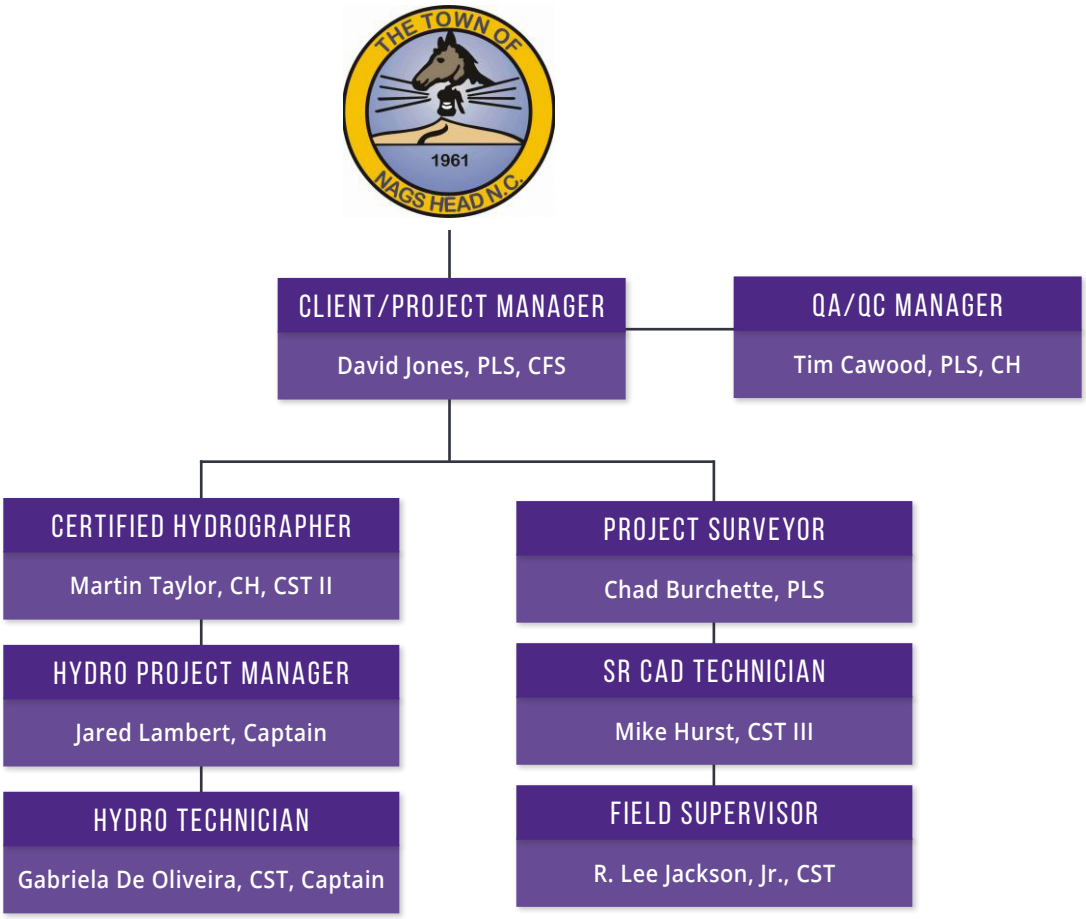
- Electronic ASCII files in the format requested by the Town
- General summary of the work performed
- Photos and Field notes
- Other files requested by the Town

PROJECT TEAM

Our project team is composed of veteran staff, each with extensive coastal mapping experience. Our staff has knowledge of coastal shoreline and inlet dynamics, responses, testing, procedures, protocols and methods. Our dedicated project team has the ability and resources to facilitate this project directly from our Wilmington office. Each team member is identified in the organizational chart on the following page.

Two NC and SC licensed surveyors, two NSPS Certified Hydrographers, five hydroggraphic technicians, five land surveyors and 10 survey crew members, along with support staff are stationed in our Wilmington office and have the resources to meet all project demands directly from our local offices. That, coupled with our experience in the area, will provide unparalleled surveying services for this pursuit.

Additional resources are also available firm-wide, as surveying staff at McKim & Creed includes 34 Professional Land Surveyors (PLS), Certified Floodplain Managers, GIS Professionals, 2 Certified Hydrographers and a supporting staff of more than 153 other technicians and specialists to pull from companywide.



SPECIFIC RELATED EXPERIENCE OF PROJECT TEAM MEMBERS

One true measurement of past performance is repeat business. We consider our client as our partner and treat him as such. Some examples of repeat contracts include:

- NCDOT annual on-call contracts for 20 consecutive years
- NC State Ports on-call contracts for 15 consecutive years
- USACE Wilmington District — 3 IDIQ contracts (12 years)
- USACE NY District — 3 IDIQ contracts (10 years)

McKim & Creed has acquired and accomplished over 300 individual task orders under many individual and annual IDIQ contracts with many districts of the US Army Corps of Engineers (USACE) since 1992, including Galveston, New York, Savannah, Wilmington, Charleston, Fort Bragg, and Norfolk. Most of these projects include hydrographic surveying services. All of the task orders and contracts have been accomplished and delivered in the formats and time frames required. McKim & Creed's current ACASS evaluations are either "very good" or "exceptional". We have been providing hydrographic survey services to the USACE NY District for 10 consecutive years. The projects include coastal monitoring surveys and navigation condition surveys for inland waterways.

Tim Cawood, PLS, CH

QA/QC MANAGER, CERTIFIED HYDROGRAPHER

KEY QUALIFICATIONS

- ✓ Hydrographic Surveys
- ✓ Mobile Scanning
- ✓ 3-D Laser Scanning
- ✓ Geodetic Control Surveys
- ✓ Photogrammetric Surveys
- ✓ Topographic and Boundary Surveys

EDUCATION

A.A.S., Marine Technology, Cape Fear Community College

Attended, Shallow Water Multibeam Course, University of New Brunswick at St. Andrews

PROFESSIONAL LICENSURE

ACSM Certified Inshore Hydrographer

Professional Land Surveyor / NC / L3358

Professional Land Surveyor / SC / 14806

Mr. Cawood has 38 years of experience in the survey profession and serves as president of McKim & Creed's Geomatics division. Having started as a rodman in 1981, Mr. Cawood has extensive field experience and has been an innovator of technology, processes and procedures throughout his career. Mr. Cawood has managed federal government projects for the United States Army Corps of Engineers for Districts throughout the North and South Atlantic Divisions, NOAA, FAA, CDC and FEMA. He has worked with many state Departments of Transportation throughout the Southeast, as well as for many of ENR's top 50 engineering and design firms in North America. He has worked throughout the U.S., including Alaska, as well as Canada and the Caribbean.

As part of his duties as the Geomatics division manager, Mr. Cawood is responsible for quality assurance and quality control and making sure that McKim & Creed is responsive and meets our commitments to our clients. Mr. Cawood is the acting Chairman of the Business Practices Committee of the Council of Professional Surveyors (COPS), a coalition of surveyors within ACEC focused on helping its members with better business practices within the survey profession.

SELECTED PROJECT EXPERIENCE

Bloody Point Beach Profile Surveys, Bloody Point Property Owners Association, Rockville, SC

Mr. Cawood served as project manager for this project. McKim & Creed has performed hydrographic beach profile surveys for the Bloody Point Homeowners Association, South Carolina since 2006. In addition to performing annual profile surveys on approximately 20 historical ranges, McKim & Creed has established four new geodectic survey control monuments set in concrete that can be used for future surveys and construction projects on the Island. The annual surveys also include detailed soundings and a topographic survey in the area of a new terminal groin on the south side of the island.

