

NAV PROJECT

THE POINT

BASELINE

EXISTING SCARP LINE

EBB
FLOOD

GROIN TO BE EXTENDED & BACK FILLED

RESTORED DUNE LINE (2010)

APPROXIMATE MHW

ATLANTIC OCEAN

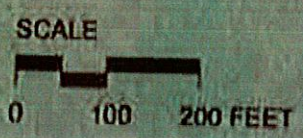
SOUTH BEACH

X TURTLE NEST (EXISTING)

SAND TUBE GROIN

BEACH FILL (2010)

EXISTING SAND BAG REVETMENT (BURIED)



Aerial Date: April 2011

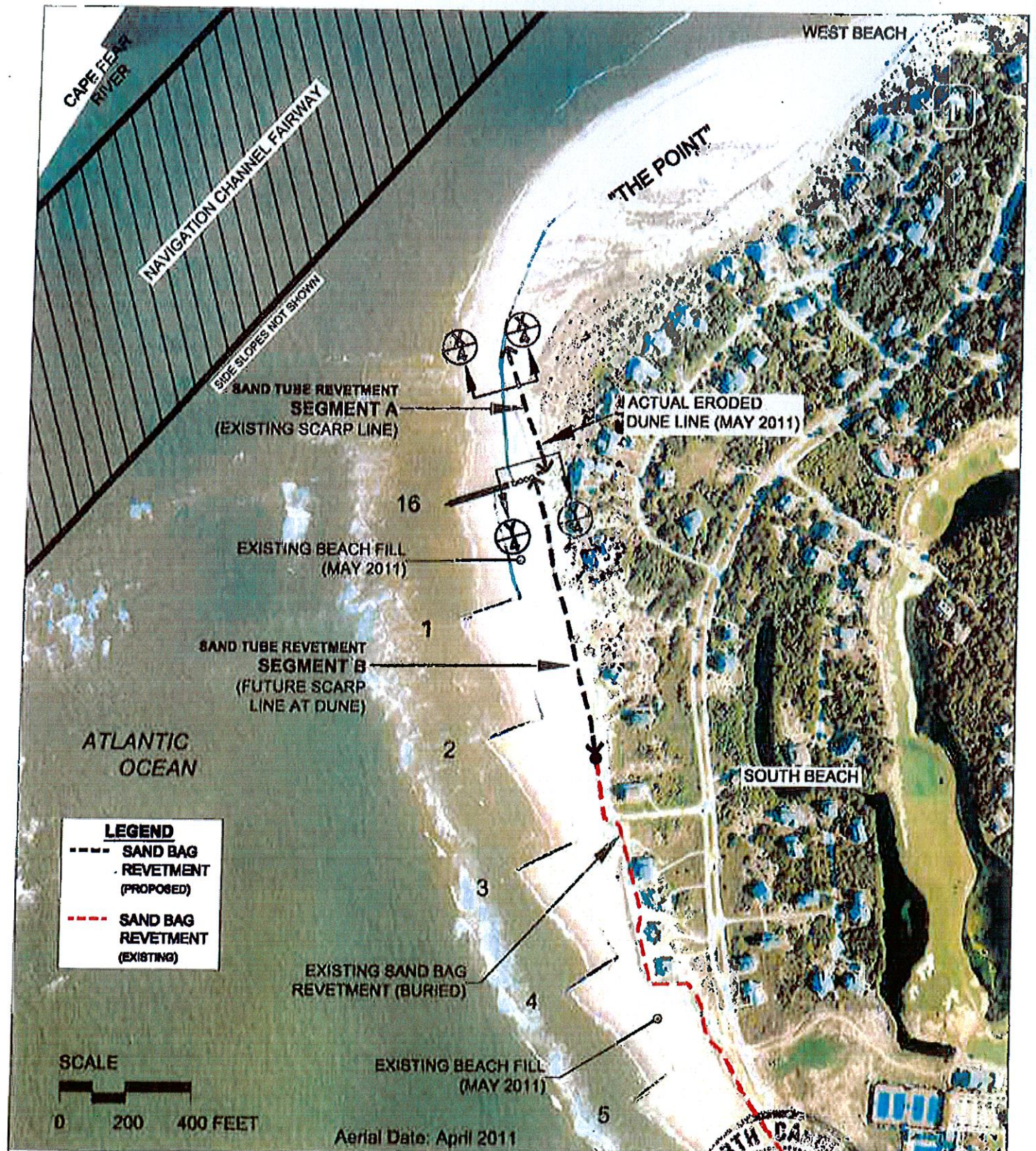
olsen
associates, inc.
2618 Herschel Street
Jacksonville, FL 32204
(904) 387-6114
(Fax) 384-7368

SAND BAG REVETMENT EXTENSION
BALD HEAD ISLAND, NORTH CAROLINA

EXISTING CONDITIONS
(JUNE 2011)



DATE	APPROVED	REVISION	DATE
			7/07/11
DRAWN BY:			ML
SHEET			2 of 4



LEGEND
 - - - SAND BAG REVETMENT (PROPOSED)
 - - - SAND BAG REVETMENT (EXISTING)

SCALE
 0 200 400 FEET

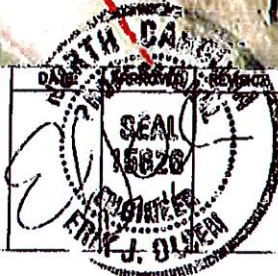
Aerial Date: April 2011



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**SAND BAG REVETMENT EXTENSION
 BALD HEAD ISLAND, NORTH CAROLINA**

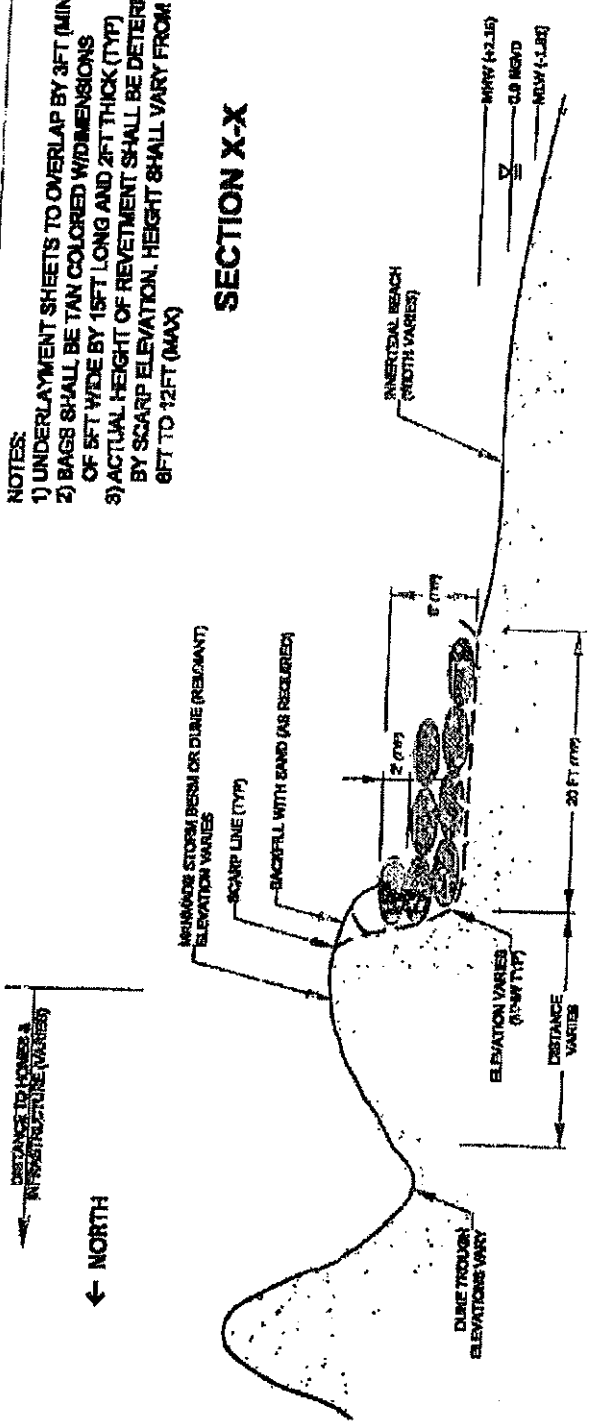
PLAN OF IMPROVEMENT



DATE:	7/07/11
DRAWN BY:	ML
SHEET	3 of 4

- NOTES:
- 1) UNDERLAYMENT SHEETS TO OVERLAP BY 3FT (MIN)
 - 2) BAGS SHALL BE TAN COLORED DIMENSIONS OF 5FT WIDE BY 15FT LONG AND 2FT THICK (TYP)
 - 3) ACTUAL HEIGHT OF REVETMENT SHALL BE DETERMINED BY SCARP ELEVATION. HEIGHT SHALL VARY FROM 6FT TO 12FT (MAX)

