APPENDIX 2

U.S. ARMY CORPS OF ENGINEERS PERMIT NO. SAJ-2000-3874 (SP-CJW)

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
10117 PRINCESS PALM AVENUE, SUITE 120
TAMPA, FLORIDA 33610

REPLY TO
ATTENTION OF

August 17, 2010

Tampa Regulatory office
SAJ-2000-3874 (SP-CJW)

Manatee County
415 10th St. West
Bradenton, Florida 34205

Dear Gentlemen:

The U.S. Army Corps of Engineers (Corps) has completed the review and evaluation of your permit application number SAJ-2000-3874 (SP-CJW) to to place approximately 169,000 cubic yards (cy) of compatible beach material along 1.0 mile of Coquina Beach and to also place approximately 25,000 cy of beach quality material along 0.6 miles of the City of Anna Maria segment of beach. The project is located on Anna Maria Island along the Gulf of Mexico, in Manatee County, Florida. The project includes nourishment of two segments of beach: Coquina Beach at the southern end of the island between Florida Department of Environmental Protection (FDEP) monuments R-35 + 790 ft and R-41 + 365 ft. (Sections 4, 9 and 10, Township 35 South, Range 16 East), and a portion of beach in the City of Anna Maria at the northern end of the island between FDEP monuments R-7 and R-10 (Section 18, Township 34 South, Range 16 East), in Manatee County, Florida.

Our regulations require that you have an opportunity to review the terms and conditions prior to final signature by the Department of the Army. Enclosed is an unsigned Department of the Army permit instrument (permit). Please read carefully the Special Conditions beginning on page 2 of the permit. These were developed to apply specifically to your project. Water Quality Certification is also required prior to issuance of a permit. The Corps has received a copy of the State of Florida certification for your project. In accordance with General Condition 5 of the permit, any special conditions of the Water Quality Certification have been attached to the Department of the Army permit.

Instructions for Objecting to Permit Terms and Conditions: This letter contains an initial proffered permit for your proposed project. If you object to certain terms and conditions contained within the permit, you may request that the permit be modified. Enclosed you will find a Notification of Administrative Appeal Options and Process fact sheet and Request for Appeal (RFA) form. If you choose to object to certain terms and conditions of the permit, you must follow the directions provided in Section 1, Part A and submit the completed RFA form to the letterhead address.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria under 33 CFR Part 331.5, and that it has been received by the District office within 60 days of the date of the RFA. Should you decide to submit an RFA form, it must be received at the letterhead address by October 17, 2010.

Instructions for Accepting Terms and Conditions and Finalizing Your Permit: It is not necessary to submit an RFA form to the District office, if you do not object to the decision in this letter. In this case, the permit must be signed by the applicant in the space provided on the signature page of the permit. In the case of corporations, acceptance must be by an officer of that corporation authorized to sign on behalf of the corporation. The party responsible for assuring the work is done in accordance with the permit terms and conditions must sign the permit. Please type or print the name and title of the person signing below the signature and the date signed.

SIGN AND RETURN THE PERMIT, IN ITS ENTIRETY, TO THE LETTERHEAD ADDRESS

The permit will be signed by the District Engineer and returned to you. It is important to note that the permit is not valid until the District Engineer signs it.

The Corps Jacksonville District Regulatory Division is committed to improving service to our customers. We strive to perform our duty in a friendly and timely manner while working to preserve our environment. We invite you to take a few minutes to visit the following link and complete our automated Customer Service Survey:

http://per2.nwp.usace.army.mil/survey.html.

Your input is appreciated- favorable or otherwise. Please be aware this web address is case sensitive and should be entered as it appears above.

Should you have any questions, please contact Cynthia Wood at the letterhead address, phone 813-769-7070, fax 813-769-7061, or e-mail Cynthia.J.Wood@usace.army.mil.

Sincerely,

Charles A. Schnepel for

Donald W. Kinard
Chief, Regulatory Division

Enclosures

Copy furnished (w/enclosures):

Coastal Planning and Engineering, Inc.
Attn: Ms. Lauren Floyd
2481 NW Boca Raton Boulevard
Boca Raton, Florida 33431

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant:	File Number:	Date:
Manatee County	SAJ-2000-3874 (SP-CJW)	08/17/2010

Attached is:		See Section below
X	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: Cynthia J. Wood 813-769-7070	If you only have questions regarding the appeal process you may also contact: Stuart Santos 904-232-2018

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

DEPARTMENT OF THE ARMY PERMIT

Permittee: Manatee County
415 10th St. West
Bradenton, Florida 34205

Permit No: SAJ-2000-3874 (SP-CJW)

U.S. Army Engineer District, Jacksonville

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: The permittee proposes to place approximately 169,000 cubic yards (cy) of compatible beach material along 1.0 mile of Coquina Beach and to also place approximately 25,000 cy of beach quality material along 0.6 miles of the City of Anna Maria segment of beach. As proposed, the constructed beaches will include a berm elevation of +4 feet NAVD on a slope of 1 foot vertical to 15 feet horizontal. The County proposes to use sand from a borrow area located approximately 3,000 feet west of the north end of Anna Maria Island. This proposed sediment source was previously permitted by both the FDEP and U.S. Army Corps of Engineers. This borrow area contains sediment very similar to the existing beach sediment. The County also proposes to construct 4.87 acres of artificial reef habitat to mitigate the loss of 1.05 acres of nearshore hardbottom.

The work described above is to be completed in accordance with the 23 pages dated November 20, 2009 affixed at the end of this permit instrument (Attachment A).

Project Location: The project is located on Anna Maria Island along the Gulf of Mexico, in Manatee County, Florida. The project includes nourishment of two segments of beach: Coquina Beach at the southern end of the island between Florida Department of Environmental Protection (FDEP) monuments R-35 + 790 ft and R-41 + 365 ft. (Sections 4, 9 and 10, Township 35 South, Range 16 East), and a portion of beach in the City of Anna Maria at the northern end of the island between FDEP monuments R-7 and R-10 (Section 18, Township 34 South, Range 16 East), in Manatee County, Florida.

Latitude/Longitude:

Coquina Beach (R-36)	27.45710 North / 82.69566 West
City of Anna Maria (R-7)	27.52708 North / 82.738276 West

Permit Conditions:

Special Conditions:

1. **Reporting Address:** All reports, documentation and correspondence required by the conditions of this permit shall be submitted to the following address: U.S. Army Corps of Engineers, Regulatory Division, Enforcement Section, 10117 Princess Palm Avenue, Suite 120, Tampa, Florida 33610. The Permittee shall reference this permit number, SAJ-2000-03874 (SP-CJW), on all submittals.

2. **Commencement Notification:** Within 10 days from the date of initiating the authorized work, the Permittee shall provide to the Corps a written notification of the date of commencement of work authorized by this permit.

3. **Biological Opinion** The enclosed US Fish and Wildlife Service (USFWS) Biological Opinion (BO) (Attachment B) contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Authorization under this Corps permit is conditional upon compliance with all of the mandatory terms and conditions associated with incidental take of the attached BO (see pages 36-43 of the BO). These terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with this Corps permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.

4. **Sea Turtle and Smalltooth Sawfish Guidelines:** The Permittee shall comply with the National Marine Fisheries Service's "*Sea Turtle and Smalltooth Sawfish Construction Conditions*". (Attachment C). No in-water work will occur during sea turtle nesting season (May 1 through October 31).

5. **Manatee Conditions:** The Permittee shall comply with the "Standard Manatee Conditions for In-Water Work - July 2005" (Attachment D).

6. **Artificial Reef:** The permittee will adhere to the Department of Environmental Protection (DEP)'s artificial reef construction and monitoring plans contained in the DEP permit (Attachment E). In addition, the permittee will adhere to the following:

a. **Initial Agency Notification:** The Permittee shall provide to the Corps and the National Oceanic and Atmospheric Administration and U.S. Coast Guard (addresses below) written notification of the

planned deployment start date at least two weeks prior to the initial deployment on the authorized artificial reef site.