Bald Head Island Beach Monitoring Program, Bald Head Island Utilities, Bald Head Island, NC

Mr. Cawood served as project manager for this project. McKim & Creed monitors survey lines on the south and east facing beaches covering nearly five miles. The project involves beach profiles and groin field monitoring surveys every spring and fall. There are 60 historical profile lines that extend off the beach from 3,000 ft. to over 5,500 ft. The profile lines on the west-facing beach extend westward to cross the newly aligned Cape Fear River Channel. The profile lines on the south-facing beach extend to 3,000 ft. offshore. Profile surveys begin at the inland toe of the primary dune and run seaward to the offshore extent of the line. The upland and surf zone portions of the profiles are surveyed using a combination of conventional survey methods, RTKGPS while the offshore areas are surveyed with a dedicated hydrographic survey boat.

Ocracoke Beach Profiles, Moffatt & Nichol Engineers, Ocracoke, NC

Mr. Cawood served as project manager for this project. McKim & Creed performed beach profiles surveys on 10 lines on Ocracoke Island. The position of the origin of each line and the azimuth of each line was provided by Moffatt Nichol Engineers. The land based shots commenced 200 feet north of NC12 of the marsh line and ran seaward to elevation -5' NGVD29 or deeper. Shots were taken along each profile at a distance that did not exceed 25 feet and included all top, toes and other breaks in grade. The land-based work was completed during low tide to ensure that the survey staff could get to the maximum safe depth. A hydrographic survey vessel completed the offshore portion of each profile.

David Jones, PLS, CFS
CLIENT/PROJECT MANAGER

KEY QUALIFICATIONS

- ✓ Boundary Surveys Topographic Surveys
- ✓ Hydrographic Surveys
- ✓ Control Surveys
- ✓ Wetland Surveys
- ✓ GPS Surveys
- ✓ Construction Staking Aviation Surveys
- ✓ GIS Data Acquisition

PROFESSIONAL LICENSURE

Professional Land Surveyor / NC / L-3672

Professional Land Surveyor / ND / LS-8170

Certified Floodplain Surveyor / NC / NC-105

U.S. Coast Guard Captain's License / #3927734

Having grown up in New Bern, North Carolina and now living in Wilmington, Mr. Jones has spent his entire life, to date, living and working on and around the water. He started working in his early teens, before school and weekends where he operated one of his father's commercial fishing boats in the Neuse River and vast Pamlico Sound by himself. Those deeply rooted experiences have helped him in his professional career as a professional surveyor and regional manager and for Geomatics in Southeastern North Carolina and for hydrographic surveying services company wide. Having those experiences at a young age has given him intimate knowledge of coastal environment and dynamics including sea conditions, erosion and accretion processes, and boat performance and safety, knowledge that many seasoned hydrographers do not even possess.

As regional manager of hydrographic surveying services, Mr. Jones oversees our fleet of survey vessels and technical and professional staff that perform these services for both public and private clients throughout the US. Our hydrographic services include bathymetry (multibeam and singlebeam), sidescan sonar, magnetometer surveys and sub-bottom profiles. These services are performed for a variety of reasons, including navigation, search and rescue, obstruction investigation, beach monitoring, volume calculations and marine construction. He is proficient in Terramodel (CAD Software), Auto CAD, HYPACK and HYSWEEP (Hydrographic survey processing and acquisition software).

SELECTED PROJECT EXPERIENCE

Bald Head Island-Beach Monitoring Survey-Spring 2015 / Village of Bald Head Island, NC
Mr. Jones served as project manager for this project, which included beach profile surveys at 67 stations on the south, east and west facing beaches at Bald Head Island. McKim & Creed also executed a single beam survey of the proposed Jay Bird Borrow Area near Bald Head Island. Hydrographic/topographic existing conditions survey of the Bald Head Island Creek Borrow Area was also completed.

Bloody Point Beach Annual Monitoring Survey 2015, Bloody Point Property Owners Association / Daufuskie Island, SC
Mr. Jones was project manager overseeing beach profile surveys for the client, totaling 25 beach profile lines. A sufficient number of points were taken along each line to ensure adequate descriptions of the profiles. All topographic features and major breaks in slope, including dunes, beach berms, foreshore, and bar and trough systems, were identified. On smoothly sloping sections a maximum elevation difference of approximately 1-foot between adjacent points was used to define this section of the profile.

Fire Island Inlet to Moriches Inlet, U.S. Army Corps of Engineers - New York District / Fire Island, NY
Mr. Jones served as project manager for this project, which included beach profile surveys between Fire Island Inlet and Moriches Inlet. These profiles were used to prepare plans and specifications of several coastal fill projects. The study area is located in Suffolk County, New York along an approximately 32-mile stretch of the Atlantic Coast, from Fire Island Inlet to Moriches Inlet.

Ocean Isle Beach Monitoring -Annual 2015, Town of Ocean Isle Beach, NC
Mr. Jones supervised hydrographic surveying services for annual beach monitoring for the Town of Ocean Isle Beach. This project met the US Army Corps of Engineers Wilmington District requirements for navigation and dredging.

Chad Burchette, PLS
PROJECT SURVEYOR

With nearly 17 years' surveying experience, Mr. Burchette specializes in performing boundary and topographic surveys.

KEY QUALIFICATIONS

- ✓ Boundary Surveys
- ✓ Topographic Surveys

EDUCATION

A.A., Land Surveying Technology, Guilford Technical Community College

PROFESSIONAL LICENSURE

Certified Survey Technician Level I

Professional Land Surveyor / NC / L-5181

OSHA 10-hour Safety Training

Certified Survey Technician Level III Construction

SELECTED PROJECT EXPERIENCE

Beach Profiles Ocean Isle, Holden Beach, and Shallotte Inlet (Task Order), U.S. Army Corps of Engineers - Wilmington District, NC, Ocean Isle, Holden Beach, NC
Mr. Burchette served as survey crew chief for this project. The work included elevation data collection along specified azimuths at specified intervals along existing baselines, breakline feature mapping, sinusoidal pattern data collection, hydrographic survey data collection, and the identification and location of existing storm sewer systems within the limits of the area.

Carolina and Kure Beaches Renourishment Surveys, Norfolk Dredging Company, Wilmington, NC
Mr. Burchette served as survey crew chief for this project. McKim & Creed performed beach renourishment (topographic and hydrographic) surveys on an as-needed basis in connection with a USACE - Wilmington District project. A total of 350 historic profile lines at 100-foot intervals were completed. The historic profile lines began at the established baseline (which in most cases is located landward of the primary dune system) and extended offshore approximately 2,500 feet. McKim & Creed utilized a combination of conventional survey methods along with GPS to maximize time and cost effectiveness. All data was based on NC Grid/NAD83 and NGVD 29.

Coastal Storm Damage Reduction – Wrightsville Beach and Ocean Isle Beach, Weeks Marine, Inc., Wrightsville Beach, NC
Mr. Burchette served as project coordinator for hydrographic and conventional land surveying provided to Weeks Marine, Inc. on an as needed basis.

Dare-Rodanthe SCurves - NC 12 Rodanthe Breach - Dare County, NCDOT, Dare County, NC
Mr. Burchette served as survey crew chief for this project. McKim & Creed performed hydrographic and topographic surveys, as well as centerline staking in and around the NC 12 breaches in Rodanthe, NC following Hurricane Irene. McKim & Creed was asked to conduct surveys of a new inlet in Rodanthe where waves carved a breach up to 50 feet wide and eight feet deep in some places, in order to tie the underwater and embankments of the new waterway to the overall mapping. McKim & Creed responded with five surveyors and an 11-foot inflatable survey vessel. Because the opportunity arose for the NCDOT to begin construction almost immediately, McKim & Creed was asked to set and control additional aerial targets, as well as stake the centerline and right-of-way, with the western right-of- way being a priority. Centerline and right-of-way geometry were provided by the NCDOT.