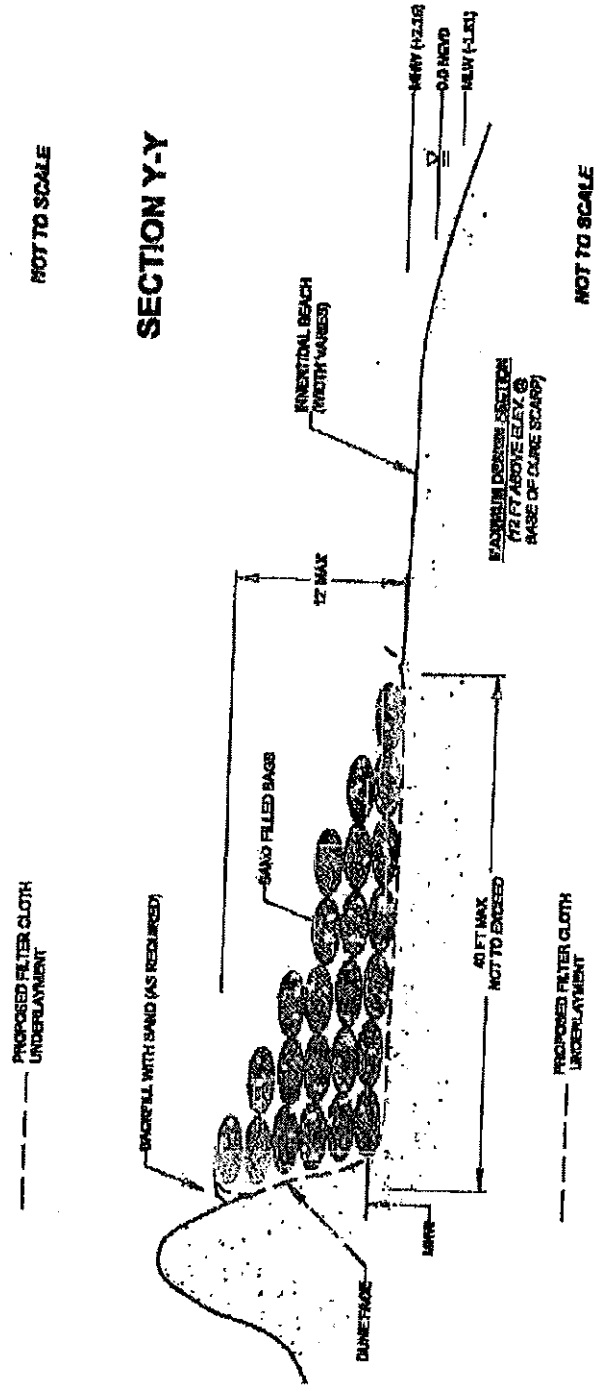
SECTION X-X



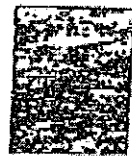
MINIMUM DUNE BEACH SECTION
 6 FT ABOVE ELEV @
 BASE OF DUNE SCARP

NOT TO SCALE

SECTION Y-Y



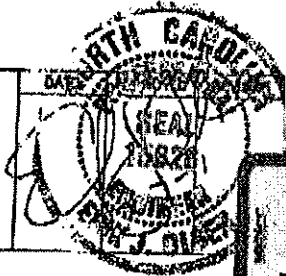
NOT TO SCALE



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 associates, inc.
 2618 Herschel Street
 Jacksonville, FL 32204
 (904) 387-6114
 Fax: 904-7368

SAND BAG REVETMENT EXTENSION
 BALD HEAD ISLAND, NORTH CAROLINA

**SAND BAG REVETMENT
 TYPICAL SECTIONS**



DATE: 7/07/11
 DRAWN BY:

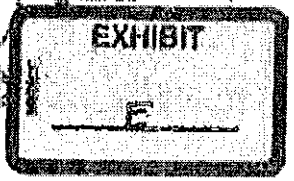
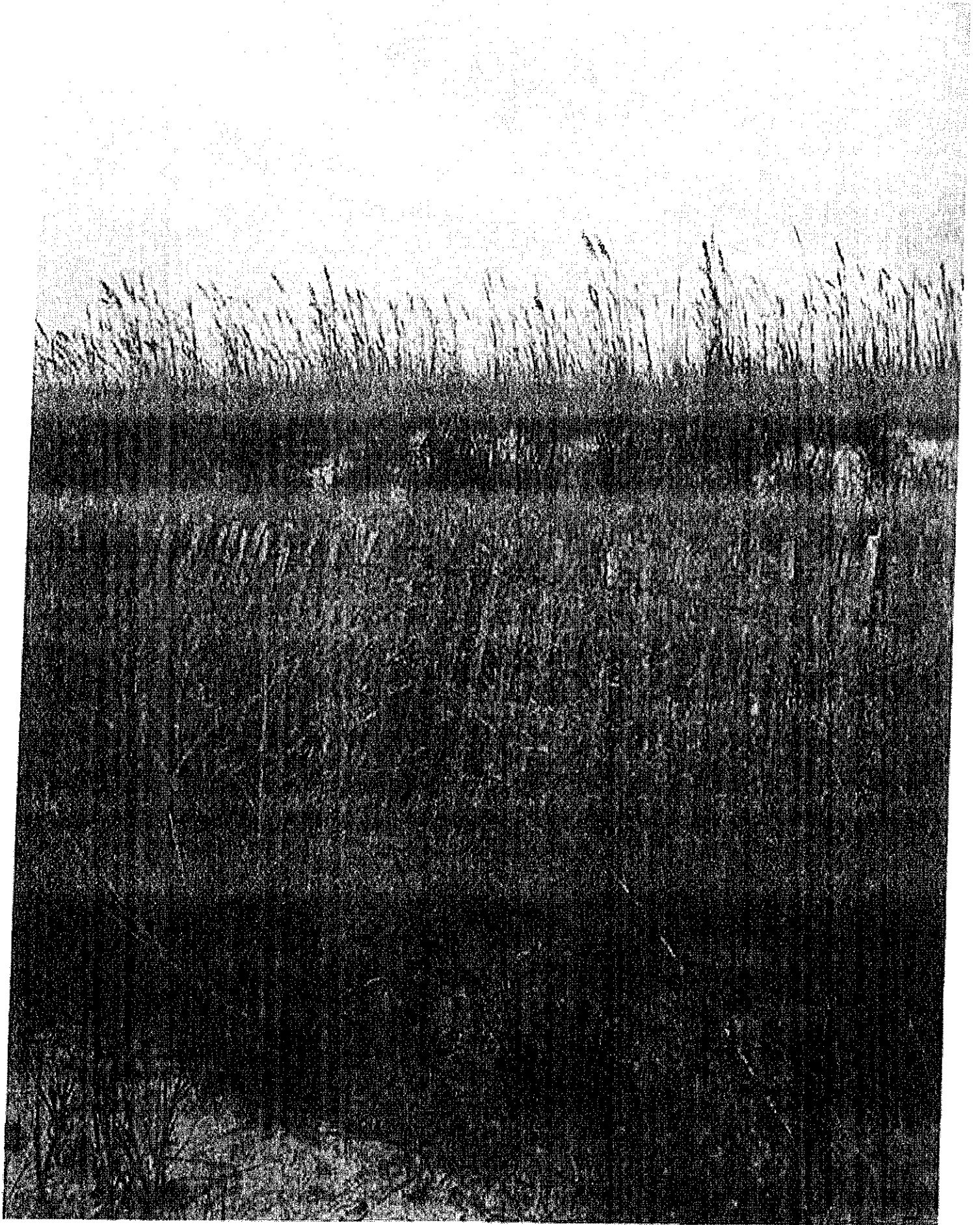




EXHIBIT
1





North Carolina Department of Environment and Natural Resources
Division of Coastal Management

Beverly Eaves Perdue
Governor

James H. Gregson
Director

Dee Freeman
Secretary

July 11, 2011

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

The Village of Bald Head Island
PO Box 3009
Bald Head Island, NC 28461

Dear Sirs:

This letter is in regards to your application request under the Coastal Area Management Act (CAMA) and the State Dredge and Fill Law to construct a sandbag revetment along a section of ocean beach on Bald Head Island, Brunswick County. Processing of the application, which was received by the Division of Coastal Management's Wilmington office on July 7, 2011, is now complete. Based on the state's review, the Division of Coastal Management has made the following findings:

- 1) CAMA Permit No. 9-95 was issued on January 31, 1995, authorizing approximately 14,000 linear feet of beach nourishment along the South and West Beach sections of Bald Head Island's oceanfront shoreline. This nourishment project was in response to continued erosion of the oceanfront beach in these areas. Due to inconsistencies with the Rules of the Coastal Resources Commission, CAMA Permit No. 9-95 specifically prohibited the construction of an associated sand tube groin field.
- 2) On February 20, 1995, the Village of Bald Head Island applied for a variance from the Rules of the Coastal Resources Commission that prohibited construction of the sand tube groin field. On March 23, 1995, the Coastal Resources Commission granted a variance to the Village of Bald Head Island allowing for the construction of 14 to 16 sand tube groins, 230 to 300 feet in length. Subsequently, CAMA Permit No. 9-95 was amended on July 7, 1995 to allow for the construction of the groin field.