National Oceanic and Atmospheric Administration
Office of Coast Survey, N/CS26, Sta. 7317
1315 East-West Highway
Silver Springs, MD, 20910-3282

Commander, U.S. Coast Guard Seventh District
Brickell Plaza Federal Building
909 SE 1st Avenue
Miami, FL 33131-3050

b. **Pre-Deployment Notification:** No less than 14 days prior to deployment of material on an artificial reef, the Permittee shall transmit by electronic mail ("email") a complete and signed "*Florida Artificial Reef Materials Cargo Manifest and Pre-Deployment Notification*" form, (Attachment F), to the Corps and Florida Fish and Wildlife Conservation Commission (FWC) Artificial Reef Program, at 620 S. Meridian Street, Box 4B2 Tallahassee, Florida 32399 to allow inspection of the proposed reef materials as deemed necessary by the agencies. Inspection is allowable at the staging area. By signing the Pre-Deployment Notification the Permittee certifies that all materials are free from asphalt, petroleum, other hydrocarbons and toxic residues. The Permittee shall not deploy material if notified by the Corps or FWC that the material is questionable. The material needs to be evaluated before it is released for deployment. Any material that is deemed unacceptable for reef material will be disposed in an approved upland disposal site. Deployment of the material shall not occur until after the end of the 14-day inspection period. The Permittee shall ensure both a copy of the Corps permit and the signed "*Florida Artificial Reef Materials Cargo Manifest and Pre-Deployment Notification Form*" are maintained aboard the deployment vessel at all times during loading, transit, and deployment.

c. **Post-Deployment Placement Report/As-Built Drawing:** No less than 30 days after deployment at the reef site, the Permittee shall transmit by email to the Corps and FWC a complete and signed "*Florida Artificial Reef Materials Placement Report and Post-Deployment Notification*" form (Attachment G). Please note the Corps requires the latitude and longitude to be accurate within 5 meters horizontal distance on the post-deployment report. Attach to the report, an as-built drawing that contains the approximate deployment configurations and the height of the material after placement. Depth shall be verified utilizing fathometer, depth sounder, or similar device accurate to within 1 meter. Also, include information on the condition of the material at the time of deployment. The report and drawing shall be limited to a few pages per deployment. Representative photographs and/or video, if available, are encouraged to be submitted.

d. **Ownership/Maintenance/Liability:** By signing this permit, the Permittee certifies and acknowledges ownership of all artificial reef materials deployed on the reef, accepts responsibility for maintenance of the artificial reef, and possesses the ability to assume liability for all damages that may arise with respect to the artificial reef.

e. **Assurance of Navigation and Maintenance:** The Permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structures or work herein authorized, or if in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the Permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

f. **Manatee Protection:** The Permittee shall ensure that wharf fenders are installed to reduce the risk of a vessel crushing a manatee. The wharf fenders shall be installed with appropriate materials to provide sufficient standoff space of at least 3 feet under compression. Fenders or buoys providing a minimum standoff space of at least 3 feet under compression shall be utilized between two vessels that are moored together.

7. Self-Certification: Within 60 days of completion of the authorized work or at the expiration of the construction window of this permit, whichever occurs first, the Permittee shall complete the attached "Self-Certification Statement of Compliance" form (Attachment E) and submit to the Corps. In the event that the completed work deviates, in any manner, from the authorized work, the Permittee shall describe, on the Self-Certification Form, the deviations between the work authorized by the permit and the work as constructed. Please note that the description of any deviations on the Self-Certification Form does not constitute approval of any deviations by the Corps.

8. **Regulatory Agency Changes:** Should any other regulatory agency require changes to the work authorized or obligated by this permit, the Permittee is advised that a modification to this permit instrument is required prior to initiation of those changes. It is the Permittee's responsibility to request a modification of this permit from the Regulatory Office.

General Conditions:

1. The time limit for completing the work authorized ends on August 17, 2015. If you find that you need more time to complete the authorized activity, submit your request for a time

extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature and the mailing address of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has bee issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

(X) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions: General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit including Attachments A-H).

Charlie Hunsicker, Director 8/19/10

(PERMITTEE) Manatee Co. Natural Resources Dept. (DATE)
Manatee County

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

for Charles A. Schnepel 8/20/10

(DISTRICT ENGINEER) (DATE)
Alfred A. Pantano, Jr.
Colonel, U.S. Army

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, sign below and have the transferee sign and date below.

_____ _____

(TRANSFEROR -SIGNATURE) (DATE)

_____ _____

(TRANSFEREE-SIGNATURE) (DATE)

_____

(NAME-PRINTED)

_____

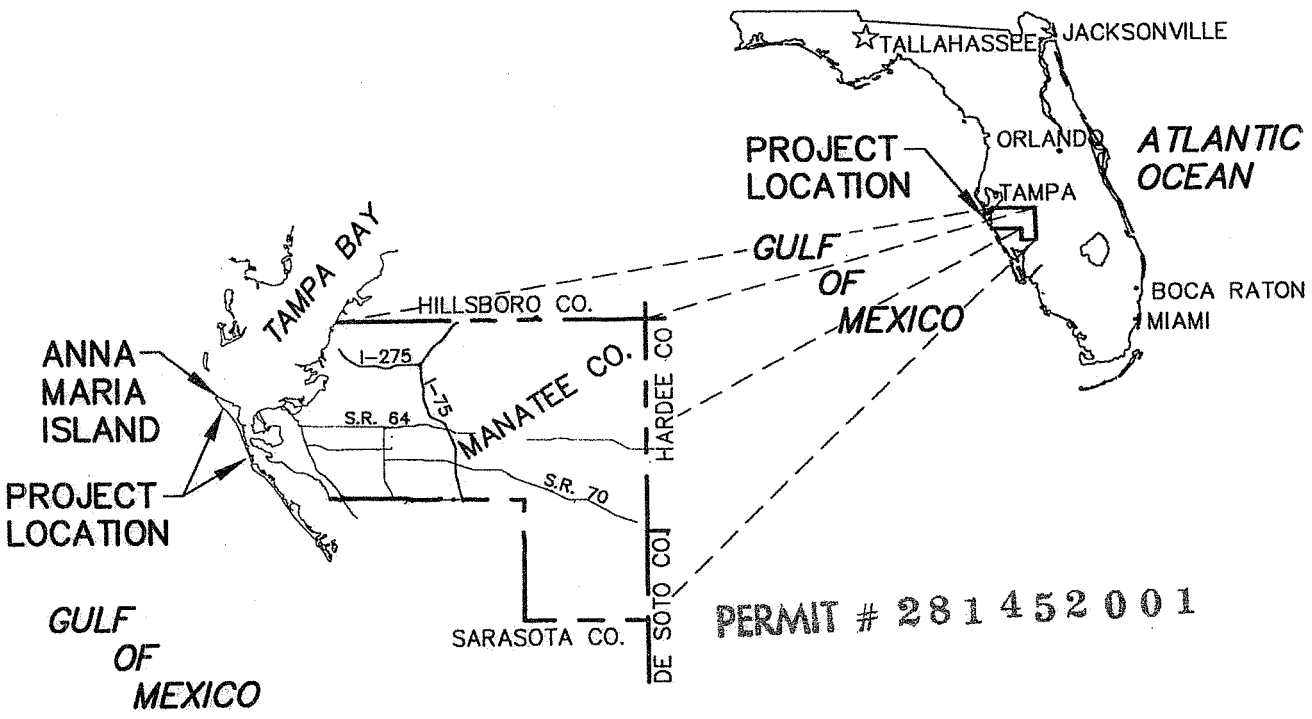
(ADDRESS)

_____

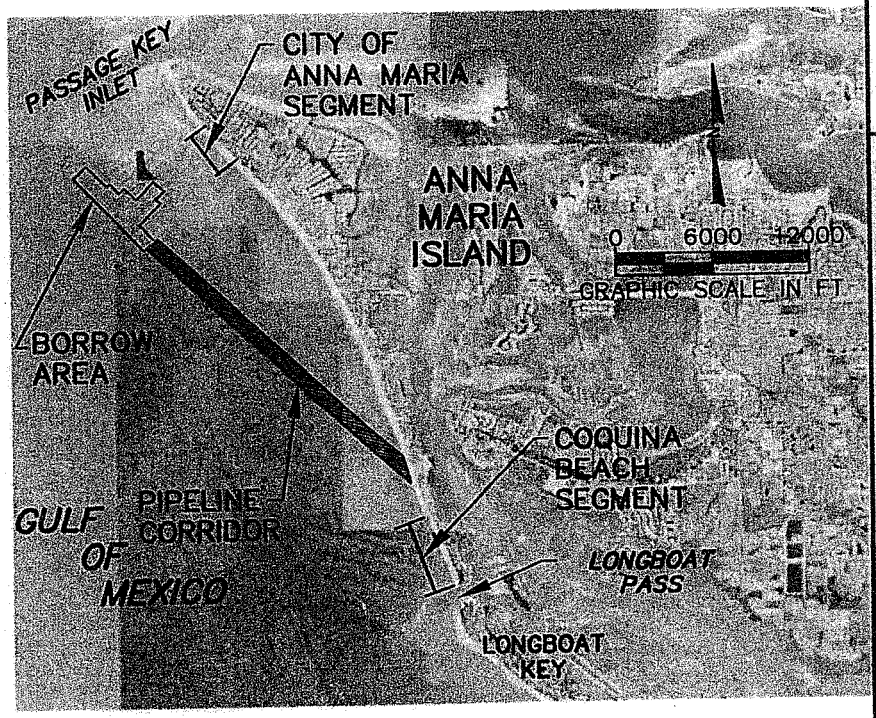
(CITY, STATE, AND ZIP CODE)