Jared Lambert, Captain
HYDROGRAPHIC PROJECT MANAGER

KEY QUALIFICATIONS

✓ Hydrographic Surveying

EDUCATION

A.S., Marine Technology, Cape Fear Community College

Attended, 74th Multibeam Sonar Training Course, University of Southern Mississippi

PROFESSIONAL LICENSURE

U.S. Coast Guard Captain's License / #2770765

Mr. Lambert has 15 years of experience conducting hydrographic and topographic surveys in the United States and Brazil. He has served as a party chief for dozens of beach profile surveys for design, construction and monitoring of beach nourishment projects, as well as for reconnaissance and control establishment surveys and hydrographic surveys of navigational channels and borrow area sites using both singlebeam and multibeam survey systems. Mr. Lambert has also assisted with numerous geophysical and geotechnical surveys as well as environmental monitoring projects. In the past, he has served as a boat captain/navigator for the geophysical surveys and scuba dive investigations. Mr. Lambert is also a certified open water diver and certified Hypack Hydrographer.

SELECTED PROJECT EXPERIENCE

Sea Bright to Manasquan PS Survey; U.S. Army Corps of Engineers - New York District Sea Bright, NJ
As hydrographic survey technician, Mr. Lambert used a combination of data collection methods and diverse remote sensing technologies were to conduct existing condition beach and groin surveys along a four-mile stretch of beach devastated by Hurricane Sandy. By blending conventional, hydrographic and airborne LiDAR techniques, McKim & Creed mapped 145 beach profiles and performed detailed topographic surveys above and below the water surface for 29 stone groins and revetments.

East Rockaway Beach Renourishment, Weeks Marine, Inc., Rockaway Beach, NY
Mr. Lambert provided hydrographic and land surveys for this project. Single beam soundings were collected using 200 kHz sonar and were provided in feet and tenths. Additionally, survey lines were performed at a minimum of 75 feet from known obstructions.

Bronx River Hydrographic Survey, U.S. Army Corps of Engineers - New York District, Bronx, NY
Mr. Lambert served as hydrographic survey technician for this project. Work included a hydrographic condition survey of the Bronx River in New York City, NY. Crews performed a single beam high frequency (200kHz) condition survey from the beginning of the federal channel north of the Bascule Bridge, which is approximately 3 miles in length.

Absecon Inlet, NJ Beach Fill Project - Philadelphia District Corps, Weeks Marine, Inc., Absecon Island, NJ
Mr. Lambert provided hydrographic surveys along 1.5 million cubic yards of beachfill along the Atlantic Ocean coastline of Absecon Island in Atlantic County, New Jersey. The project area encompassed the municipalities of Atlantic City and Ventnor City. The contract work also consisted of the construction and repair of pedestrian, vehicle, and handicap dune crossovers; planting dune grass; providing sand fencing; repairing or extending existing storm water outfalls; and relocating or removing various existing structures to accommodate the new beachfill and dunes.

Maintenance Dredging-Wilmington Inner Harbor & Carolina Beach & Kure Beach Storm Damage Reduction, Weeks Marine, Inc., New Hanover/Brunswick County, NC
Mr. Lambert was hydrographic survey technician, and the scope included professional staking, pre-placement and hydrographic surveying services. Additionally, single beam soundings were collected using 200 kHz high frequency sonar. All surveys were performed in accordance with the standards of practice for land surveying in North Carolina.

Gabriela De Oliveira, CST, Captain
HYDROGRAPHIC TECHNICIAN

A recent hire with McKim & Creed, Ms. De Oliveira is a trained Marine Technician and critical problem solver. Her extensive background includes vessel and sea equipment positioning, maintaining detailed logs, troubleshooting navigation equipment, processing navigation data and ensuring data was accurate and complete, and managing equipment inventory and installation. Her unique experience includes monitoring for sea turtles and marine mammals to properly log all sightings and implement mitigation measures to protect marine life during seismic activities.

KEY QUALIFICATIONS

- ✓ Hydrographic Surveys

EDUCATION

A.A.S., Marine Technology

B.S., Biological Science

M.Sc., Biological Science

Attended, Multibeam Training Course, Hypack

PROFESSIONAL LICENSURE

U.S. Coast Guard Captain's License / #8419498

Certified Survey Technician Level I

SELECTED PROJECT EXPERIENCE

Bald Head Island Beach Monitoring Surveys and Jay Bird Shoals Conditions Survey, Bald Head Island, NC
Hydrographic Survey Technician, Fathometer Operator. McKim & Creed surveyed all 80 monitoring profile lines including the MHWL and the 5 transect lines and Jay Bird Shoal Borrow Area. The team also performed a single beam survey of the proposed Jay Bird Borrow Area near Bald Head Island. The area to be surveyed is approximately 405 acres which includes 500' of survey coverage outside the proposed permit limits of the borrow area.

Multibeam and Side Scan Sonar Surveys of Existing Bonner Bridge and Scour Protection - Dare County, NC
Hydrographic Survey Technician, CAD Technician. McKim & Creed provided a pre-demolition multibeam and side scan sonar survey of existing Bonner Bridge and scour protection, comprising an area of 1.25 miles by 150 feet.

Manasquan Inlet to Barnegat Inlet Beach Fill Project, U.S. Army Corps of Engineers - Philadelphia District, Point Pleasant, NJ
Hydrographic Survey Technician, CAD Technician. Since 2017, McKim & Creed has been providing hydrographic and topographic surveys for both pre- and post-dredging operations spanning from Manasquan to Barnegat Inlet, NJ as well as monthly deliveries of beach profiles in AutoCad Civil 3D and USACE Beach Morphology Analysis Package (BMAP). These surveys consist of single beam, wade and land surveys of over 700 beach profiles lines.

Dominion Energy Chesterfield Power Station Hydrographic Surveying, Chester, VA
CAD Technician. McKim & Creed performed hydrographic surveying for the power station, The scope of work consisted in performing 100% coverage plus 10% overlap multibeam and side scan sonar survey on Intake area of the power plant, and a single beam survey in the outfall area. The side scan images were used to perform approximate measurements of the water intake gates.

Hudson River Federal Navigation Channel between Kingston and Waterford, Albany, NY
Hydrographic Survey Technician. McKim & Creed provided hydrographic survey and volume calculations of the Hudson River Federal Navigation Channel between Kingston (Reach 63) and Waterford (Reach N01), New York. The area included two anchorage areas, the Albany Turning Basin. The survey consisted of 100% coverage plus 10% overlap over approximately 63 nautical miles of river channel using a Multibeam Echosounder System.

Martin Taylor, CH, CST Level II
CERTIFIED HYDROGRAPHER

KEY QUALIFICATIONS

- ✓ Hydrographic Surveying
- ✓ 3-D Laser Scanning
- ✓ Tide Stations
- ✓ Mapping
- ✓ GPS

EDUCATION

B.S., Physics, University of Waikato, New Zealand

PROFESSIONAL LICENSURE

Certified Survey Technician Level I

U.S. Coast Guard Captain's License / 107523

OSHA 10-hour Safety Training

Certified Survey Technician Level II Field

Certified Hydrographer / 318

Mr. Taylor has ten years of experience in the survey industry. He specializes in hydrographic surveying and has been supervising survey operations for six years. During this time he has used hydrographic, conventional and remote sensing survey equipment, as well as GPS. Mr. Taylor has performed a variety of land and hydrographic surveys, including multibeam, single beam, side scan, magnetometer, sub-bottom, topographic, boundary, beach profile, route, subdivision layout, as-built and remote sensing surveys. He is proficient in Terramodel (CAD Software), Auto CAD, HYPACK and HYSWEEP (Hydrographic survey processing and acquisition software).