400 Commerce Ave., Morehead City, NC 28557
Phone: 252-808-2808 \ FAX: 252-247-3330 Internet: www.nccoastalmanagement.net

An Equal Opportunity \ Affirmative Action Employer

One
North Carolina
Naturally

- 3) Numerous modifications to CAMA Permit No. 9-95 have been issued since the original permit was issued. These modifications have allowed for continued maintenance of the groin field, including reconstruction and slight realignments of the tubes.
- 4) The beach within the vicinity of the groin tubes has received sand several times since the groin field was constructed, either as a result of the nourishment projects initiated by the Village of Bald Head Island or from the placement of sand by the U.S. Army Corps of Engineers resulting from the maintenance dredging of the Wilmington Harbor.
- 5) On July 7, 2011, The Village of Bald Head Island applied for a minor modification to Permit No. 9-95, in which authorization was requested to construct a 1,300-linear-foot sandbag revetment along South Beach and the western end of the Point. As proposed, the sandbag revetment would be installed in 2 segments. Both segments of the requested revetment would be placed oceanward of the eroding dunes. Segment A would involve the construction of a 350-linear-foot sandbag revetment at and to the north of Sand Tube Groin No. 16. Segment B would involve the future construction of a 950-linear-foot sandbag revetment to the south of Sand Tube 16. The July 7, 2011 minor modification request stated that the 950-foot Segment B revetment would only be installed "in consult with DCM as conditions necessitate it". The modification request does not describe what conditions would need to occur to initiate this consultation.
- 6) As proposed, the sandbag revetment would be between 6 and 12 feet in height, with a base width of between 20 and 40 feet. Information submitted by The Village of Bald Head Island indicate that the actual height and width of the sandbag revetment would be determined by scarp elevation at the time of construction.
- 7) Based upon current site conditions, all of the 350-linear-foot Segment A revetment would be constructed below the mean high water line.
- 8) The Division of Coastal Management has not determined that any imminently threatened roads, buildings or associated septic systems, as defined by 15A NCAC 07H .0308(a)(2)(B) exist within the project area.
- 9) Based upon the above referenced items, the Division of Coastal Management has determined that the proposed project is inconsistent with the following Rules of the Coastal Resources Commission:
 - i) 15A NCAC 07H .0308 (a)(2)(B), which states "Temporary erosion control structures as defined in Part (2)(A) of this Subparagraph shall be used to protect only imminently threatened roads and associated right of ways, and buildings and their associated septic systems. A structure shall be considered imminently

Village of Bald Head Island
July 11, 2011
Page 3


threatened if its foundation, septic system, or right-of-way in the case of roads, is less than 20 feet away from the erosion scarp. Buildings and roads located more than 20 feet from the erosion scarp or in areas where there is no obvious erosion scarp may also be found to be imminently threatened when site conditions, such as a flat beach profile or accelerated erosion, increase the risk of imminent damage to the structure."

- ii) 15A NCAC 07H .0308 (a)(2)(B), which states "Permittable temporary erosion control structures shall be limited to sandbags placed landward of mean high water and parallel to the shore."
- iii) 15A NCAC 07H .0308 (a)(2)(K), which states "Sandbags used to construct temporary erosion control structures shall be tan in color and three to five feet wide and seven to 15 feet long when measured flat. Base width of the structure shall not exceed 20 feet, and the height shall not exceed six feet."

Given the preceding findings, it is necessary that your request for issuance of a CAMA Major Permit be denied. This denial is made pursuant to N.C.G.S. 113A-120 (a)(8), which requires denial for projects inconsistent with the state guidelines for Areas of Environmental Concern or local land use plans.

If you wish to appeal this denial, you are entitled to a hearing. The hearing will involve appearing before an Administrative Law Judge who listens to evidence and arguments of both parties and then makes a recommendation to the Coastal Resources Commission. Your request for a hearing must be in the form of a written petition, complying with the requirements of §150B of the General Statutes of North Carolina, and must be filed with the office of Administrative Hearings, 6714 Mail Service Center, Raleigh, NC 27699-6714, (919) 733-2698, within twenty (20) days from the date of this letter. A copy of this petition should also be filed with this office. If you have any questions concerning this matter, please contact Mr. Doug Huggett at (252) 808-2808, ext. 212.

Sincerely,


James H. Gregson

cc: Colonel Jefferson Ryscavage – U.S. Army Corps of Engineers, Wilmington, NC
David Kennedy, Director – OCRM/NOAA, Silver Spring, MD



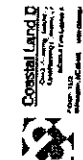
LEGEND

10	EXISTING CONC ELEVATIONS
1026	LOT LINES / FENCE
	LOT NUMBER
	DRAFTING STYLE
	WOODEN WALKWAY
	WOODEN BEACH

REV.	DESCRIPTION
A	ADD DIMENSIONS PER ILL. REVISED



The Village of Bald Head
Bald Head Island, NC

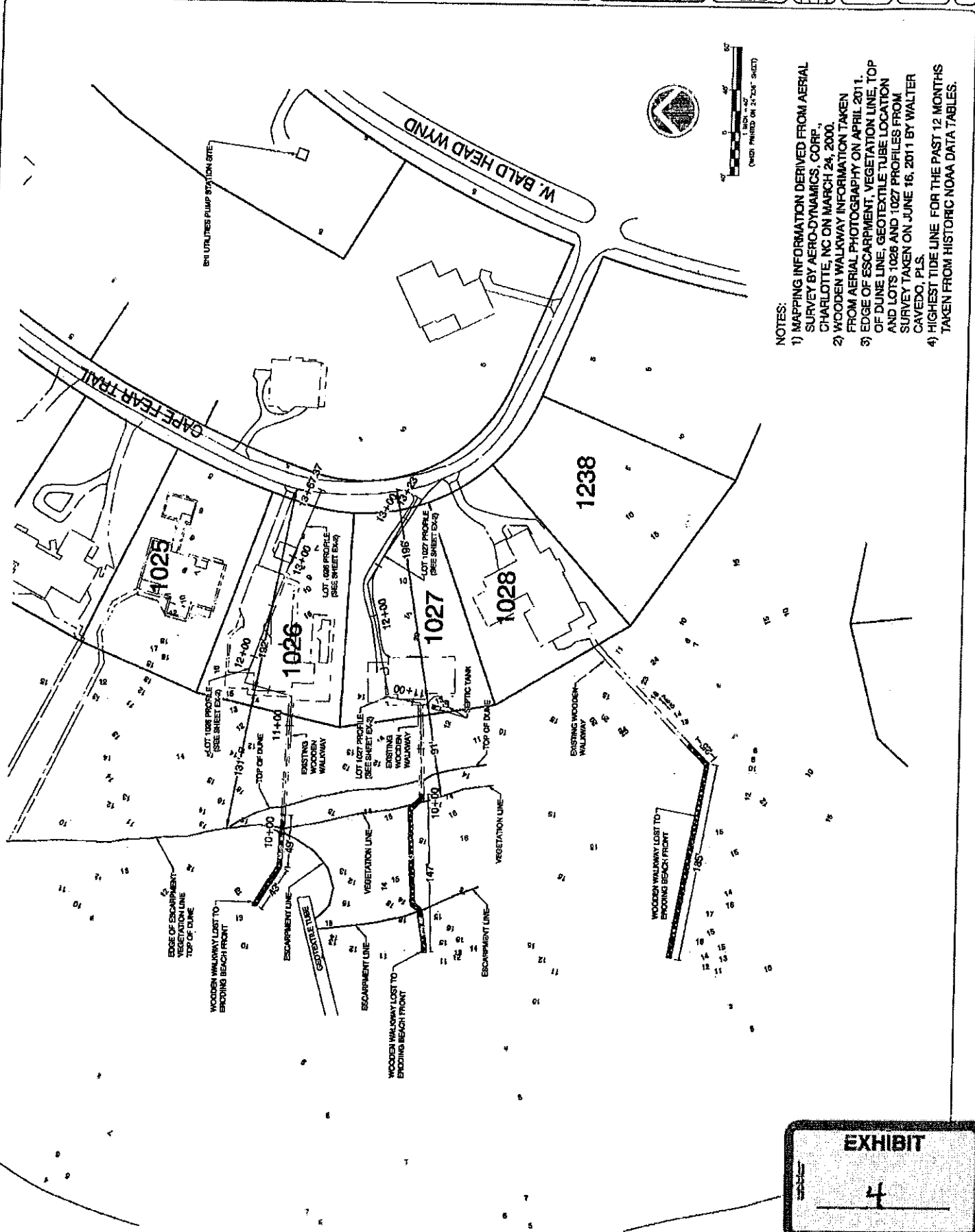


NO.	DATE	BY	REVISION
1	1/17/03	JK	PRELIM
2	1/21/03	JK	REVISED
3	1/21/03	JK	REVISED
4	1/21/03	JK	REVISED
5	1/21/03	JK	REVISED
6	1/21/03	JK	REVISED
7	1/21/03	JK	REVISED
8	1/21/03	JK	REVISED
9	1/21/03	JK	REVISED
10	1/21/03	JK	REVISED

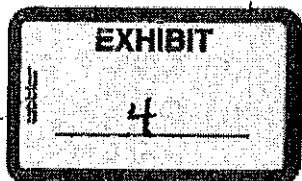
The Village of Bald Head
Bald Head Island, NC

TOPOGRAPHIC EXHIBIT OF CAPE FEAR TRAIL

250-03



- NOTES:**
- 1) MAPPING INFORMATION DERIVED FROM AERIAL SURVEY BY AERO-DYNAMICS, CORP., CHARLOTTE, NC ON MARCH 24, 2000.
 - 2) WOODEN WALKWAY INFORMATION TAKEN FROM AERIAL PHOTOGRAPHY ON APRIL 2011.
 - 3) EDGE OF ESCARPMENT, VEGETATION LINE, TOP OF DUNE LINE, GEOTEXTILE TUBE LOCATION AND LOTS 1026 AND 1027 PROFILES FROM SURVEY TAKEN ON JUNE 16, 2011 BY WALTER CAVEDO, PLS.
 - 4) HIGHEST TIDE LINE FOR THE PAST 12 MONTHS TAKEN FROM HISTORIC NOAA DATA TABLES.