Attachment A
Permit Drawings
23 pages dated November 20, 2009

ANNA MARIA ISLAND
BEACH NOURISHMENT PROJECT
MANATEE COUNTY, FLORIDA



PERMIT # 281452001



SHEET INDEX

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/20/09
DATE

REVISIONS		
DATE	BY	DESCRIPTION
1/4/09	JRC	RAI #1
5/1/09	RS	RAI #2 – GEOTEXTILE TUBE

ANNA MARIA ISLAND
BEACH NOURISHMENT PROJECT
COVER SHEET

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-8102
FAX (561) 391-6116
C.O.A. FL. #4023
C.O.A. LA. #2531
www.CoastalPlanning.net

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 1

SAJ-2000-03874

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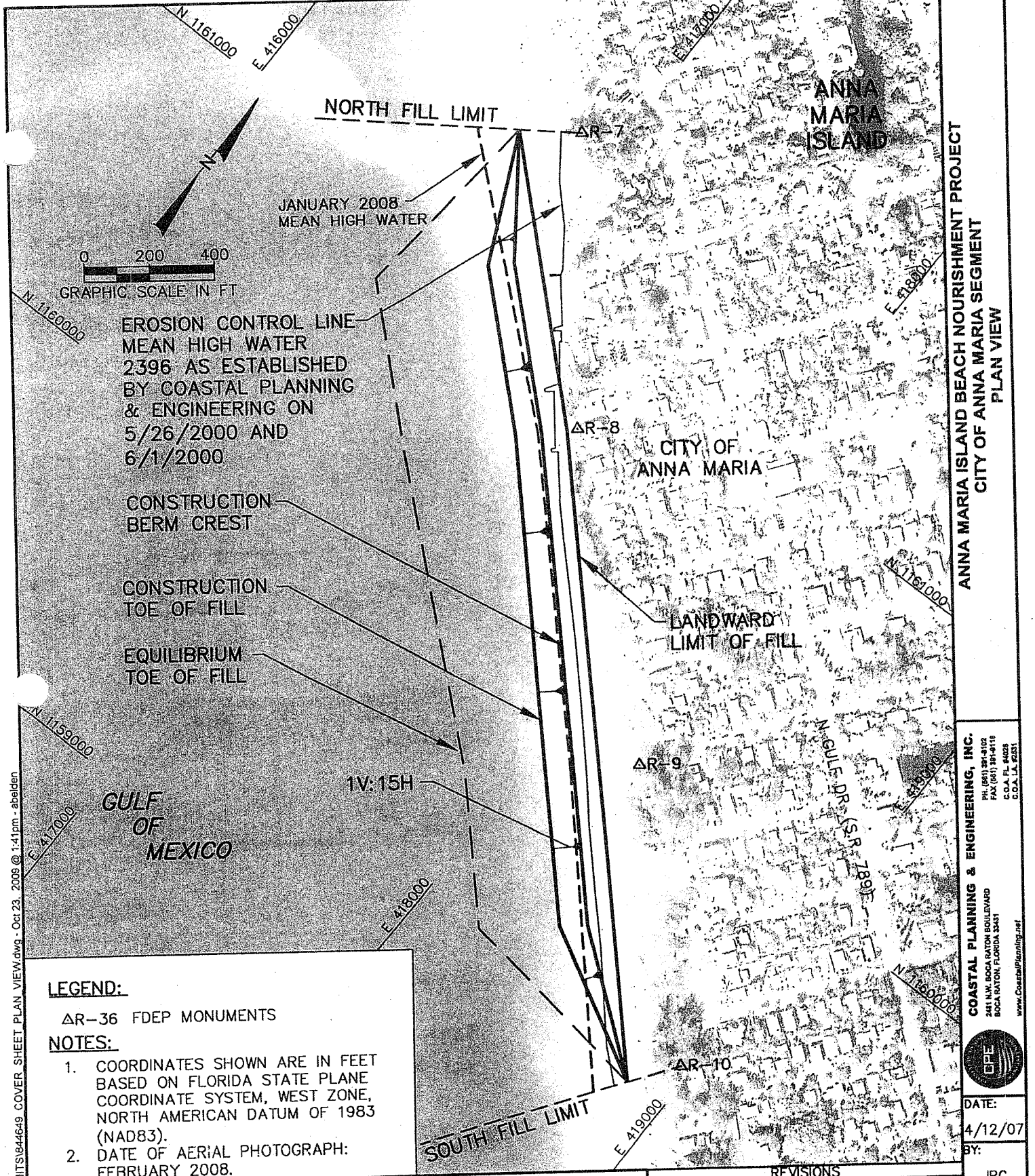

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
CITY OF ANNA MARIA SEGMENT
PLAN VIEW

LEGEND:

ΔR-36 FDEP MONUMENTS

NOTES:

1. COORDINATES SHOWN ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
2. DATE OF AERIAL PHOTOGRAPH: FEBRUARY 2008.

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/20/09
DATE

PERMIT # 28145 2001

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-5102
FAX (561) 391-9116
C.O.A. FL. #4628
C.O.A. LA. #2631
www.CoastalPlanning.net

REVISIONS		
DATE	BY	DESCRIPTION
2/4/09	JRC	RAI #1

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 2

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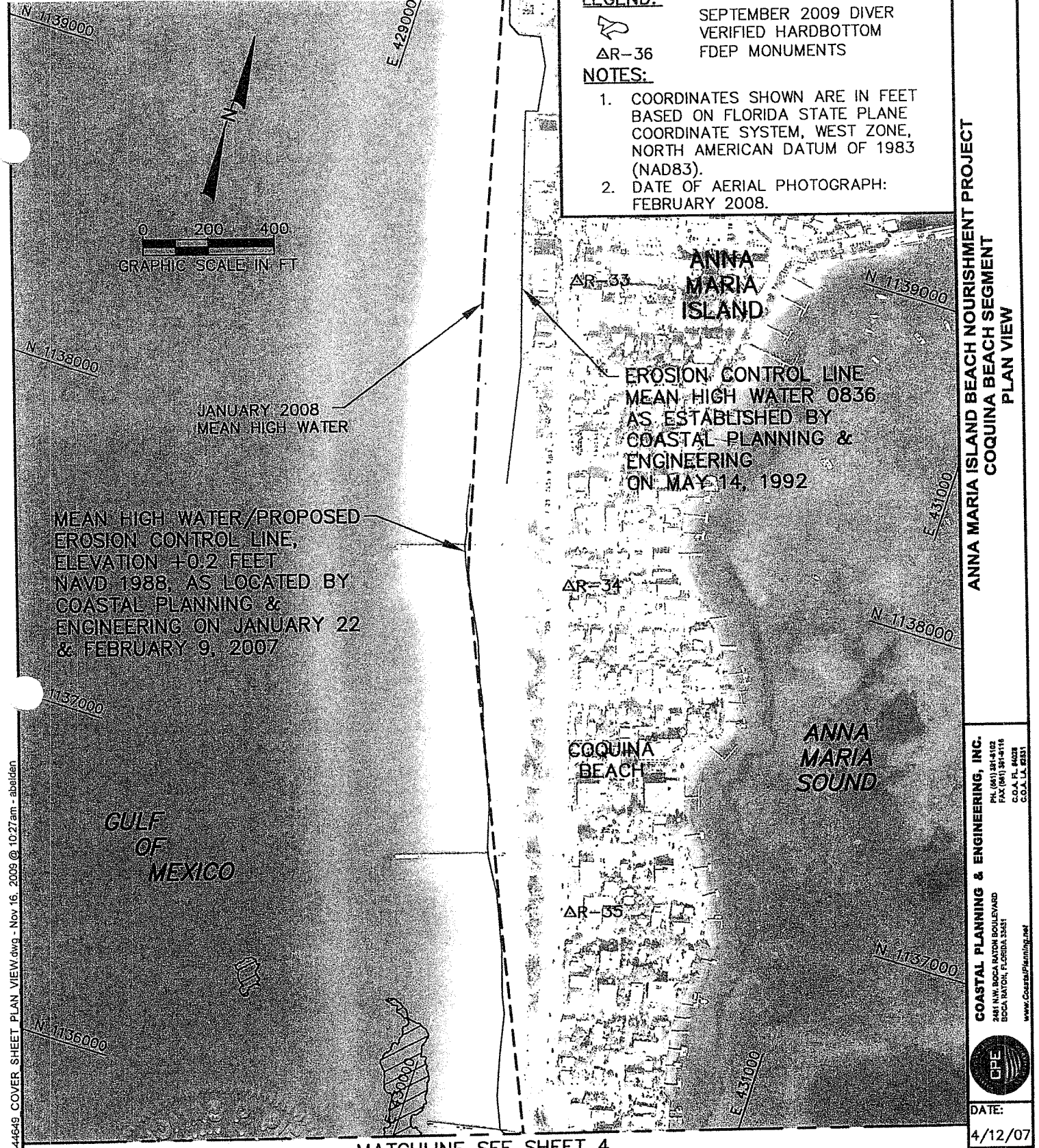