SELECTED PROJECT EXPERIENCE

2010 Debordieu Beach Profile Survey, Debordieu Colony Community Association, Inc., Georgetown, SC
Mr. Taylor served as hydrographic specialist for this project. McKim & Creed performed beach profile and hydrographic surveys at 30 control reference locations.

Bald Head Island Beach Monitoring Surveys, Olsen Associates, Inc., Bald Head Island, NC
Mr. Taylor served as hydrographic survey technician for this project. McKim & Creed provided hydrographic surveying services that included performing beach profile surveys at 67 stations on the south, east and west facing beaches on Bald Head Island, NC. Surveys commenced at the inland toe of the primary dune system and extended seaward to a depth of -20 LF or 2,500 LF from the baseline, whichever was greater. Lines at several stations 46 were extended as needed to cross the exiting Federal Cape Fear River Shipping Channel. Profile surveys were performed on 16 existing geo-tube groin structures. Profiles ran along the centerline and each side (toe) of each structure.

Ocracoke Beach Profiles, Moffatt & Nichol Engineers, Ocracoke, NC
Mr. Taylor performed beach profiles surveys on 10 lines on Ocracoke Island. The land-based shots commenced 200 feet north of NC12 of the marsh line and ran seaward to elevation -5 feet NGVD29 or deeper. Shots were taken along each profile at a distance that did not exceed 25 feet and included all top, toes and other breaks in grade. The land based work was completed during low tide to ensure that the survey staff could get to the maximum safe depth. A hydrographic survey vessel completed the offshore portion of each profile. The offshore portions of the profiles near the beach were performed at high tide to ensure maximum coverage with minimal risk.

Bloody Point Beach Profile Surveys, Bloody Point Property Owners Association, Rockville, SC
Mr. Taylor served as hydrographic specialist for this project. McKim & Creed has performed hydrographic beach profile surveys for the Bloody Point Homeowners Association, South Carolina since 2006. In addition to performing annual profile surveys on approximately 20 historical ranges, McKim & Creed has established four new geodectic survey control monuments set in concrete that can be used for future surveys and construction projects on the Island. The annual surveys also include detailed soundings and a topographic survey in the area of a new terminal groin on the south side of the island.

Manteo Bay & Oregon Inlet Bridge Vicinity Spit Beach Nourishment Surveys, Great Lakes Dredge & Dock Company, Manteo, NC
Mr. Taylor provided hydrographic surveying services that included beach nourishment pre- and post-placement surveys at Manteo Bay near the Oregon Inlet Bridge in Outer Banks, NC. Data was processed on site and available immediately in Hypack form. In processing, data was converted to Microstation and In-Roads format, as well.

Michael Hurst, CST Level III
SENIOR CAD TECHNICIAN

Mr. Hurst has been with McKim & Creed for 23 years, the first five years as a survey crew party chief and the past 18 years as a CAD technician. He has extensive field experience with all types of surveys including topographic, boundary, wetlands, highway and bridge design surveys, subdivision layout, golf course layout, easement surveys, utility route surveys, beach profiles, and volumetric surveys. Since becoming a CAD technician Mr. Hurst has become proficient in Terramodel, AutoCAD 2009, MicroStation V8, C&G, TDS, and SMI. He is capable of using Microstation with Geopak and In-Roads COGO packages. In the past few years, Mr. Hurst has provided Microstation CAD deliverables for over 50 projects for the USACE.

KEY QUALIFICATIONS

- ✓ AutoCAD
- ✓ Microstation
- ✓ Terramodel

EDUCATION

A.A.S., Surveying Technology, Coastal Carolina Community College

A.A.S., Marine Construction Engineering Technology, Cape Fear Community College

A.A.S., Marine Laboratory Technology, Cape Fear Community College

PROFESSIONAL LICENSURE

Certified Survey Technician Level III Office

Certified Survey Technician Level III Boundary

SELECTED PROJECT EXPERIENCE

Bloody Point Beach Upland and Hydrographic Beach Profile Surveys, Erickson Consulting Engineers, Inc./Coastal Design & Engineering, Dafauskie Island, SC
Mr. Hurst served as CAD technician for this project. McKim & Creed performed beach profile monitoring surveys and ebb shoal surveys on 6,500 feet of beach frontage and Bloody Point Inlet. Set control monuments at each historic monitoring lines. There are 22 monitoring stations

2010 Debordieu Beach Profile Survey, Debordieu Colony Community Association, Inc., Georgetown, SC
Mr. Hurst served as CAD technician for this project. McKim & Creed performed beach profile and hydrographic surveys at 30 control reference locations.

Bald Head Island and Oak Island Beach Profile Survey, U.S. Army Corps of Engineers - Wilmington, Bald Head and Oak Island, NC
Mr. Hurst served as CAD technician for this project, which provided surveying and mapping services for designated areas onshore and offshore of Bald Head Island and onshore only on Oak Island. All horizontal or vertical control used for the survey was from a North Carolina or a United States Agency network and of third-order accuracy or better.

Bald Head Island Beach Monitoring Surveys, Olsen Associates, Inc., Bald Head Island, NC
Mr. Hurst served as CAD technician for this project. McKim & Creed provided hydrographic surveying services that included performing beach profile surveys at 67 stations on the south-, east- and west-facing beaches on Bald Head Island, NC. Surveys commenced at the inland toe of the primary dune system and extended seaward to a depth of -20 LF or 2,500 LF from the baseline, whichever was greater. Lines at several stations 46 were extended as needed to cross the existing Federal Cape Fear River Shipping Channel. Profile surveys were performed on 16 existing geo-tube groin structures. Profiles ran along the centerline and each side (toe) of each structure.

Absecon Inlet, NJ Beach Fill Project - Philadelphia District Corps, Weeks Marine, Inc., Absecon Island, NJ
Mr. Hurst served as CAD technician for this project, which provided contract work that consisted of a base bid to place approximately 1.5 million cubic yards of beachfill along the Atlantic Ocean coastline of Absecon Island in Atlantic County, New Jersey. The project area encompassed the municipalities of Atlantic City and Ventnor City. The contract work also consisted of the construction and repair of pedestrian, vehicle, and handicap dune crossovers; planting dune grass; providing sand fencing; repairing or extending existing storm water outfalls; and relocating or removing various existing structures to accommodate the new beachfill and dunes.

R. Lee Jackson, Jr., CST
FIELD SUPERVISOR

KEY QUALIFICATIONS

- ✓ Static GPS Surveys
- ✓ RTKGPS Surveys
- ✓ Wetland Surveys
- ✓ Subdivision layout
- ✓ Topographic Surveys

EDUCATION

Attended, Lenoir Community College

PROFESSIONAL LICENSURE

Certified Survey Technician Level I

OSHA 10-hour Safety Training

As a geomatics crew chief with McKim & Creed, Mr. Jackson has extensive experience performing all types of surveys, including topographic surveys, boundary surveys, beach profile surveys, route surveys, subdivision layout and as-built surveys. He is experienced with conventional survey equipment, robotic total stations and GPS. He has also been involved with high-order GPS control surveys.

SELECTED PROJECT EXPERIENCE

Debordieu Island Beach Renourishment Project Survey, Debordieu Colony Community Association, Inc., Georgetown, SC. Mr. Jackson served as party chief for this project. McKim & Creed performed beach fill profile and hydrographic surveys of borrow area. Post-construction survey was completed within three weeks of completion of beach fill placement. Monitoring survey was completed annually for two years.