BALD HEAD ASSOCIATION

P.O. BOX 3030

BALD HEAD ISLAND, N.C. 28461

June 17, 2011

DENR, Wilmington Regional Office
Attn: Heather Coats, DCM Field Representative
127 Cardinal Drive Extension
Wilmington, NC 28405-3845

RE: Authorized Agent

Dear Ms. Coats,

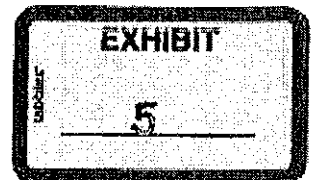
This letter is to request that the Division of Coastal Management permit the Village of Bald Head Island to act as the authorized agent for Bald Head Association in filing a Minor Permit Application to install a sandbag revetment wall located on Bald Head Association "common area."

If you have any questions feel free to contact me at 910-457-4676.

Sincerely,

Carrie Moffett
Executive Director

Cc: Chris McCall, Shoreline Protection Manager, CAMA LPO





July 6, 2011

To whom it may concern,

The BHI Conservancy is a non-profit environmental organization whose mission is Barrier Island Conservation, Education, and Preservation. In business for 28 years, the organization grew as a result of the BHI community's desire to "live in harmony with nature." We are funded through private donations, educational programs, and foundation grants. Our staff includes environmental professionals with academic credentials and strong experience in the field of barrier island conservation. The Sea Turtle Protection Program is the only privately permitted effort to tag these protected species. We have been a NMFS index nesting beach for over 20 years and are the only beach in NC that conducts an all-night saturation tagging program, whereby all nesting females are documented along with each nest. In addition to our work with turtles, we monitor nesting shorebirds, maritime forest and salt marsh environments. In 2009 we established a dune monitoring protocol that covers our 14 miles of beach. This survey tracks the changes of vegetated dunes throughout the island.

The BHI Conservancy supports efforts to protect critical dune habitat on our southwestern beaches. Since 2009 the area has experienced significant non-natural erosion. Our monitoring has documented losses of up to 40 meters at some key sites. In the past, these sites were important nesting habitat for shorebirds in addition to turtle nesting habitat and home to rare species like the coachwhip snake and the federally threatened seabeach amaranth. The habitat also provided important ecosystem services for the globally imperiled maritime forest ecosystem (NC Natural Heritage Foundation), which sits behind the impacted area along our dune ridge.

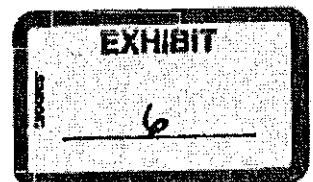
Because the context of this erosion is non-natural, not being primarily due to sea level rise, we contend that extraordinary measures are justified to protect well-established dunes in the vicinity of the southwestern point of Bald Head Island. We acknowledge that these last resort measures are not the environmental ideal, but still necessary to limit additional damage to dunes and dune ecosystems.

Please support the strategy developed by the Village of Bald Head Island in consultation with the Marine Engineer (Olsen and Associates) and the BHI Conservancy. The BHI Conservancy at the direction of its board of directors is committed to provide any technical support for the Village of BHI as they work to stabilize the dunes.

Thank you for the consideration that DCM is providing to protect established dunes on BHI.

Sincerely,

Suzanne E. Dorsey, Ph.D
Executive Director





July 8, 2011

James H. Gregson, Director
Division of Coastal Management
North Carolina Department of Environment
and Natural Resources
400 Commerce Avenue
Morehead City, NC 28557

Re: Village of Bald Head Island

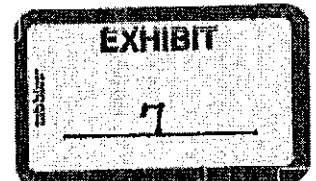
Dear Mr. Gregson:

We are providing this letter to express our unreserved support for the measures that the Village of Bald Head Island (Village) is seeking to implement in order to address the un-natural and highly accelerated rate of erosion at the area we refer to as the "Point" - where the Cape Fear River channel joins the Island's South and West Beach areas. Bald Head Island Limited, LLC has been responsible for the development of Bald Head Island for more than twenty seven years. During that time, we have enjoyed a productive relationship with the Division and fully appreciate the goals and objectives of the Coastal Area Management Act and the manner in which responsible development can take place within its rules and regulations, while addressing the acknowledged interests of property owners, the environment and the public at large.

For years the Point had experienced stable or accreting beach conditions in front of the adjacent homes, in particular those located on Cape Fear Trail. This had been a substantial area of natural wildlife and plant species habitat protected by frontal and secondary dunes. Within the last two to three years there has been increasing and unprecedented erosion of these features largely as a consequence of the manner in which the Cape Fear River channel has been dredged and maintained. In an effort to at least temporarily stave off the unnatural erosion threats in 2010, the Village undertook its own property owner funded beach re-nourishment project. However, within a year over half of the sand placed upon these beaches has eroded, much of it at the Point, and there has been a total loss of entire portions of the West Beach area.

This accelerating rate of erosion is now destroying the last of the once extensive protective dune barrier which in turn poses imminent threat to the nearby homes, infrastructure and remaining habitat. This is not the consequence of natural littoral movement, but the actions and inaction of agencies responsible for the maintenance of

Bald Head Island Limited
Post Office Box 3069 • Bald Head Island, North Carolina 28461
910-457-5000 • 800-234-1666 • www.baldheadisland.com

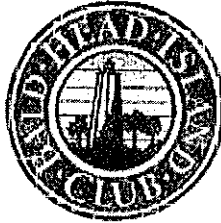


the adjacent ship channel. As such the Village, impacted property owners and our numerous visitors drawn from the public at large, now face unnecessary hardships and loss of resource access that is not the result of natural conditions, conduct on their part or characteristic of the impacted properties. Accordingly, we believe that the objectives of our State's coastal program and the public interest justify approval of those measures being requested by the Village. We respectfully encourage the Division to work with the Village and any reviewing tribunal to authorize actions that will help responsibly mitigate the situation.

Sincerely,

A handwritten signature in black ink, appearing to read "Charles A. Paul, III". The signature is written in a cursive style with a large, rounded initial "C" and a long, sweeping tail.

Charles A. Paul, III
Chief Executive Officer



July 8, 2011

Division of Coastal Management
North Carolina Department of Environment and Natural Resources
400 Commerce Avenue
Morehead City, NC 28557

Attn: Mr. James H. Gregson, Directory
Mr. Doug Huggett, Manager

Dear Mr. Gregson and Mr. Huggett,

On behalf of the Bald Head Island Club Board of Governors, as well as the members of the Club, I am writing to communicate our complete support of the Village of Bald Head Island's beach erosion prevention plan.

This unnatural erosion of the South and West beaches pose the following risks to the Bald Head Island community, but are not limited to: (1) the South facing beach has eroded to the point where it poses risks to the Bald Head Island Club property and our members use of the Club facilities, (2) South Bald Head Wynd contains the underground utility infrastructure and it is particularly vulnerable to additional erosion, and (3) several of the Club members have homes along the South beach which are at risk. These risks, as well as others threaten the economic viability of Bald Head Island.

The majority of Bald Head Island property owners also possess an equity interest in the Bald Head Island Club. Therefore, their potential loss ascends much higher than the impending loss of their property alone. As a small community, we stand united to protect our island.

The members of the Bald Head Island Club appreciate any assistance you could provide to help the Village move forward with the temporary measures to protect the dunes and infrastructure vital to the property owners on Bald head Island.

Should you have any questions, I may be reached by calling 910.457.9572 or by emailing me at eeramm@msn.com.

Sincerely,

Gene Ramm
President, Board of Governors
Bald Head Island Club





BALD HEAD ASSOCIATION
P.O. BOX 3030
BALD HEAD ISLAND, N.C. 28461

July 6, 2011

Division of Coastal Management
North Carolina Department of Environment and Natural Resources
400 Commerce Avenue
Morehead City, NC 28557

Attn: Mr. James H. Gregson, Director
Mr. Doug Huggett, Manager

Dear Mr. Gregson and Mr. Huggett,

On behalf of Bald Head Association (BHA), we write to state that our organization has no objection to, and in fact supports the Village of Bald Head Island's beach erosion prevention efforts of placement of a sand revetment wall on the beach located near The Point, where West and South Beaches meet.

As you are aware, the property specifically included in the variance application submitted by the Village is 'common area' owned by the BHA. The non-natural accelerated erosion experienced by this portion of BHA property is significant. Engineers estimate that as much as 350 feet of beach disappeared between April 2010 and April 2011. And, the situation continues to worsen with each passing day, week and month.