MATCHLINE SEE SHEET 4

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
COQUINA BEACH SEGMENT
PLAN VIEW

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-8102
FAX (561) 391-8106
C.O.A. FL. #4628
C.O.A. LA #2351
www.CoastalPlanning.net

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 3

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/20/09
DATE

REVISIONS		
DATE	BY	DESCRIPTION
2/4/09	JRC	RAI #1
10/23/09	TP	ADD 2009 HARDBOTTOM EDGE

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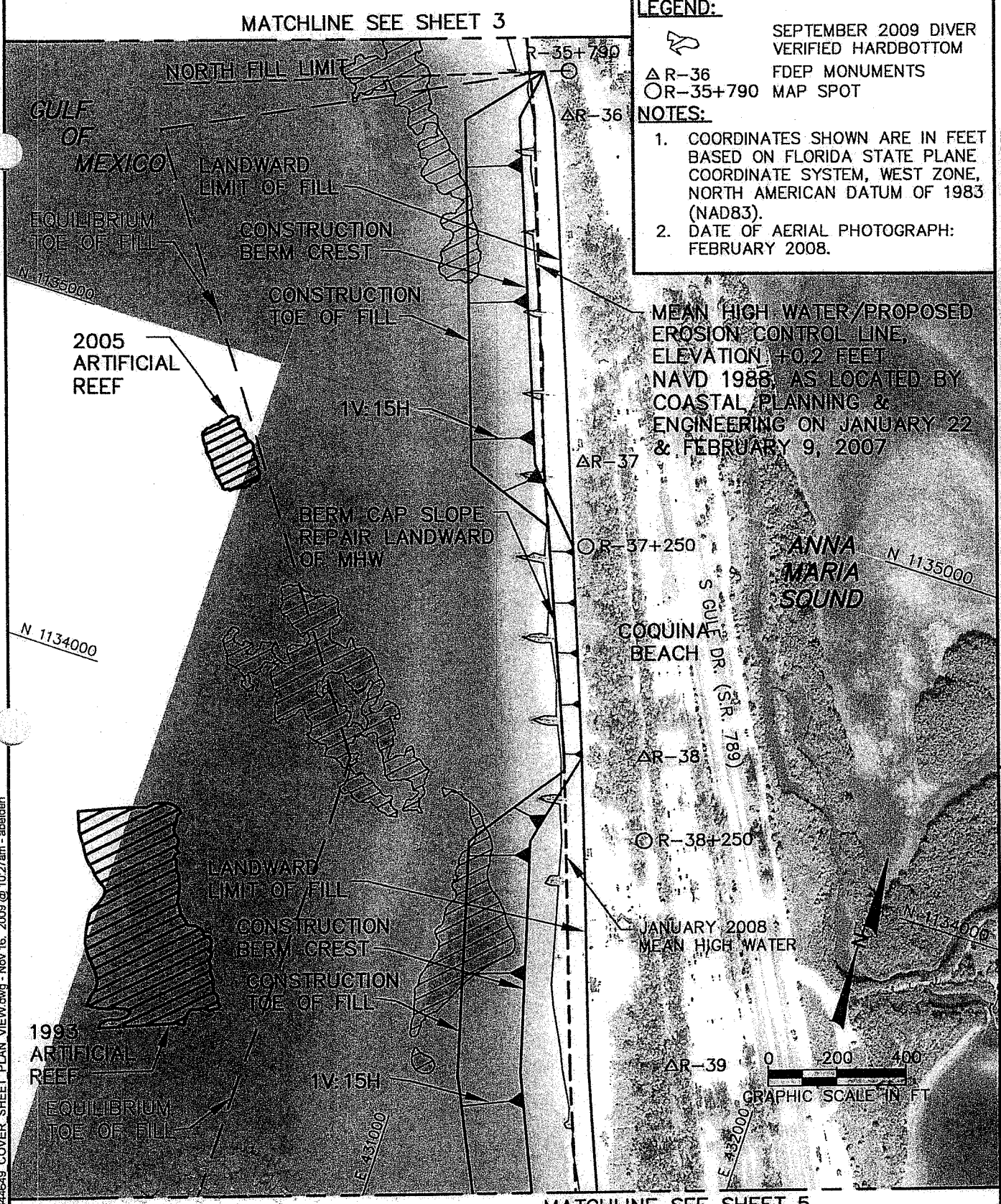
PERMIT # 281452001



LEGEND:

- SEPTEMBER 2009 DIVER VERIFIED HARDBOTTOM
- △R-36 FDEP MONUMENTS
- ○R-35+790 MAP SPOT

NOTES:

1. COORDINATES SHOWN ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
2. DATE OF AERIAL PHOTOGRAPH: FEBRUARY 2008.

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
COQUINA BEACH SEGMENT
PLAN VIEW

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH: (561) 391-8102
FAX: (561) 391-9116
C.O.A. FL. #4228
C.O.A. LA. #2531
www.CoastalPlanning.net

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 4

NOT FOR CONSTRUCTION
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11/20/09
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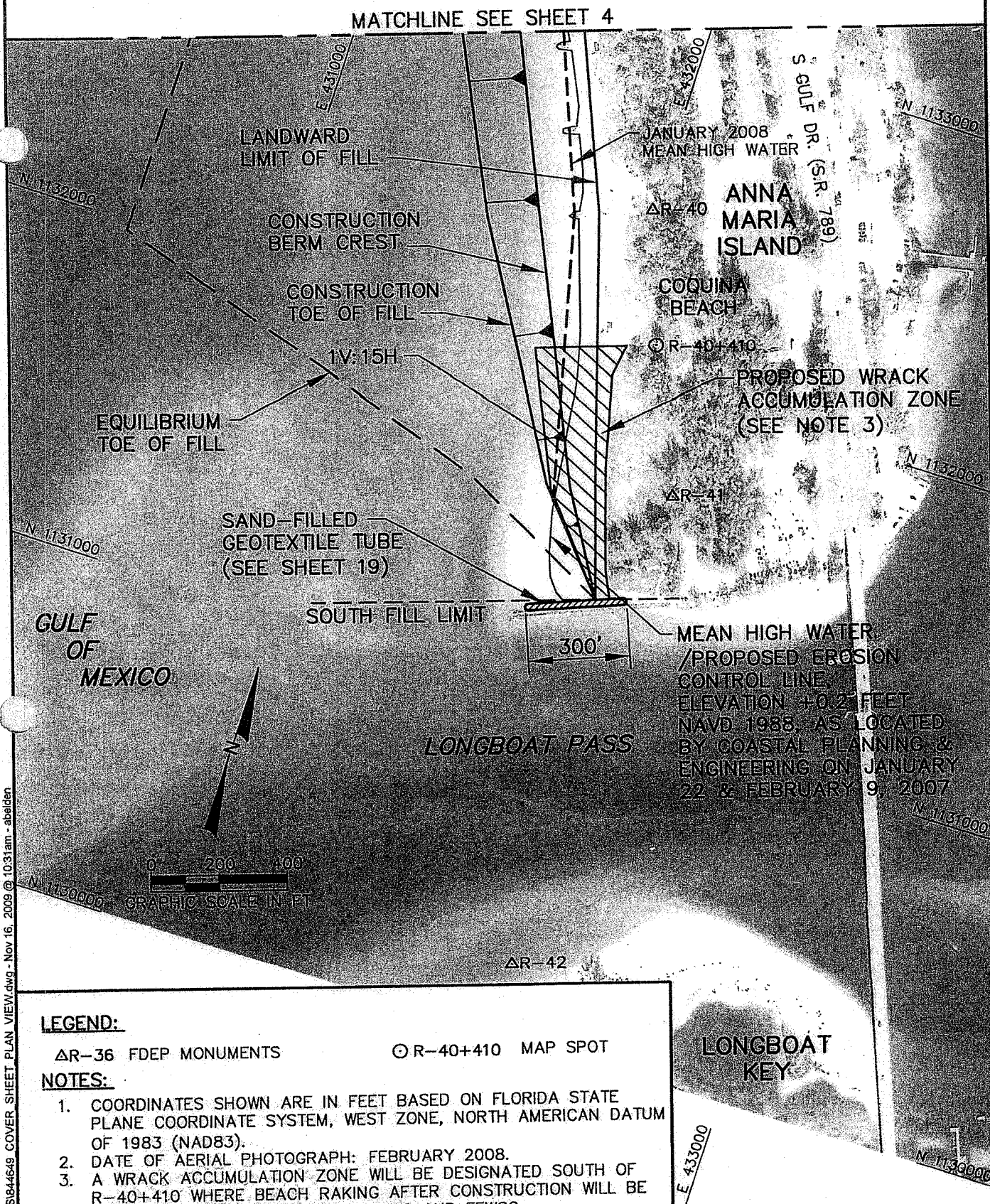
REVISIONS		
DATE	BY	DESCRIPTION
2/4/09	JRC	RAI #1
5/6/09	RWM	RAI #2
10/23/09	TP	ADD 2009 HARDBOTTOM EDGE