Beach Profiles Ocean Isle, Holden Beach, and Shallotte Inlet (Task Order), U.S. Army Corps of Engineers - Wilmington District, NC, Ocean Isle, Holden Beach, NC
Mr. Jackson served as party chief for this project. The work includes elevation data collection along specified azimuths at specified intervals along existing baselines, breakline feature mapping, sinusoidal pattern data collection, hydrographic survey data collection, and the identification and location of existing storm sewer systems within the limits of the survey area.

Big Beach, Beach Monitoring Services Winter 2006/2007, City of Virginia Beach, Virginia Beach, VA
Mr. Jackson served as party chief for this project. McKim & Creed conducted a beach monitoring survey of approximately 32,000 LF in connection with a beach nourishment project along waterfront referred to as "Big Beach." Topographic and hydrographic cross-sections were performed every 500 feet along previously established baselines, and the new profiles were overlaid and compared to previously drawn USACE's BMAP. Additionally, the collected data was incorporated into a GIS for further analysis of shoreline and volumetric change. An evaluation of the remaining duration of the beach nourishment project was made based on these analyses, and a report summarizing findings was issued to the city.

Carolina and Kure Beaches Surveying Services, Greenhorne & Omara, Carolina and Kure Beach, NC
Mr. Jackson served as party chief for this project. McKim & Creed surveyed and mapped designated areas onshore and offshore of Carolina and Kure Beaches in North Carolina. The work included elevation data collection along specified azimuths at specified intervals along an existing baseline, breakline feature mapping, and hydrographic survey data collection within the survey limits.

Ocean View Norfolk VA Beach Profile Surveys Fall 2007 and Summer 2008, Moffatt & Nichol Engineers, Ocean View, VA
Mr. Jackson served as party chief for this project. McKim & Creed provided hydrographic surveying services that included beach profile surveys and land based profile surveys at a beach in Ocean View, VA. Land-based profile surveys commenced at inland toes of dunes; shots were taken along each profile that included all elevation tops, toes and breaks in grade.

CURRENT PROJECT WORKLOAD

"*To provide the most responsive and dependable service all the time*" is part of our firm-wide Mission Statement. These are more than just words on our wall. Being responsive and meeting our commitments is part of our culture and play a major part of our success in becoming the largest surveying & mapping operation in the Southeast United States.

At McKim & Creed, we use our best professional judgment, practices, and years of experience in determining the most practical, safe, and cost-efficient approach to each task. McKim & Creed has the experience and professionalism to get the assignment done on time, within the budget and with the utmost attention to the quality of the survey. We have achieved a seamless blend of the latest methodology with long-established basic surveying principles to maximize results. Our current workload allows for our proposed team to fully respond to the requests and needs of the Town of Nags Head.

We have carefully assessed our current and projected workload and are confident that our uniquely qualified team is available to provide the services required to complete this project on schedule.

KEY PERSONNEL AVAILABILITY

Each member of our proposed project team has been carefully selected to assemble a team that brings extensive experience. The table below demonstrates that our key personnel are available to perform on this project.

KEY TEAM AVAILABILITY

Tim Cawood, PLS	50%
David Jones, PLS, CFS	52%
Chad Burchette, PLS	70%
Jared Lambert, Captain	70%
Gabriela De Oliveira, CST, Captain	80%
Martin Taylor, CH, CST II	75%
Mike Hurst, CST III	80%
R. Lee Jackson, CST	80%

The availability shown represents the availability based on their current utilization rate, however they will be 100% available to your projects

McKim & Creed performed annual monitoring surveys for the Fort Fisher Revetment for the USACE

Attachment 1

RESPONDENT'S CERTIFICATION FORM

THIS PAGE MUST BE COMPLETED AND INCLUDED WITH THE SUBMITTAL CERTIFICATION

The undersigned hereby certifies, on behalf of the Respondent named in this Certification (the "Respondent"), that the information provided in this proposal submittal to Town is accurate and complete, and I am duly authorized to submit same. I hereby certify that the Respondent has reviewed this RFQ in its entirety and accepts its terms and conditions. I certify that all information contained in this proposal is truthful to the best of my knowledge and belief.

I further certify that I did not either directly or indirectly enter into any combination or arrangement with any person, firm or corporation, or enter into any agreement, participate in any collusion, or otherwise take any action in the restraint of free competition in violation of the Sherman Anti-Trust Act, 15 USCS Sections 1 et seq.; the North Carolina General Statutes Sections 133-24 through 133-31.

I further certify, under oath, that this proposal is made without prior understanding, agreement, connection, discussion, or collusion with any other person, firm or corporation submitting a proposal for the same product or service; no officer employee or agent of the Town of Nags Head or any other respondent is interested in said proposal; and that the undersigned executed this Respondent's Certification with full knowledge and understanding of the matters therein contained and was duly authorized to do so. This is an acknowledgement that FEMA financial assistance will be used to fund the contract only. The Respondent will comply with all applicable federal laws regulations, executive orders, FEMA policies, procedures, and directives. It is distinctly understood that the Town of Nags Head reserves the right to reject any or all proposals

McKim & Creed Inc

(Name of Respondent)

(Signature of Authorized Representative

David Jones, PLS

(Typed Name of Authorized Representative)

Regional Manager

(Title)

November 22, 2019

(Date)

HUB PARTICIPATION

McKim & Creed is committed to partnering with small businesses, small disadvantaged businesses, woman-owned businesses, and minority businesses when the need arises. A significant portion of McKim & Creed's services are performed for clients who routinely require HUB/DBE/MBE participation. We routinely work with and pursue HUB/DBE/MBE subconsultants and use our ever-expanding database of qualified HUB/DBE/MBE subconsultants to procure additional work depending on the needs of our clients. In fact, we have never failed to meet a client's contractual requirement in regard to the use of HUB firms.

McKim & Creed commits to exploring opportunities to achieve the 10% HUB Project Goal set forth by the Town.

SUBMITTED BY:
MCKIM & CREED | WILMINGTON, NC
910.343.1048 | MCKIMCREED.COM

McKIM&CREED
ENGINEERS SURVEYORS PLANNERS

FIRM GENERAL BACKGROUND

PROJECT TEAM

CURRENT PROJECT WORKLOAD

CERTIFICATION FORM

HISTORICALLY UNDERUTILIZED BUSINESS PARTICIPATION

Agenda Item Summary Sheet

Item No: **G-2**
Meeting Date: **May 6, 2020**

Item Title: From April 15th Board meeting – Discussion of 2020 Fireworks

Item Summary:

At the April 15th Board of Commissioners meeting, the Board considered the fireworks display for 2020. It was suggested at that time that due to the COVID-19 pandemic and to discourage mass gatherings, that fireworks for 2020 not be provided. This agenda item is provided for further discussion concerning holding a fireworks display this year.

Number of Attachments: 0

Specific Action Requested:

Provided for Board discussion.

Submitted By: Administration Date: April 28, 2020

Finance Officer Comment:

The Town will be able to cancel the contract and will need to notify the Visitors Bureau regarding grant award funding. Contract cost of $25,000 is split in half between the Town and the Visitors Bureau grant. The Board's decision will be reflected in the fiscal year 2020-2021 Manager's Recommended Budget.

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

As requested by the Board, this item is provided for discussion of this year's fireworks display.

Signature: Cliff Ogburn Date: April 28, 2020

Agenda Item Summary Sheet

Item No: **G-3**
Meeting Date: **May 6, 2020**

Item Title: From April 15th Board meeting – Discussion of status of recycling program

Item Summary:

Town Manager Ogburn and staff will provide an update of the Town's recycling program and present plans for discussion at the May 6th Board of Commissioners meeting.