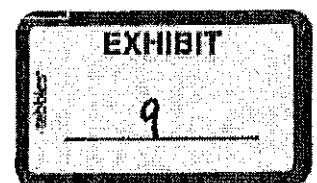
With its location adjacent to a federal navigation channel, the cause of this non-natural accelerated erosion on Bald Head Island has clearly been inspired by outside forces beyond BHA's control. However, the resulting situation is exasperating for BHA and for our member property owners – particularly those whose residences are located along Cape Fear Trail. When those homes were built, they were conservatively sited, but as a result of the non-natural accelerated erosion that has occurred there, the dune and associated natural habitat that was once abundant there is rapidly disappearing – and our member property owners' homes are in seemingly imminent danger. This sand revetment wall can help temporarily slow the rate of erosion until a longer-term solution can be implemented.

We appreciate whatever help you can provide to expedite the Village's variance application to help provide a stopgap measure to help protect the dune, what remains of BHA's property there and our member property owner's homes. Please contact me if you have any questions or need additional information.

Sincerely,

Jerry VanSant
President

Carrie Moffett
Executive Director



Village of Bald Head Island (Project Map w/ Street Locations)

WILMINGTON HARBOR
NAVIGATION CHANNEL

SEGMENT A

SEGMENT B

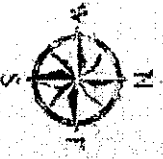
EXISTING SAND BAG
RETAINMENT

SAND PAPER FENCE

SOUTH BALD HEAD WIND

CAPE FEAR TRAIL

WEST BALD HEAD WIND



April 2011 Orthophotography

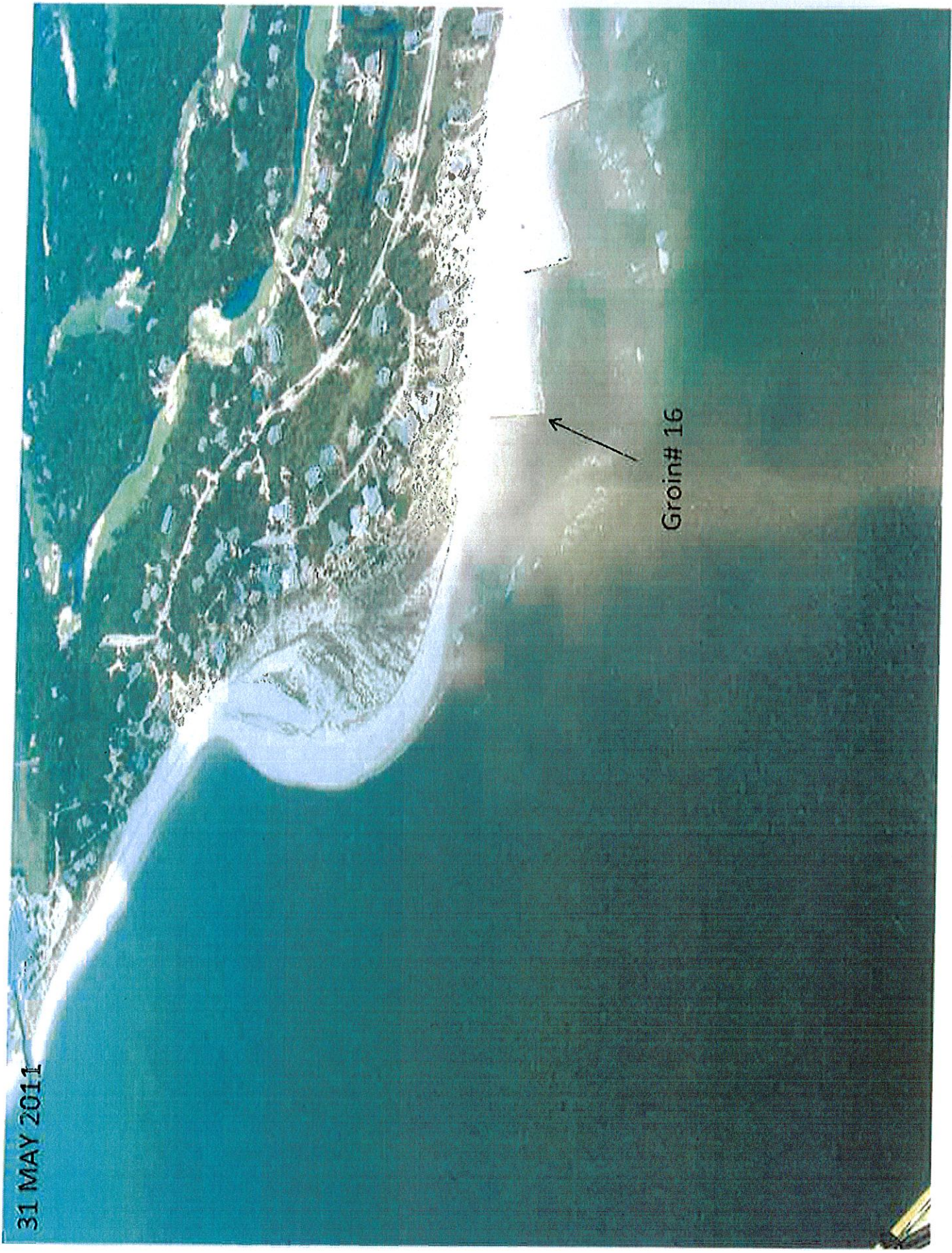


EXHIBIT
10

FEB 2011



31 MAY 2011



Groin# 16

12 JUL 2011

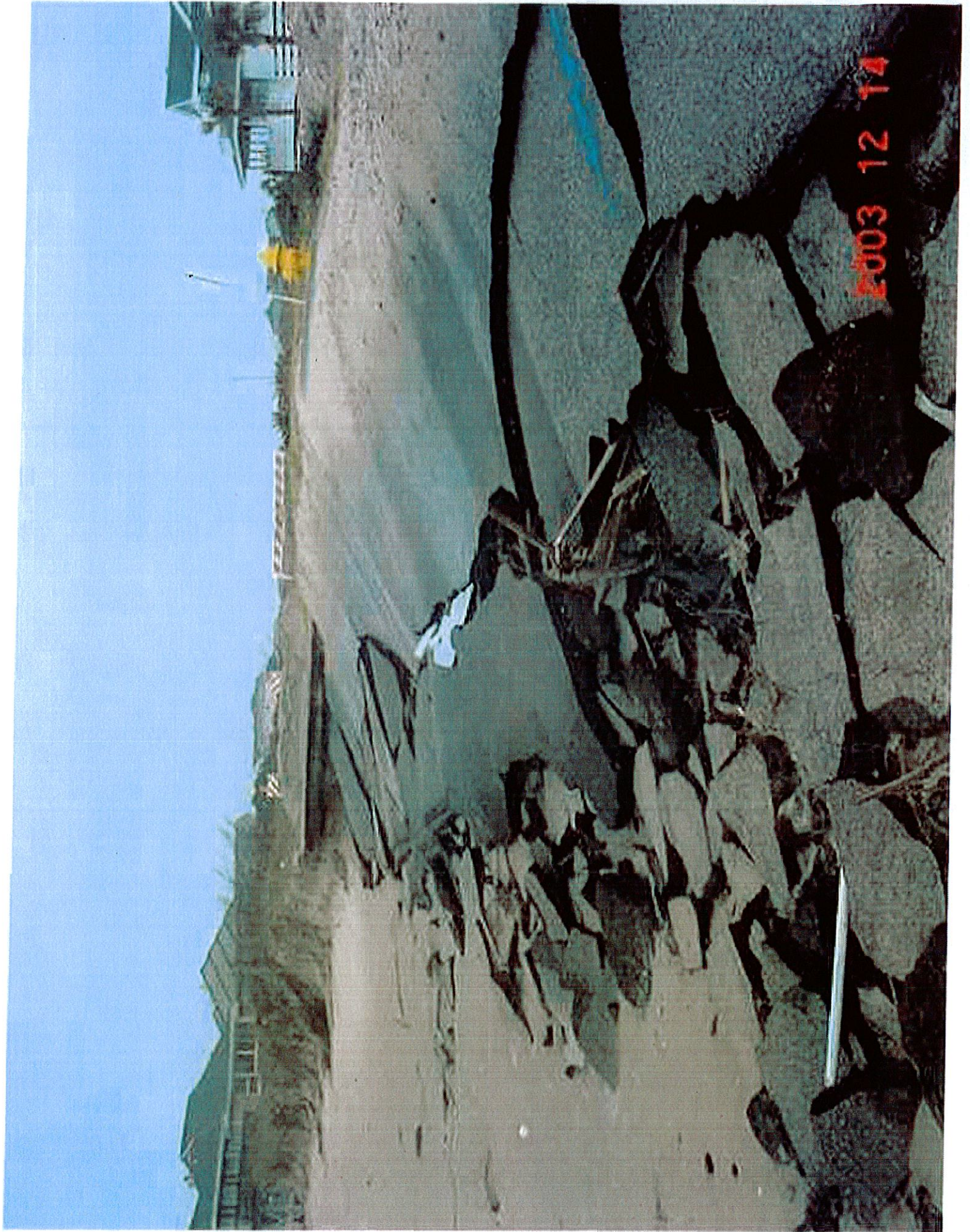


Groyne# 16

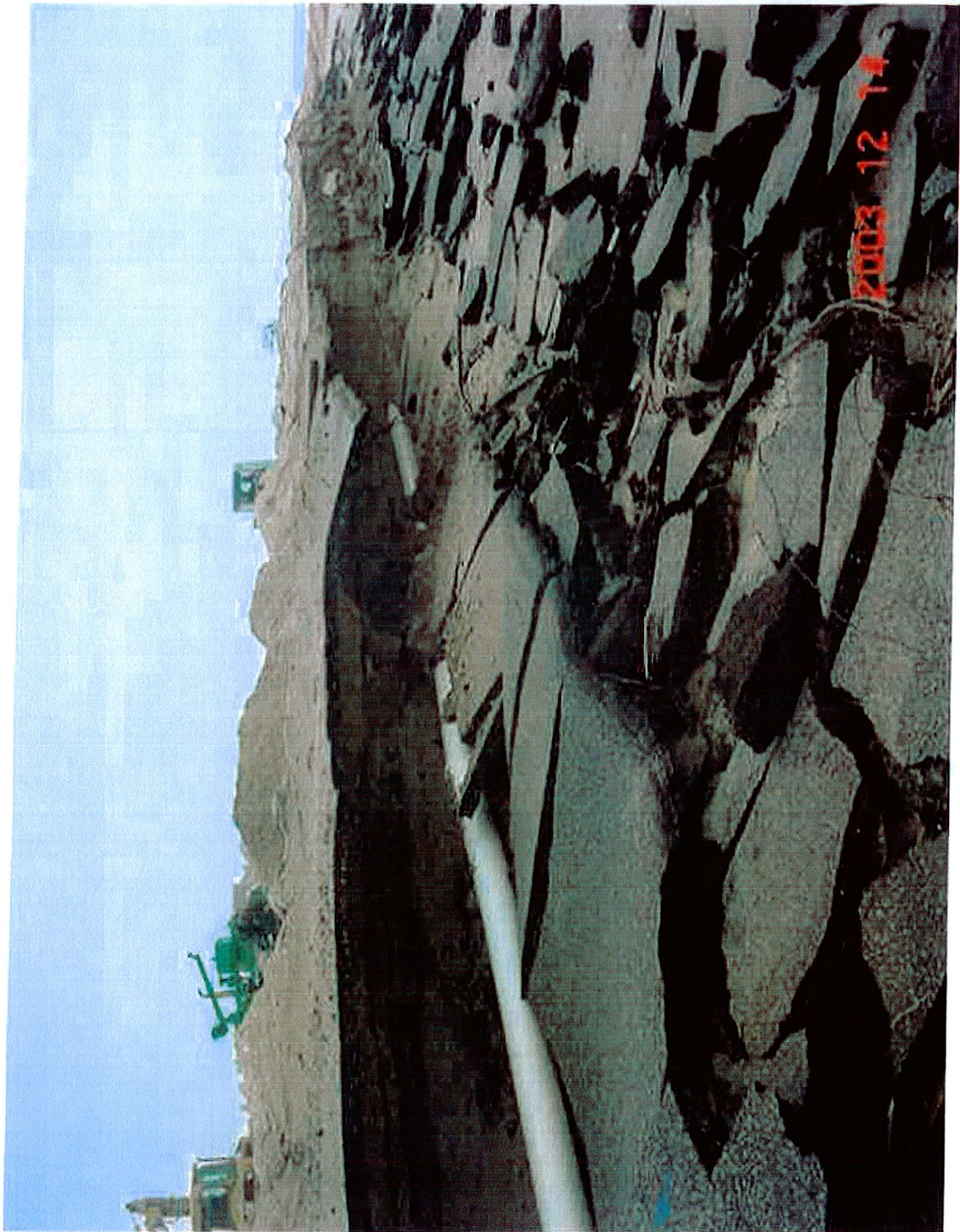


1200

EXHIBIT
12



2003 12 14



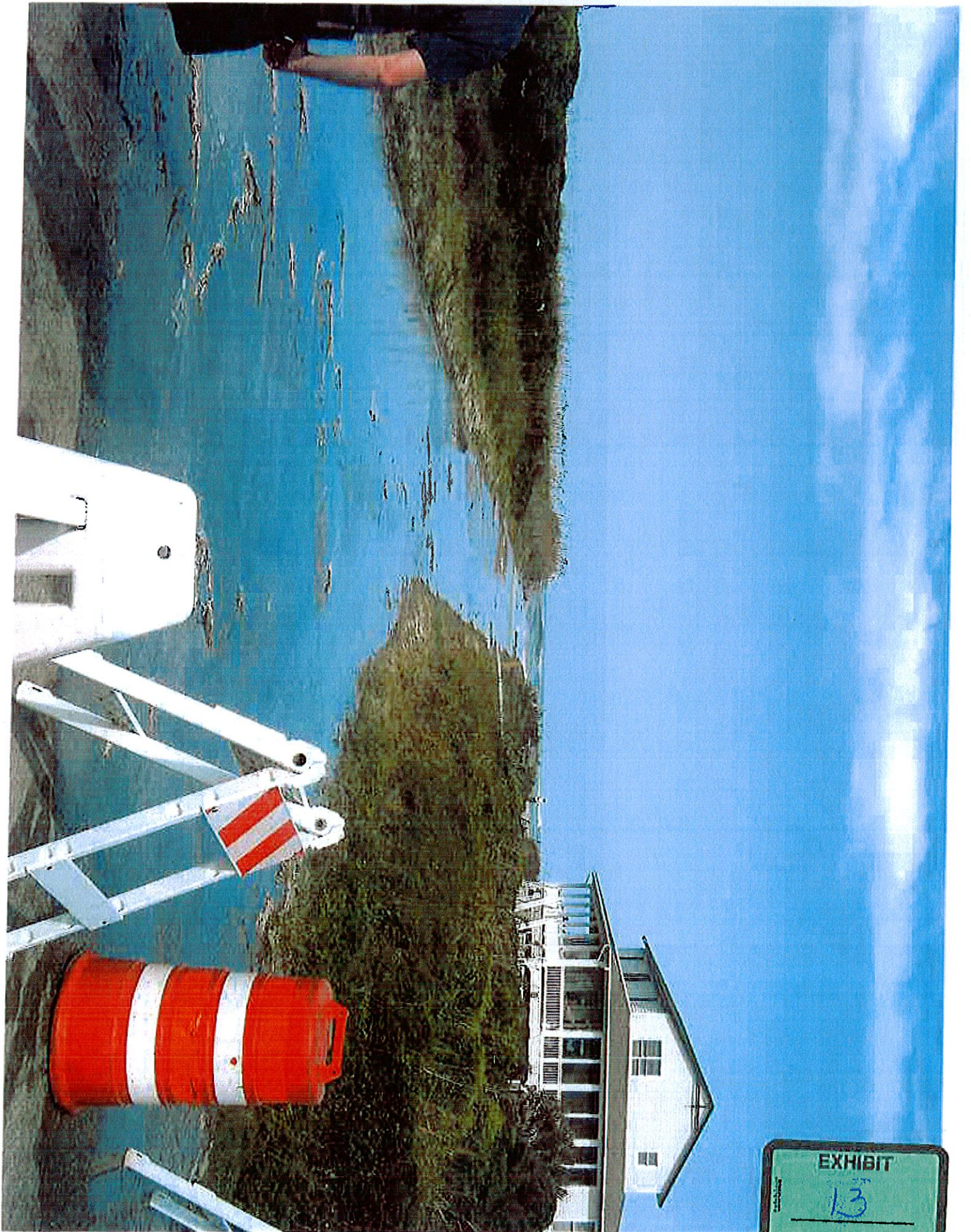


EXHIBIT
13





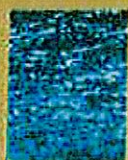