PERMIT # 281452001

H:\Manate\8446\PERMITS\844649_COVER_SHEET_PLAN_VIEW.dwg - Nov 16, 2009 @ 10:27am - abeldin



ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
COQUINA BEACH SEGMENT
PLAN VIEW

LEGEND:

ΔR-36 FDEP MONUMENTS ⊙R-40+410 MAP SPOT

NOTES:

1. COORDINATES SHOWN ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
2. DATE OF AERIAL PHOTOGRAPH: FEBRUARY 2008.
3. A WRACK ACCUMULATION ZONE WILL BE DESIGNATED SOUTH OF R-40+410 WHERE BEACH RAKING AFTER CONSTRUCTION WILL BE LIMITED IN COOPERATION WITH USFWS AND FFWCC.

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/20/09
DATE

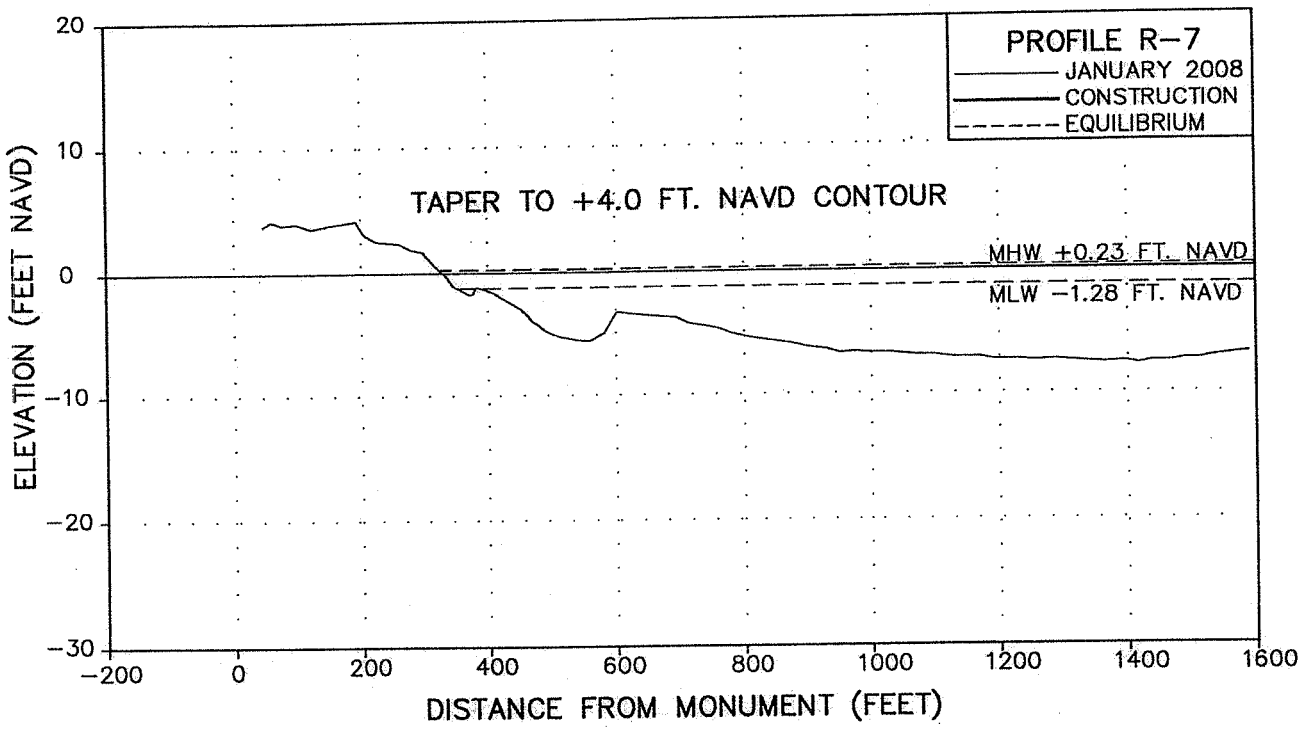
REVISIONS		
DATE	BY	DESCRIPTION
2/4/09	JRC	RAI #1
5/6/09	RWM	RAI #2
5/1/09	RS	RAI #2 - GEOTEXTILE TUBE
10/23/09	TP	ADD WRACK ZONE

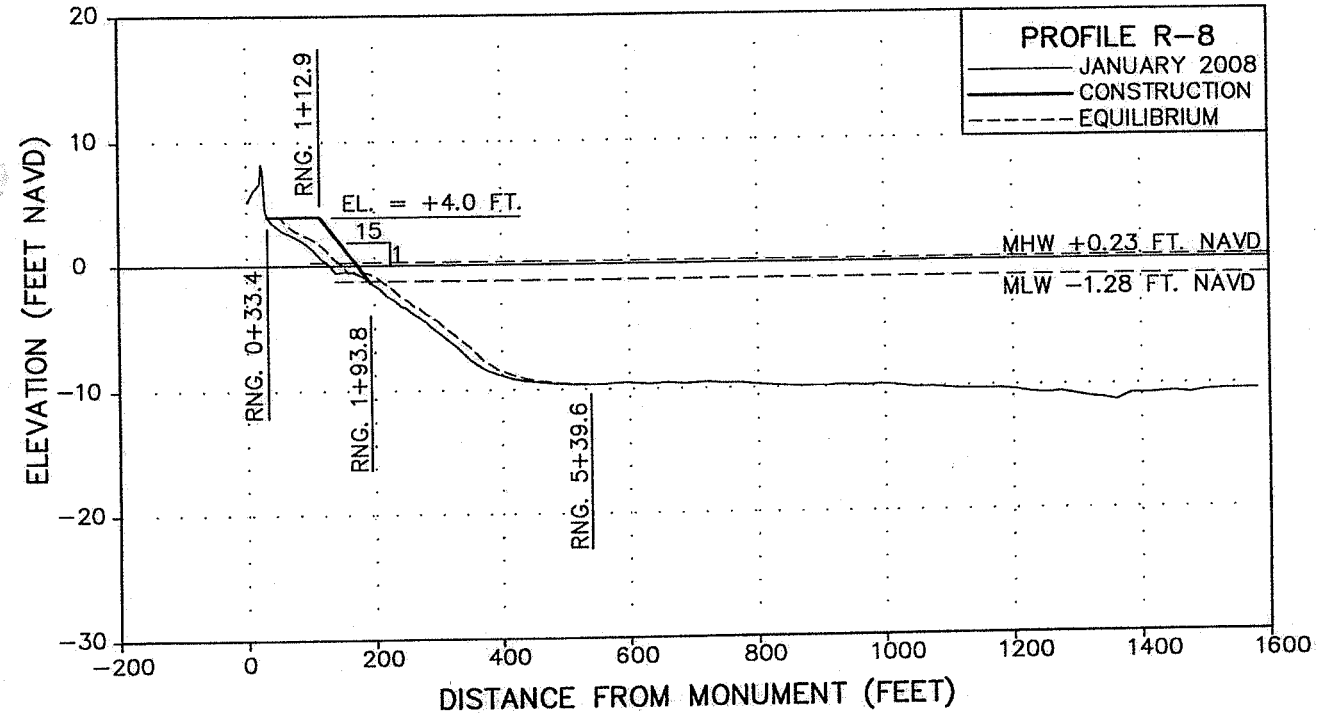
COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
Ph: (561) 391-8102
FAX: (561) 391-8106
C.O.A. FL. #4628
C.O.A. LA. #2231
www.CoastalPlanning.net

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 5

H:\Manatee\549\PERMITS\844649_COVER SHEET PLAN VIEW.dwg - Nov 16, 2009 @ 10:31am - abelden

PERMIT # 281452001





NOTE:

MEAN HIGH WATER (MHW) AND MEAN LOW WATER (MLW) ELEVATIONS PUBLISHED IN NAVD 88, FROM LAND BOUNDARY INFORMATION SYSTEM (LABINS) BASED ON EPOCH 1983-2001 TIDE INTERPOLATION POINT IDENTIFICATION NUMBER 200904.