Attached memo from Town Manager Ogburn provides additional details.

Number of Attachments: 1

Specific Action Requested:

Provided for Board discussion.

Submitted By: Administration Date: April 28, 2020

Finance Officer Comment:

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

Provide for Board review and discussion.

Signature: Cliff Ogburn Date: April 28, 2020

Town of Nags Head
Post Office Box 99
Nags Head, North Carolina 27959
Telephone 252-441-5508
Fax 252-441-0776
www.nagsheadnc.gov

MEMORANDUM

To: Board of Commissioners

From: Cliff Ogburn, Town Manager

Date: April 29, 2020

Re: Discussion of status of recycling program

At your May 6 meeting, I will ask the Board to render a decision on the town's recycling program. As the Board is aware, the town amended its contract with Bay Disposal earlier this year to allow for the incineration of recycling materials. This resulted from the changes to the recycling market and the substantial increases in costs to process recycling materials. At your April 15 meeting, I shared that the NC State Department of Environmental Quality has found a processing facility with reasonable costs that could serve northeastern North Carolina communities. Details about this continue to evolve. Since our last meeting, we have been offered a combination of pricing from the new processing facility, RDS of Portsmouth, VA, and Bay Disposal which is equivalent to the pricing of our current contract. This would allow us to continue with our current program as is. I have included a brief pricing analysis in the sidebar on the following page. I have concerns about the RDS contract since it includes penalties for contaminated loads which would create uncertainty as to how this would increase our costs. Additionally, RDS would like us to execute a five-year contract, which I would not recommend, primarily since our current hauling contract expires in 2022. I believe the town would need to align these contract terms and our preference would be to contract with one vendor for these services.

On Monday, May 4th, Bay Disposal is meeting with RDS to discuss a contract between the two entities. The goal of this discussion would be to provide Bay Disposal with terms that would allow the town to contract solely with them for recycling hauling and processing. We think this would eliminate the concerns about the misalignment of contract timelines as well as surcharges for contaminated loads. My intent is to provide the Board with these additional details as soon as they are available in advance of the meeting.

If Bay is successful in negotiating this contract the Board will need to determine if it wishes to continue recycling at the same price or suspend the program to realize a cost savings.

Option A – Recycle w/ Bay and RDS
Recycling Processing with RDS = $57 per ton
Approximately 902 tons @ $57 = $51,414
Hauling w/ Bay Disposal = $162,810
Additional Bay hauling charge per ton = $23
Approximately 902 tons @ $23 per ton = $20,746
Total cost for both contracts = $234,970
($51,414 + $162,810 + $20,746)
*(*Does not include any charges for contaminated loads; this could add an additional $121 per contaminated ton)*

Option B –Current contract w/ Incineration
Previous contract pricing:
Hauling = $195,000 (includes processing of materials collected by Bay Disposal)
Processing for materials delivered by town forces = $70 per ton; 579 tons at 70 per ton = $40,530
Total cost for current contract = $235,530
($195,000 + $40,530)

Option C – Eliminate Recycling
Bay contract price for hauling and processing of materials collected by Bay Disposal = $195,000
Bay collects approximately 323 tons which are included in their price; 323 tons diverted to Dare County @ $76 per ton = $24,548
579 tons collected by the town @ $70 per ton would increase to $76 per ton = $3,420
Total savings over current costs = $167,032
($195,000 - $24,548 - $3,420)

If the Board chooses to suspend the program to realize a cost savings, all material would be diverted to the Dare County Transfer Station @ $76 per ton. Several adjustments to our program need to be considered with this option. This would include any schedule changes and how we would treat the existing blue recycling carts. Our initial thought is that we will treat the blue carts as trash carts. If the schedule is not changed, we would be collecting trash two days in a row on the red and green routes, since the blue recycling carts are collected one day after the green trash carts.

Staff feels as though the best option regarding the schedule would include very limited changes to avoid confusion so close to the season. Staff recognizes the inefficiency of collections two days in a row on these routes; we believe we have the capacity to collect both green and blue carts on the same day however this would create a change to the schedule on two of our routes. The Board would need to determine if it is better to leave things the way they are this summer in order to maintain continuity, or to eliminate a day of back to back service. If we decide it is better to eliminate the back to back collection, we would recommend collecting both carts on Tuesday on the red and green routes. We recognize that now the green route would essentially receive one day of trash service, however they would have additional cart capacity since the recycling carts would be used for trash. I think the Board and staff believe that a suspension of this service would be temporary due to the current economic circumstances, and that our program could be reinitiated at some point in the future.

Agenda Item Summary Sheet

Item No: **H-1**
Meeting Date: **May 6, 2020**

Item Title: Committee Reports

Item Summary:

At the May 6th Board of Commissioners meeting, Board members will provide reports from meetings they have attended on behalf of the Town.

Number of Attachments: 0

Specific Action Requested:

Provided for Board update.

Submitted By: Administration Date: April 28, 2020

Finance Officer Comment:

No unbudgeted fiscal impact.

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

N/A

Signature: Cliff Ogburn Date: April 28, 2020

Agenda Item Summary Sheet

Item No: **H-2**
Meeting Date: **May 6, 2020**

Item Title: Consideration of Board/Committee appointments/reappointments

Item Summary: At the May 6th Board of Commissioners meeting, request appointments/reappointments be made to the following:

Planning Board	David Elder – term expires 5/3/20
Board of Adjustment	Don Milbrath (ALT) – term expires 6/7/20
Personnel Grievance Panel	Jean Flanigan (ALT) – term expires 6/7/20
Firemen's Relief Fund Board	Annette Ratzenberger – term expires 6/20
Firemen's Relief Fund Board	Rose Lay – term expires 5/20

All have indicated their interest in being reappointed.

Attached please find the Candidate Charts of those interested in serving on the Planning Board and Board of Adjustment. Also attached are tracking charts with current rosters for each.

Number of Attachments: 6

Specific Action Requested:

Provided for Board appointment/reappointment.

Submitted By: Administration Date: April 29, 2020

Finance Officer Comment:

No unbudgeted fiscal impact.

Signature: Amy Miller Date: April 29, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 29, 2020

Town Manager Comment and/or Recommendation:

N/A

Signature: Cliff Ogburn Date: April 29, 2020

Tracking Chart for Town of Nags Head ***CURRENT*** Planning Board Meeting Date: May 6, 2020

Name of Board/Committee	***Current members***	***Contact Info***	***Last appointed date***	***Seat expires***	***Eligible for Re-appointment***	***Notes***
Planning Board 3rd Tuesday at 9:00	Megan Vaughan Chair	Phone/email on file	02/07/18	02/07/21	No	
7 members Three (3) year terms	Kristi Wright Vice-Chair	Phone/email on file	01/08/20	01/08/23	No	
	David Elder	Phone/email on file	05/03/17	05/03/20	Yes	Interested in being reappointed
	Megan Lambert	Phone/email on file	11/07/18	11/07/21	No	
	Meade Gwinn	Phone/email on file	01/02/19	01/02/22	No	
	Gary Ferguson	Phone/email on file	01/08/20	01/08/23	No	
	Molly Harrison	Phone/email on file	01/08/20	01/08/23	No	