Groin Field Reconstruction

Bald Head Island, N.C. Beach Monitoring Program

Monitoring Report No. 8 (June 2009 to May 2010)

Prepared for:
Village of Bald Head Island

Prepared by:
Olsen Associates, Inc.
2816 Herschel Street
Jacksonville, FL 32204
(904) 387-6114
(Fax) 384-7368
olsen-associates.com
C-1468

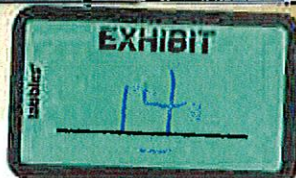


olsen
associates, inc.

August 2010



Beach Nourishment



of 20 FT and a height of 6 FT. The sand bags were originally installed above the mean high water line, however severe erosion in subsequent years lowered the beach profile so that wave run-up reached the base of the bags on a normal high tide and partially covered them during a lunar or storm tide. The sand bag revetment was placed at the most landward location possible so as to be subject to burial within a dune or beach berm during future beach nourishment operations. The 2003/2004 improvements included the lengthening of the structure by approximately 200 FT. Additionally, the base width was increased to 40 FT and the crest elevation to +12 ft-NGVD.

A sand-filled tube groin field (sixteen tubes) replacement project was constructed between January and March 2005, immediately following the 1.217 Mcy disposal project. Minor changes in groin location were made in an effort to improve performance. Similarly, experimental "tapered" tubes were deployed in an attempt to better accommodate beach profile recession over time. As with all such "soft" structures, maintenance requirements are high and overall project life limited. This action was required by the Wilmington District, USACOE with the goal of reducing the rate of shoaling within the authorized navigation channel in the vicinity of the Point. The \$743,000 construction cost for groin field reconstruction was paid by the Village.