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THOMAS P PIERRO P.E. NO. 64683

11/20/09
DATE

REVISIONS		
DATE	BY	DESCRIPTION
1/28/09	JRC	RAI #1

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
CITY OF ANNA MARIA SEGMENT
FILL PROFILES

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
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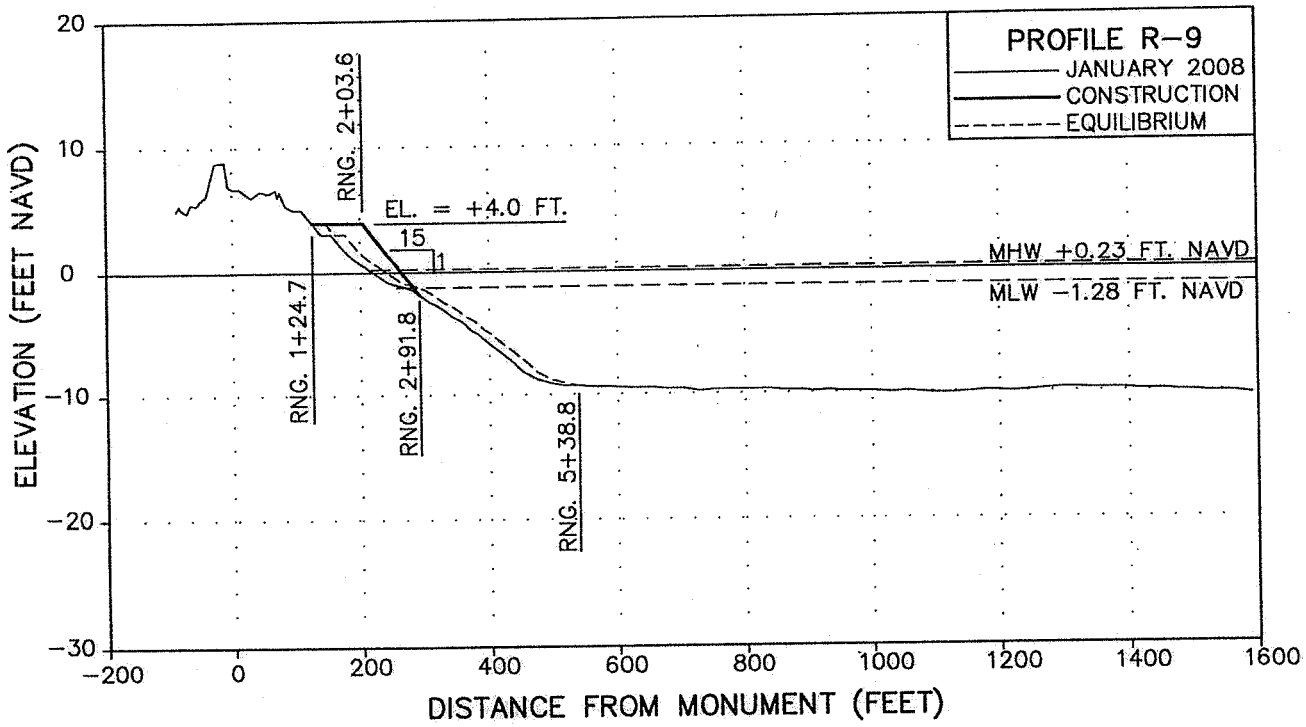
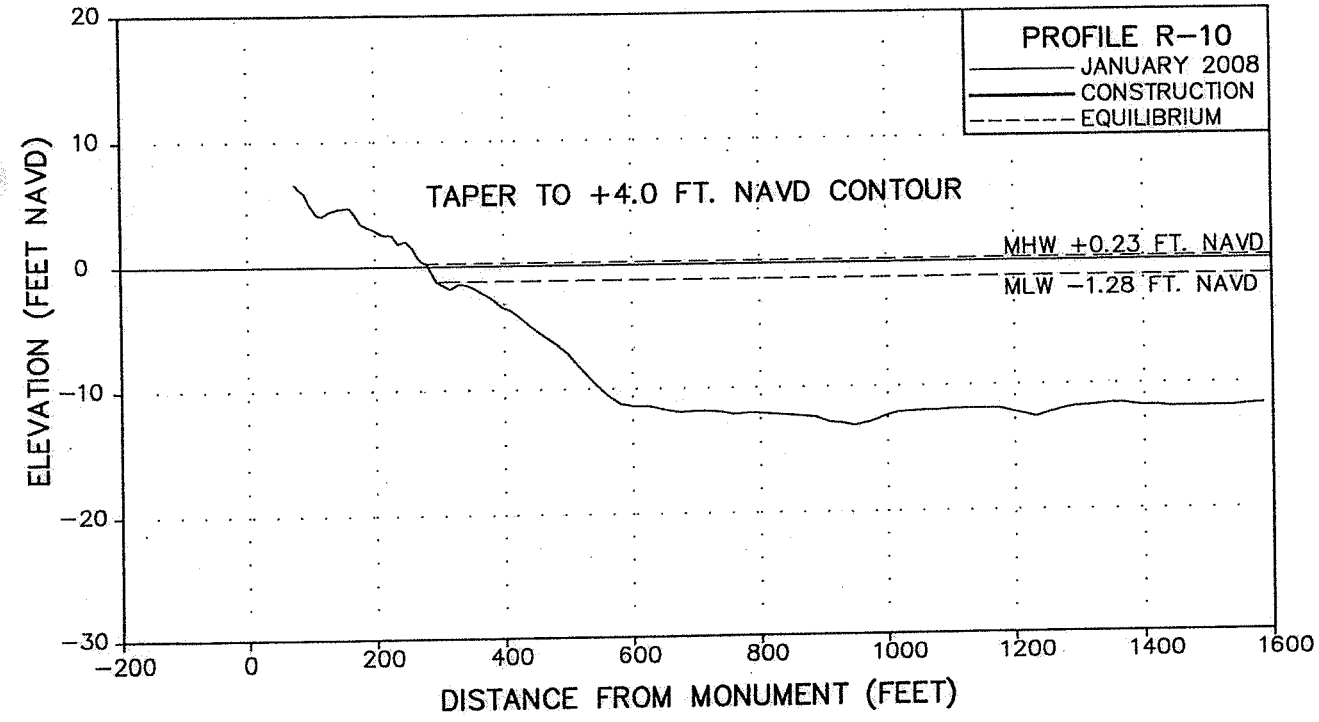
PH: (561) 391-8102
FAX: (561) 391-8106
C.O.A.: FL. #4628
C.O.A.: LA. #2231
www.CoastalPlanning.net

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 6

H:\Manatee\49\PERMITS\844649 PROFILES.dwg - Oct 23, 2009 @ 1:51pm - rchasse

PERMIT # 281452001





NOTE:

MEAN HIGH WATER (MHW) AND MEAN LOW WATER (MLW) ELEVATIONS PUBLISHED IN NAVD 88, FROM LAND BOUNDARY INFORMATION SYSTEM (LABINS) BASED ON EPOCH 1983-2001 TIDE INTERPOLATION POINT IDENTIFICATION NUMBER 200904.