CANDIDATES Characteristic Chart – Planning Board Meeting Date: May 6, 2020

Applicant Name	Bd/Comm Interested in Serving	Yrs of Residency	Location of Residency	Education	Role in Community	Attributes to offer Bd/Comm	Special Interest in Bd/Comm	Currently serving on Town Bd/Comm
Barbara Ayars (7/31/18)	Planning Bd	6 yrs.	Gallery Row	BA & Law Degree	Retired attorney	Knowledge of environmental law	Assist w/maintaining a balance between ecosystem protection and use	No
Ellen Heatwole (8/28/18)	BOA/ Planning Bd	3 yrs.	SNH	Studies for ministry	Realtor	Knowledge of small business	Interested in keeping the town a great place to live, work and play	No
Lauren Evans (11/1/18)	BOA/ Planning Bd	7 yrs	Villa Dunes	BA Hospitality Mgmt	Restaurant Server	Knowledge in event planning and art	Wants to stay connected to decisions within the town	Arts & Culture
Al Friedman (12/27/18)	BOA/ Planning Bd	2.5 yrs.	SNH	Former Engineer	Realtor	Knowledge of management skills, logistics	Interested in being active in determining the direction town is going	No
Anne Farmer (1/30/19)	BOA/ Planning Bd	7 yrs. full time	SNH	MD-Economics	Information Technology	Experience on various bds/assocs.	Interested in being part of town to ensure it thrives	No
AG (Don) Milbrath (10/16/19)	Planning Bd	5 yrs.	Beach Road	BS Bus Admin Accounting	Self-employed Manager	Experience with Planning & Zoning Committees	Interested in utilizing experience for community good	BOA - (ALT)
Jim Troutman (01/16/20)	Planning Bd	14 yrs.	Southridge	Banking	Retired Banker	Career banker w/construction experience	To assist Town & BOC w/common sense review of future development maintaining NH values	No

Tracking Chart for Town of Nags Head ***CURRENT*** Board of Adjustment Meeting Date: May 6, 2020

Name of Board/Committee	*Current members*	*Contact Info*	*Last appointed date*	*Seat expires*	*Eligible for Re-appointment*	*Notes*
Board of Adjustment 2nd Thursday at 9AM as necessary 5 Regular Members 4 Alternate Members	Jack Cooper, Chair	Phone/email on file	9/5/18	9/5/21	No	
	Margaret Suppler Vice-Chair	Phone/email on file	2/06/19	2/06/22	No	
	Judy Burnette	Phone/email on file	6/05/19	6/05/22	No	
	John Mascaro	Phone/email on file	03/04/20	03/04/23	No	
	Bobby Gentry	Phone/email on file	2/07/18	2/07/21	No	
	Angelina Lowe (ALT)	Phone/email on file	03/04/20	03/04/23	No	
	Don Milbrath (ALT)	Phone/email on file	06/07/17	06/07/20	Yes	Interested in being reappointed
	Tina Adderholdt (ALT)	Phone/email on file	2/21/18	2/21/21	No	
	VACANT Alternate					

CANDIDATES Characteristic Chart Board of Adjustment Meeting Date: May 6, 2020

Applicant Name	Bd/Comm Interested in Serving	Yrs of Residency	Location of Residency	Education	Role in Community	Attributes to offer Bd/Comm	Special Interest in Bd/Comm	Currently serving on Town Bd/Comm
Barbara Ayars (7/31/18)	BOA/ Planning Bd	6 yrs	Gallery Row	BA & Law Degree	Retired attorney	Knowledge of environmental law	Assist w/maintaining a balance between ecosystem protection and use	No
Ellen Heatwole (8/28/18)	BOA/ Planning Bd	3 yrs	SNH	Studies for ministry	Realtor	Knowledge of small business	Interested in keeping the town a great place to live, work & play	No
Lauren Evans (11/1/18)	BOA/ Planning Bd	7 yrs	Villa Dunes	BA Hospitality Mgmt	Restaurant Server	Knowledge in event planning and art	Wants to stay connected to decisions within the town	Arts & Culture
Al Friedman (12/27/18)	BOA/ Planning Bd	2.5 yrs	SNH	Former Engineer	Realtor	Knowledge of time mgmt. & logistics	Interested in assisting in determining the direction of the town	Community Watch
Anne Farmer (1/30/19)	BOA/ Planning Bd	Full time 7 yrs	SNH	MS Economics	IT Mgmt 35 years	Experience w/variety of bds/assoc.	Wants to be part of the voice & process to ensure town thrives	Local Business Committee
Marvin Demers (11/22/19)	BOA	13 yrs	SNH	MA Industrial Engineering BA Mechanical Engineering	- Retired - Current Small business owner	Knowledge of Town's UDO and former commissioner	Wants to apply experience/knowledge of town's code and UDO	No

Tracking Chart for Town of Nags Head *CURRENT*
Personnel Grievance Panel

Meeting Date: May 6, 2020

Name of Board/Committee	*Current members*	*Contact Info*	*Last appointed date*	*Seat expires*	*Eligible for Re-appointment*	*Notes*
Personnel Grievance Panel 3 Registered Voters 3 Alternates	Perry White	Phone/email on file	03/04/20	03/04/23	No	
	Jeanne Kramer	Phone/email on file	11/04/17	11/04/20	No	
	Tina Adderholdt	Phone/email on file	09/05/18	09/05/21	No	
	Saundra Futrell (ALT)	Phone/email on file	03/04/20	03/04/23	No	
	Jean Flanigan (ALT)	Phone/email on file	06/07/17	06/07/20	Yes	Interested in being reappointed
	Vacant (ALT)					

Town of Nags Head ***CURRENT***
Firemen's Relief Fund Board of Trustees

Meeting Date: May 6, 2020

Name of Board/Committee	*Current members*	*Contact Info*	*Last appointed date*	*Seat expires*	*Eligible for Re-appointment*	*Notes*
Firemen's Relief Fund Board of Trustees	Robert Muller (Chair)	Phone/email on file	6/2009		N/A	Appointed by State Comr of Insurance - Serves at the pleasure of the State
	Annette Ratzenberger	Phone/email on file	6/2017	6/2020	Yes	Interested in being reappointed
	Rose Lay	Phone/email on file	5/2018	5/2020	Yes	Interested in being reappointed
	Phil Wolfe (Treasurer)	Phone/email on file	12/2020	12/2022	N/A	Appointed by Fire Dept
	Scott Hooper	Phone/email on file	12/2018	12/2020	N/A	Appointed by Fire Dept

Agenda Item Summary Sheet

Item No: **J-1**
Meeting Date: **May 6, 2020**

Item Title: Town Manager Ogburn – Update on plans for summer 2020 re: tents on the beach, lifeguards, and enforcement of social distancing on the beach

Item Summary:

At the May 6th Board of Commissioners meeting, Town Manager Ogburn will provide an update on plans for summer 2020 re: tents on the beach, lifeguards, and enforcing social distancing on the beach.

Attached please find Town Manager Ogburn's memo with additional details and a proposed beach sign encouraging social distancing.

Number of Attachments: 2

Specific Action Requested:

Provided for Board discussion.

Submitted By: Administration Date: April 28, 2020

Finance Officer Comment:

Insufficient information to determine fiscal impact.

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

Provided for Board review and discussion.

Signature: Cliff Ogburn Date: April 28, 2020

Town of Nags Head
Post Office Box 99
Nags Head, North Carolina 27959
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MEMORANDUM

To: Board of Commissioners

From: Cliff Ogburn, Town Manager

Date: April 29, 2020

Re: Update on plans for summer 2020 re: tents on the beach, lifeguards, and enforcement of social distancing on the beach

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At Commissioner Fuller's request, I will update and discuss with the Board plans for the upcoming summer (2020) to include tents on the beach, lifeguards, and enforcement of social distancing as part of relevant state and local orders.

As of May 1, 2020, the Town of Nags Head is under a State of Emergency Order with restrictions to maintain the public's health, safety, and welfare due to the impacts of COVID-19. The Governor's Executive Order No. 121, issued on March 27, 2020, prohibits gatherings of more than 10 people and requires social distancing to the extent individuals are using shared or outdoor spaces outside their residence. All individuals must keep a six-foot distance between one another unless they are part of the same family.