The westernmost sand tube groins are subject to quickened downdrift destabilization due to navigation project related sand losses at "the Point", as well as sand starvation when the updrift portion of the groin field becomes activated to the point that net alongshore transport (toward the west) is diminished. Prior to beach fill construction by the Village in 2009/2010, several of the westernmost groins had been severely flanked and eventually destroyed by a rapidly receding dune line and downdrift shoreline. The Village obtained a renewal of the groin field permit(s) so as to be able to reconstruct all or portions of the structures subsequent to the locally funded and constructed winter 2009/10 beach renourishment project. Some adjustment of groin length, and the westward relocation of groin no. 1 were made to in an attempt to improve project performance. Work began on January 27, 2010, mol and was completed on 17 April 2010. The contract cost incurred by the Village for this work was \$1.14M, mol.

4.4 Groin Field Monitoring

Pursuant to each renewal of the CAMA Permit for the sand tube structure replacement, monitoring of survey profiles is required at each groin along the tube centerline, as well as on the updrift (eastward) and downdrift (westward) side of each structure. Plots of these profiles are provided as **Appendix E** for the May 2010 survey only since the entire groin field was replaced between January and April 2010.

During the 12-month monitoring period (May 2009 to May 2010), the 6940 feet of shoreline within the limits of the sand tube groin field (Sta. 46+89 to 106+00) gained (as a result of sand placement as beach fill) approximately +131,000 cy above the MHWL and 588,600 cy between the MHWL and -16 ft-NGVD (**Table 4.9**). However, between May 2009 and September 2009 (pre-renourishment) the groin field lost -346,000 cy above -16 ft-NGVD.

During the latter half of the prior monitoring year (*i.e.*, November 2008 to May 2009), the shoreline erosion and profile deflation within and downdrift of the groin field, extending to the navigation channel lead to the undermining and/or flanking of several of the westernmost groins. Several homes had become eminently endangered and would have been damaged or lost had the renourishment project not been initiated in November 2009. In order to address the evolving endangerment issue, the first priority for beach filling by the Village occurred at that location (see Report Cover).

6.0 SUMMARY AND CONCLUSIONS

Since completion of the last (*i.e.*, 2007) beach disposal project on Bald Head Island, through monitoring survey dated September 2009, the South Beach fill area lost approximately 955,800 cubic yards or roughly 100% of the total volume placed from the channel. Overall, the West Beach, the "Point" and South Beach shorelines have lost a combined 1.5M cubic yards between June 2007 and September 2009 (ref. **Table 4.5**), or approximately 666,000 cy/yr, on average.

Through September 2009, an overall volume gain since November 2000 includes the beneficial effects of approximately 4.1 Mcy of beach disposal⁶ along primarily the South Beach shoreline. After accounting for the placement of channel maintenance sand, the Bald Head Island shoreline experienced a cumulative loss of roughly -3.54 Mcy over the 8.83 year period or approximately -400,000 cy per year, on average. As shown by **Figure 4.9**, the limited spatial benefits of approximately 9 years of beach disposal are limited to that portion of South Beach eastward of Sta. 74+00 mol and on the leeward side of the Point. The remainder of South Beach and the Point exhibit significant net losses since November 2000. Conversely, USACOE Monitoring Report No. 7 (Draft) found that as of May 2009, the three (3) beach segments of Bald Head Island exhibited only 118,000 more cubic yards of sand measured in-place relative to their 2000 pre-fill condition. This conflicts with the Village surveys which show a larger measured net gain of sand through September 2009 – irrespective of a documented loss of 700,000 cy between May and September 2009 (ref. **Figure 4.1**). The reason for this "discrepancy" is how the Village surveys compute volumetric changes at the Point where the channel gorge is involved. The Village monitoring program methodology since inception has limited volumetric comparison of profiles to a depth of -16 ft-NGVD. Hence, such computations are conservative within the river channel where depths (natural or manmade) can well exceed -40 ft-NGVD. A global estimate of this effect between 2000 and May 2010 shows a potential *under prediction* of sand losses (in the Cape Fear River gorge) approaching 500-700,000cy. Accordingly, when this volume is considered it can be assumed that there is little difference between the Corps' and the Village's long-term sediment loss computations and findings.

The maintenance dredging of the Federal Navigation Channel in the spring of 2009, *without* the concurrent beach disposal at Bald Head Island, has resulted in an evolving unmitigated physical impact along a portion of the shorefront nearest the navigation project. The sand tube groin field appears to have had some negative effects at certain locations on the downdrift shoreline prior to the initiation of channel dredging

⁶ Disposal quantities are based upon USACOE estimates.

in February 2009. However, the erosion which occurred was not because a few groins failed but rather because the field of groins in general was "functioning" as groins do...*i.e.*, by holding sand. This effect becomes problematic however, at BHI, when the beach system is starved (by erosion or because BHI does not receive biennial renourishment). At that point, the groins retain sand, to the degree that the volume of sand transported past the groin field to the Point is diminished.

Surveys document that the shoreline at both "the Point" and the western end of South Beach are substantially more eroded when compared to pre-harbor deepening project construction conditions (2000). This large-scale net loss exists even after the placement of over 4 million cubic yards of sand from the navigation project since 2001. Additionally, in 2009 net shoreline recession at several locations became significantly greater than historical conditions. Monitoring programs initiated by both the Village of Bald Head Island and the Wilmington District (USACOE, 2010 Draft) have corroborated this fact.

Prior Monitoring Reports prepared on behalf of the Village had predicted a looming net loss phenomenon concurrent with the third biennial channel maintenance event and as a result recommended the locally sponsored renourishment project ultimately constructed between November 2009 and March 2010. That interim measure – costing approximately \$14.92M – was necessitated by the Wilmington District's requirement that the Wilmington Harbor Sand Management Plan had to run its full 3-maintenance operation cycle and the Wilmington District had completed its associated monitoring, before any changes to the Plan were considered. In addition, the sand tube groin field was likewise replaced in the winter of 2009/2010 at a construction cost of approximately \$1.14M. The 1995 sand tube replacement cost was \$762,000. The principal differences between the two (2) projects were associated with the cost of sand tube removal in 2009/2010.

As of the date of this Village Monitoring Report No. 8 (August 2010), the Wilmington District has indicated its continued intent to formulate recommendations regarding the Wilmington Harbor Sand Management Plan and that in the interim, the next scheduled beach disposal would occur at Bald Head Island, per the original Plan. Unfortunately, Congressional funding has not been provided to date for the 2010/2011 regularly scheduled maintenance dredging of the Smith Island Channel thru Bald Head Shoal Reach 2 segment of the entrance channel, irrespective of a declared need due to both a documented reduction in the navigable channel width nearest the Point and the erosional impacts to the westernmost segment of South Beach.

Without direct beach disposal on Bald Head Island concurrent with channel maintenance operations, in early 2009 the island lost an estimated 900,000 cy, mol., of sand between May and November 2009 – the initiation of beach renourishment. The gross fill quantity associated with that project approached some 1.85 Mcy. Considering the level of erosion which immediately preceded the work (in addition to continuing losses during construction) net benefits associated with the Village renourishment project will be reduced. Options for the implementation of near-term protective measures sufficient to address predictable erosional losses along the westernmost segment of South Beach and the Point resulting from a delayed federal beach disposal operation are non-existent, or at best *extremely limited*.

Implicit in the survey data gathered to date (*i.e.*, May 2010) is the fact that direct beach disposal on South Beach typically “masks” the impacts of dredging for generally a 2-year period. Without regularly scheduled and coincident sand disposal with each channel maintenance dredging operation, the Harbor Deepening Project can be shown to have had substantial net adverse effects to the westernmost portions of South Beach and the Point, as well as to the island’s sediment budget in general.

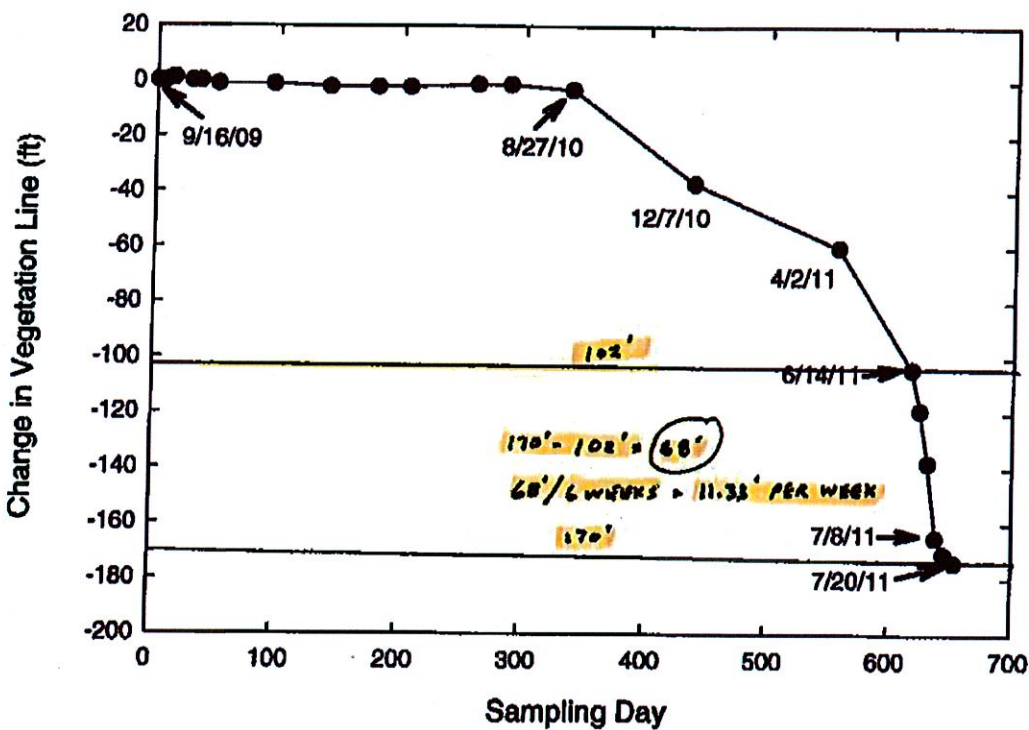


Figure C-5: Bald Head Island August 2009 aerial photography.