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FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/20/09
DATE

REVISIONS		
DATE	BY	DESCRIPTION
1/28/09	JRC	RAI #1

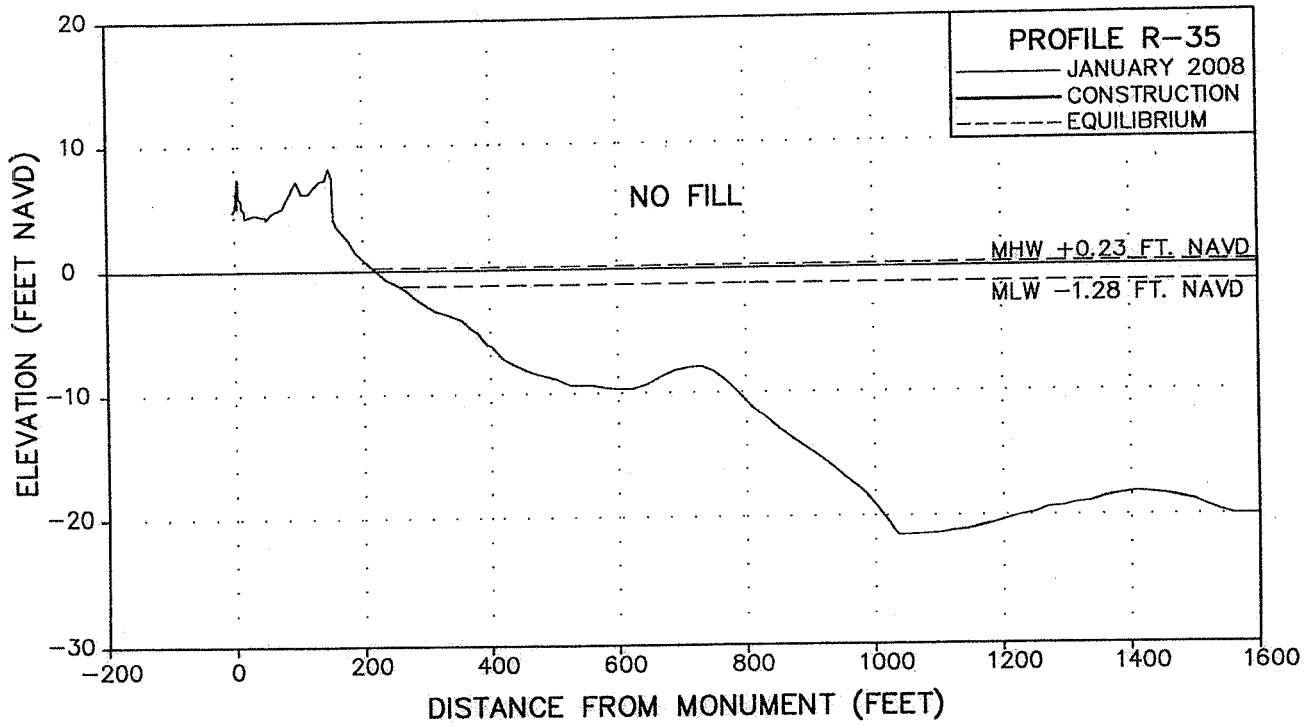
ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
CITY OF ANNA MARIA SEGMENT
FILL PROFILES

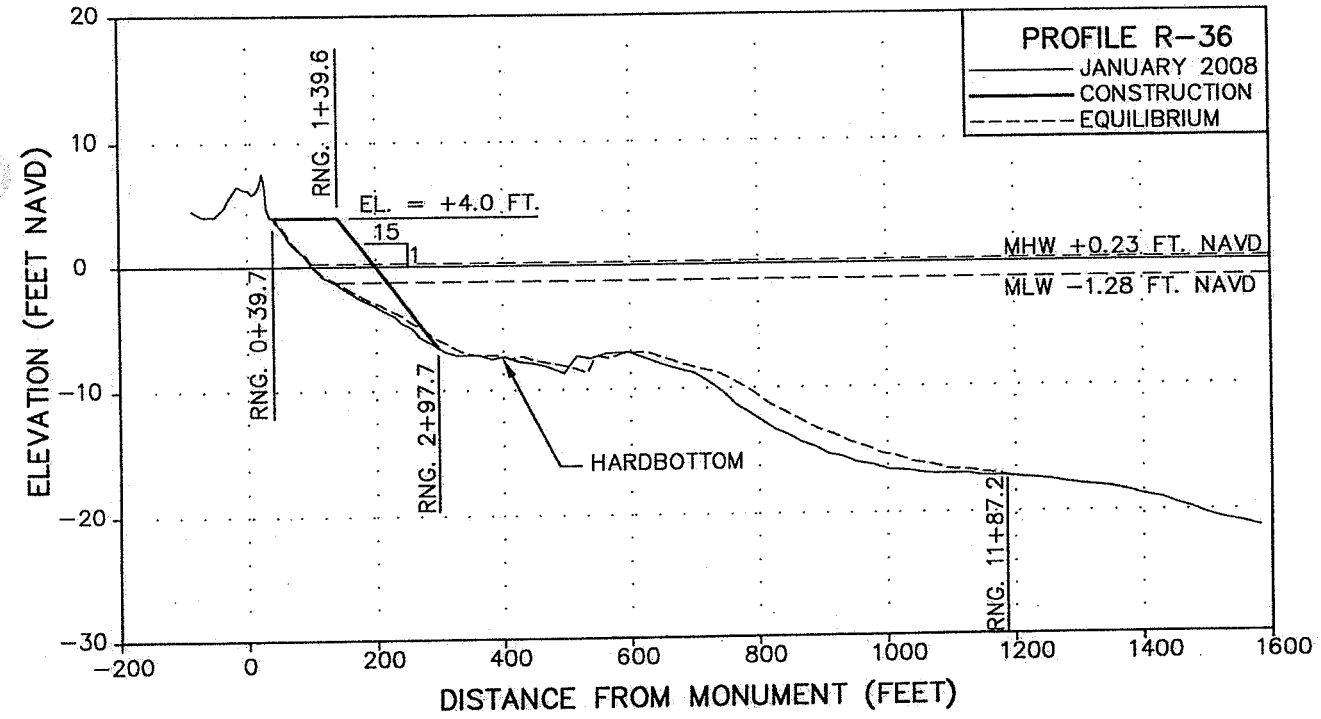
COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH: (561) 391-8102
FAX: (561) 391-9116
C.O.A. FL. #4028
C.O.A. LA. #2531
www.CoastalPlanning.net

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 7

PERMIT # 281452001

H:\Manatee\91PERMITS\8446491 PROFILES.dwg - Oct 23, 2009 @ 1:51pm - rchasse





NOTE:

MEAN HIGH WATER (MHW) AND MEAN LOW WATER (MLW) ELEVATIONS PUBLISHED IN NAVD 88, FROM LAND BOUNDARY INFORMATION SYSTEM (LABINS) BASED ON EPOCH 1983-2001 TIDE INTERPOLATION POINT IDENTIFICATION NUMBER 200904.

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/20/09
DATE

REVISIONS		
DATE	BY	DESCRIPTION
1/28/09	JRC	RAI #1

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
COQUINA BEACH SEGMENT
FILL PROFILES