Dare County's Stay at Home Order, which the Town included in its most recent State of Emergency proclamation, further requires that all individuals are required to wear a mask or cloth face covering in public settings where other social distancing measures are difficult to maintain. This requirement is in place, currently, until May 22. The earliest a decision will be made regarding visitor entry into Dare County is May 8.

On April 23, 2020, NC Governor Cooper held a press conference to announce several important updates regarding the stay at home order and plans to reopen the state. First, he announced that the original stay at home order from Executive Order 121, which was set to expire on April 29th, has now been extended through Friday, May 8th. Governor Cooper also laid out a multistep plan for reopening the state in phases after May 8th, provided that certain metrics are met pertaining to the trajectory of cases, the ability to test and trace, and the availability of personal protective equipment. If and when those metrics are met, the state's reopening would impact the town's beach as follows:

Beginning May 8 - Phase 1

- Continue to limit gatherings to no more than 10 people.
- Continue to recommend face coverings in public spaces when 6 feet of social distancing isn't possible, which is required as part of the Dare County Order.
- Encourage employers to continue teleworking policies.
- Continue rigorous restrictions on nursing homes and other congregant care settings.
- Local emergency orders with more restrictive measures may remain in place.

At least 2-3 weeks after Phase 1 (May 22-29) - Phase 2

- Lift Stay at Home order with strong encouragement for vulnerable populations to continue staying at home to stay safe.
- Increase the number of people allowed at gatherings.

At least 4-6 weeks after Phase 2 (June 19 – July 3) - Phase 3

- Lessen restrictions for vulnerable populations with encouragement to continue practicing physical distancing and minimizing exposure to settings where distancing isn't possible.
- Further increase the number of people allowed at gatherings.

Ocean Rescue Staffing for Summer 2020

At the present time, the status of 16 of our 22 J-1 Visa Ocean Rescue staff is uncertain. The earliest date they may enter the US for employment has been moved from May 15 to June 15. Six of these guards have confirmed that they will not be able to wait until the June 15th date, seven are undecided, and nine are committed to coming at that time. Captain Motz has been able to recruit a few guards locally. At this time, it is unknown when visitors will be permitted entry into Dare County or what the beach population will be this summer. Ocean Rescue must be prepared ahead of a re-entry decision for visitors due to the need for advance training and education. Guards will be prepared for Memorial Day but with a reduction in the number of Lifeguard stands from 15-10. In addition to the guards assigned to those stands, six guards will patrol the beach via ATV, four supervisors will be split coverage on the beach and one Captain will be assigned daily, bringing the total daily staffing number to 21 guards for 11 miles of beach. This is a process that is continuously evaluated with the goal of having a highly trained and capable Ocean Rescue staff ready when the visitors are allowed reentry. Guards will train in groups of 10 or less. They will undergo daily health screenings to include temperature checks. Guards will be instructed to adhere to social distancing restrictions as much as possible.

Additionally, we will be following the suggestions made by Peter Wernicki, Medical Advisor of the USLA:

•Follow the directives of your employing agency, which should be informed by and consistent with the directives of state and local public health authorities.

•Use social distancing at work, avoiding large meetings, close training, and close proximity to others (example: one guard per stand/tower).

•Practice good personal hygiene, including regular hand washing.

•Use universal precautions when providing medical aid. Avoid mouth to mouth or mouth to mask resuscitation. Use a bag-valve-mask or positive pressure ventilator.

•Regularly clean the surfaces with which you, your fellow lifeguards, and the public come in contact.

•Avoid touching other people, including your fellow lifeguards, unless necessary.

•Consider regular temperature checks by lifeguards.

•If you feel ill, advise your supervisor.

Tent Monitoring and Removal

The Public Works Facilities Maintenance Division will conduct beach monitoring & removal of unattended equipment from 5am to 7am, Monday thru Saturday, from May 23, 2020 to September 7, 2020. Ocean Rescue staff will tag tents on Sunday and Public Works will tag tents Monday to Saturday. All tagged tents will be photo documented and logged. Tagged tents will be removed by FM staff Monday through Saturday. Staff will hand out pamphlets explaining the rules and providing visitors with town staff contact info if they have any questions. If the collection crews are stopped by an owner prior to the removal of a tent, staff would leave the equipment, provide the owner with the pamphlet, and answer any questions they may have. Large umbrellas are included in the monitoring and removal process. After collection, all items are treated as trash and disposed of. No retrieval is possible.

Two trucks will be used for the process; one will run north to south beginning at Eighth Street and another will run south to north beginning at McCall Court. Facilities Maintenance will adjust the process as necessary to develop a successful and consistent program.

Social Distancing – Enforcement on the Beach

While these requirements remain in effect per state and local orders, the Town's Beach Ambassador and Ocean Rescue staff will educate and inform our beach goers of the importance of gathering in groups of less than 10 individuals while maintaining a six-foot distance between parties. Obviously, enforcement will be nuanced and it is impractical to enforce distancing requirements on related or affiliated groups. Where we see the greatest potential for conflict is when someone establishes their location on the beach and another party places their equipment too close. While the town's beaches are spacious and most beachgoers are at least six feet apart, occasionally this may happen and someone may become uncomfortable and ask for assistance; most likely from our Ocean Rescue staff. Our protocol will be to ask the offending party for voluntary compliance followed by a response from the Town's Beach Ambassador or other Police staff if necessary. Our efforts will be strongly focused on compelling compliance through education and signage; not with heavy-handed enforcement. We do understand that even after the social distancing and mass gathering mandate is lifted, we may still receive calls from concerned citizens. We will play a role in mediating any disputes in order to provide a safe environment for our residents and visitors. Police staff will be training our Ocean Rescue staff in conflict resolution and de-escalation techniques to help them in these situations until LE arrive.

I am concerned that the public will expect that we strictly enforce this requirement. If visitation resumes before state and local orders are lifted, it will create practical difficulties with enforcement of these requirements. A clear effort from our staff to educate the public will hopefully show that we are making an attempt to inform the public of the social distancing requirements.

It is important to note that the town has not increased staffing levels to enforce social distancing and we will do our best to keep the beaches safe and our visitors compliant while maintaining a friendly visitor experience. We do not plan to try and limit beach populations via partial beach access closures or using any other means, as has been done in southern beach communities. If there is an inherent conflict between local and state orders, additional limitations may be something that the board should discuss.

Public beach bathhouse facilities will remain closed at this time until further guidance is received from Health Department officials regarding their safe opening.

I have attached a rendering of a potential sign for education purposes that will be placed at beach accesses and on lifeguard stands.

THANK YOU FOR PRACTICING

SOCIAL DISTANCING

TOWN OF
NAGS HEAD

Agenda Item Summary Sheet

Item No: **L-1**
Meeting Date: **May 6, 2020**

Item Title: Mayor Ben Cahoon – Discussion of "actionable" items from Envisioning Exercise – Future of Nags Head - from the Jan 23-24, 2020 Board Retreat

Item Summary:

One of the topics of discussion at the January 2020 Board of Commissioners Retreat concerned envisioning the future of Nags Head.

While this item will remain as a standing agenda item, discussion will continue once the Board can resume normal meetings.

Number of Attachments: 0

Specific Action Requested:

Provided for Board discussion.

Submitted By: Administration Date: April 28, 2020

Finance Officer Comment:

Insufficient information to determine fiscal impact.

Signature: Amy Miller Date: April 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: April 28, 2020

Town Manager Comment and/or Recommendation:

I will participate in the discussion as necessary.

Signature: Cliff Ogburn Date: April 28, 2020