Figure D-5: Bald Head Island April 2010 aerial photography.

Transect 7 (19 Cape Fear Trail)



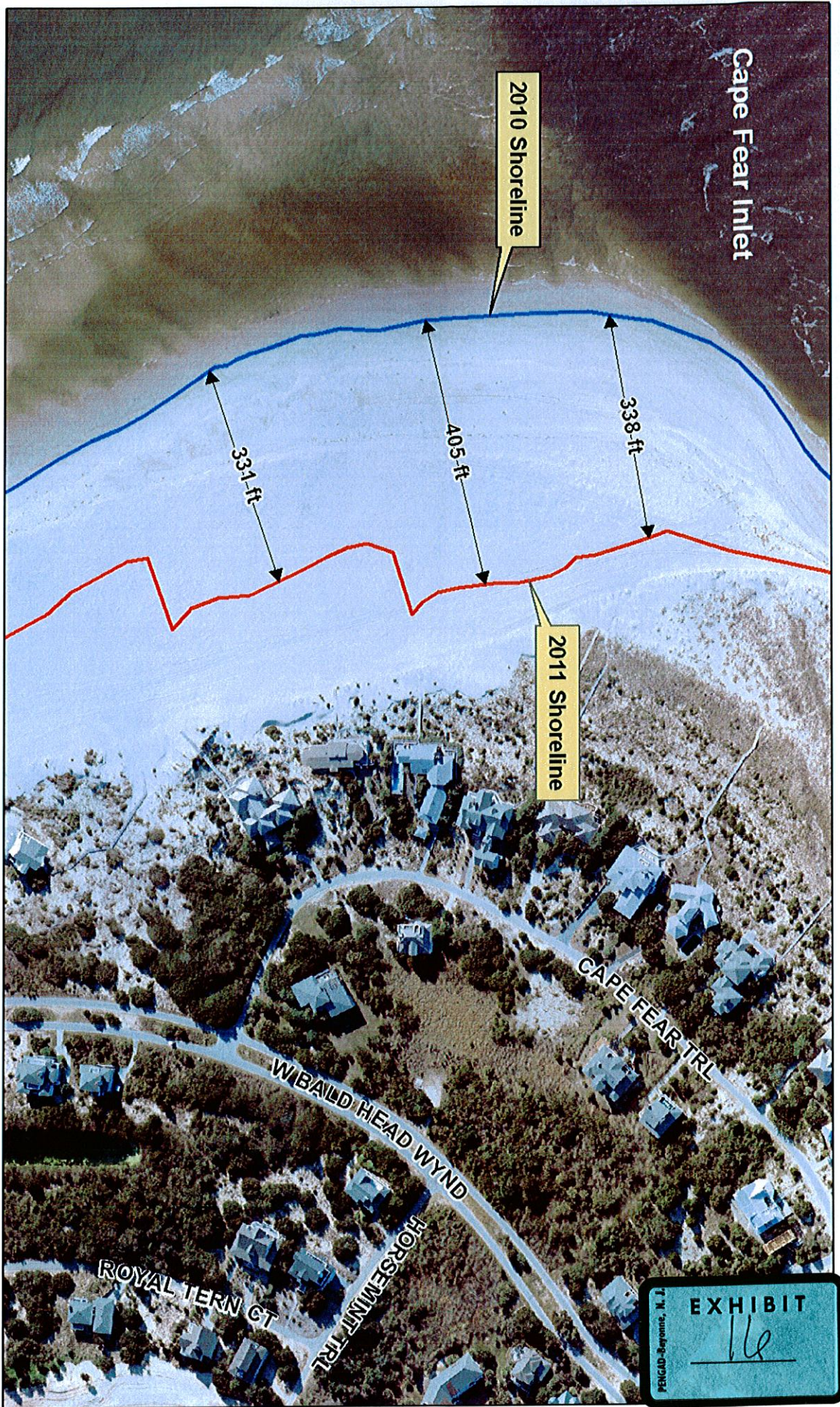
Tom Hancock, Director of Conservation
Bald Head Island Conservancy
2

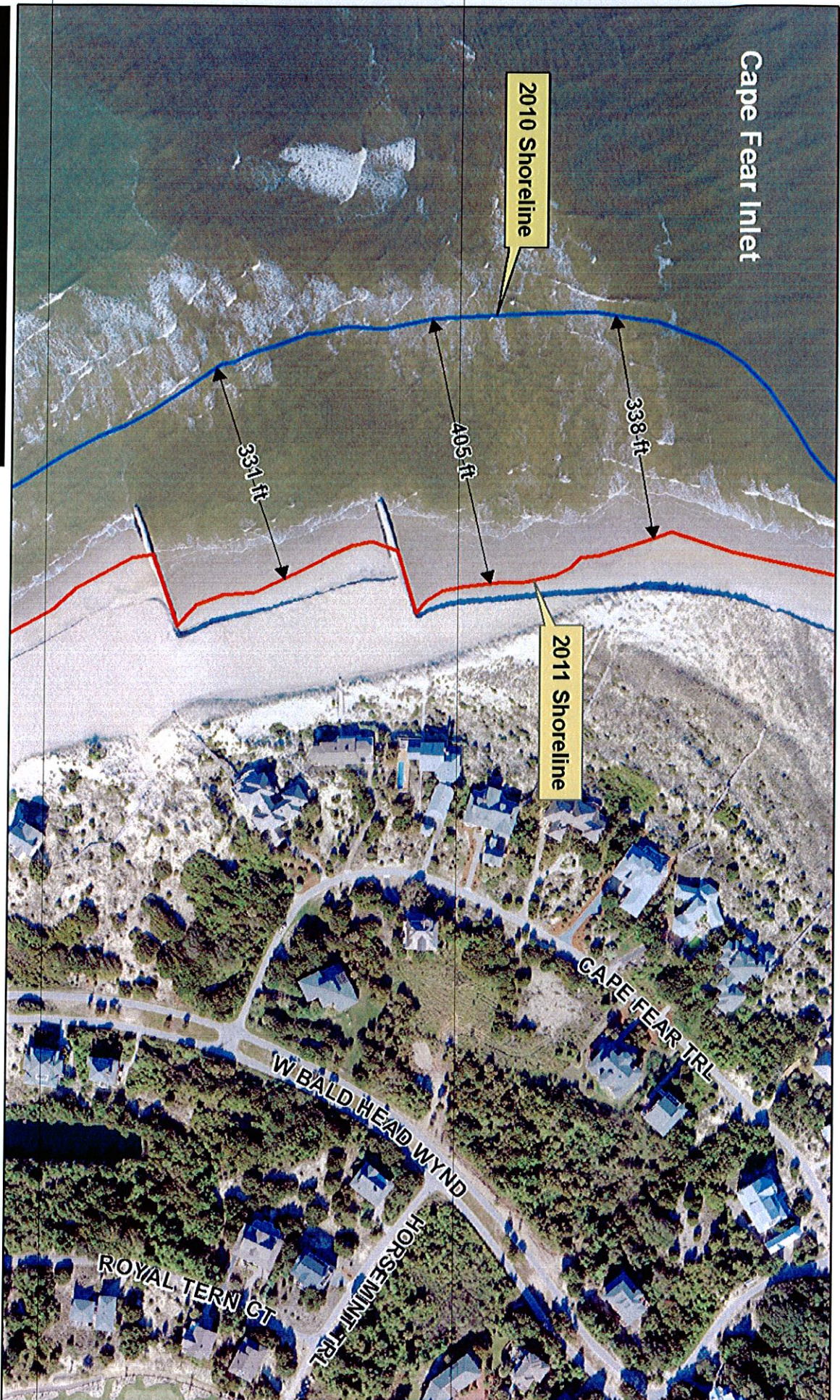


Transects 6-10a



Tom Hancock, Director of Conservation
Bald Head Island Conservancy





Cape Fear Inlet

2010 Shoreline

2011 Shoreline

331 ft

405 ft

338 ft

CAPE FEAR TRL

W BALD HEAD WYND

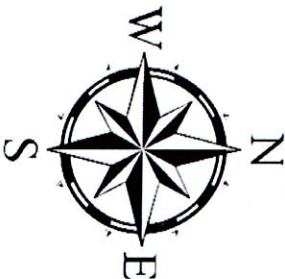
HORSEMINT TRL

ROYAL TERN CT

Legend

— Shoreline (2011)

— Shoreline (2010)



2011 Photo

at Bald Head Island





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EXHIBIT
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