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
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PH. (561) 391-9102
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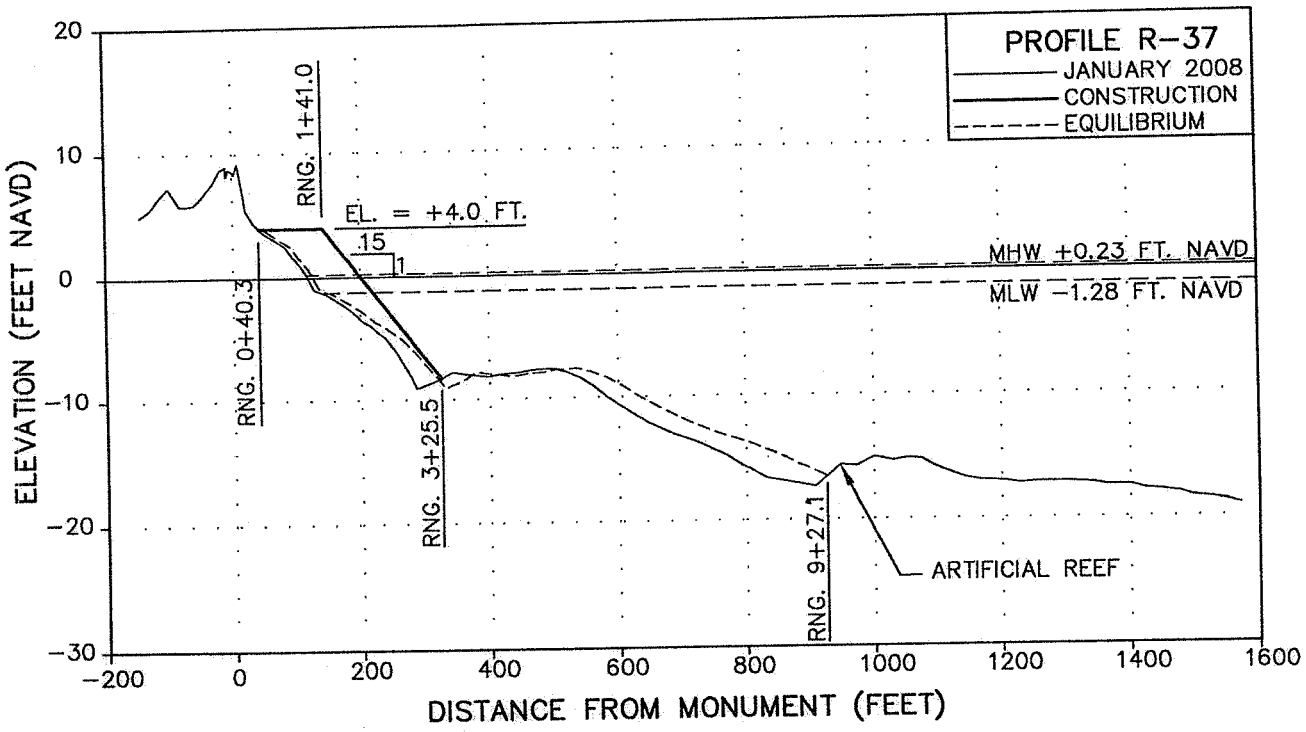
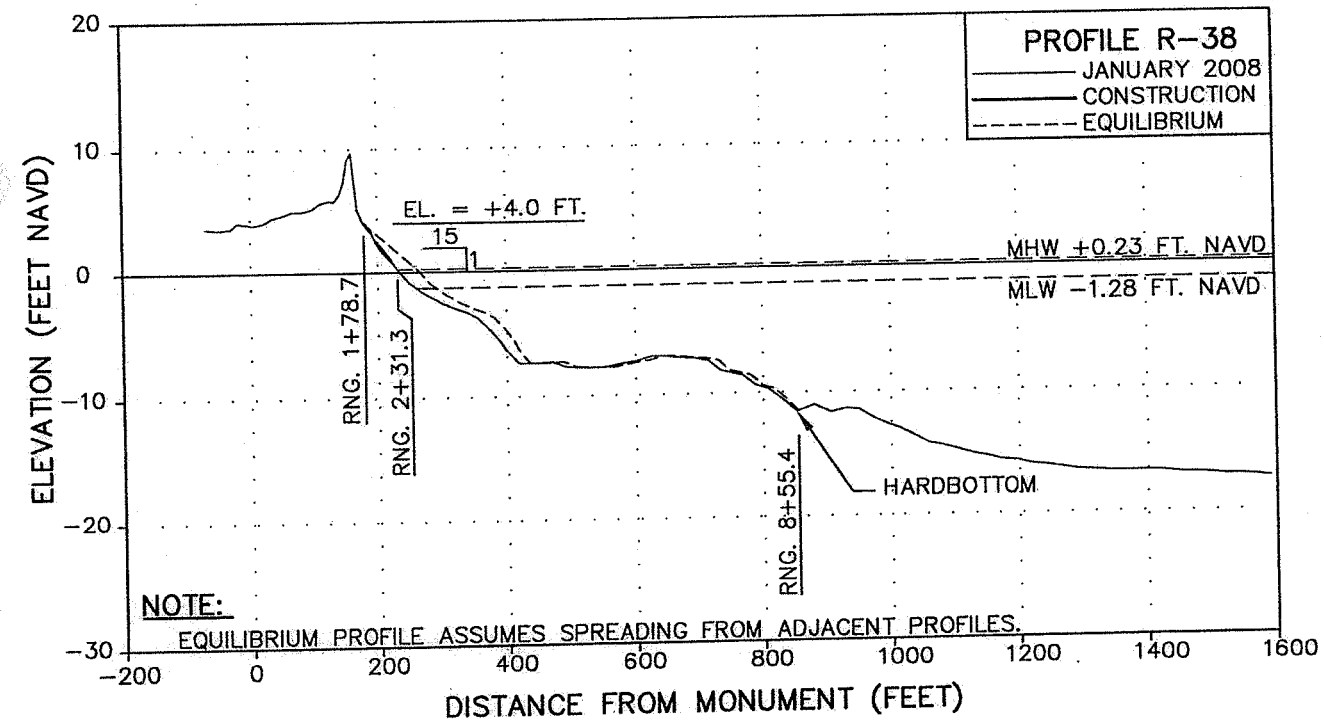
C.O.A. FL. #4028
C.O.A. LA. #251
www.CoastalPlanning.net

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 8

H:\Manatee\2009\PERMITS\8446-49 PROFILES.dwg - Oct 23, 2009 @ 1:53pm - rchasse

PERMIT # 281452001





NOTE:

MEAN HIGH WATER (MHW) AND MEAN LOW WATER (MLW) ELEVATIONS PUBLISHED IN NAVD 88, FROM LAND BOUNDARY INFORMATION SYSTEM (LABINS) BASED ON EPOCH 1983-2001 TIDE INTERPOLATION POINT IDENTIFICATION NUMBER 200904.

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FOR REGULATORY REVIEW ONLY

THOMAS P. PIERRO P.E. NO. 64683

11/20/09
DATE

REVISIONS		
DATE	BY	DESCRIPTION
/28/09	JRC	RAI #1
5/1/09	RS	RAI #2

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
COQUINA BEACH SEGMENT
FILL PROFILES

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
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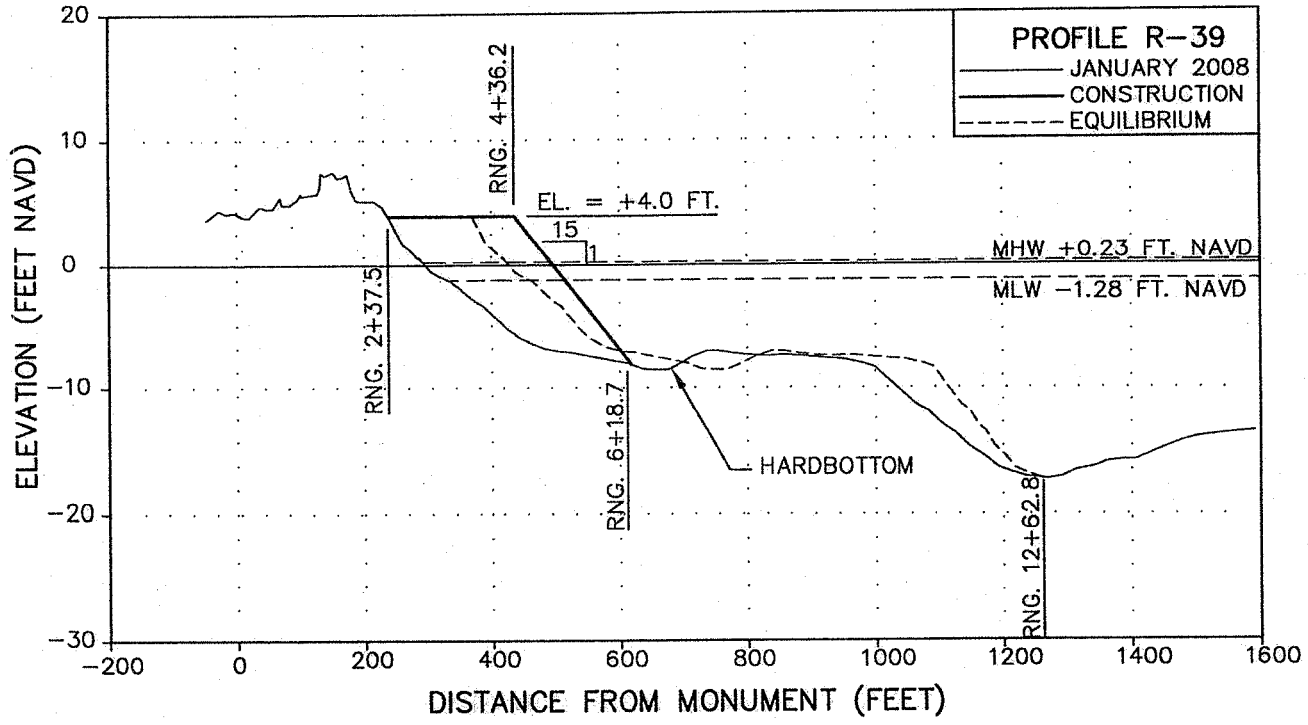
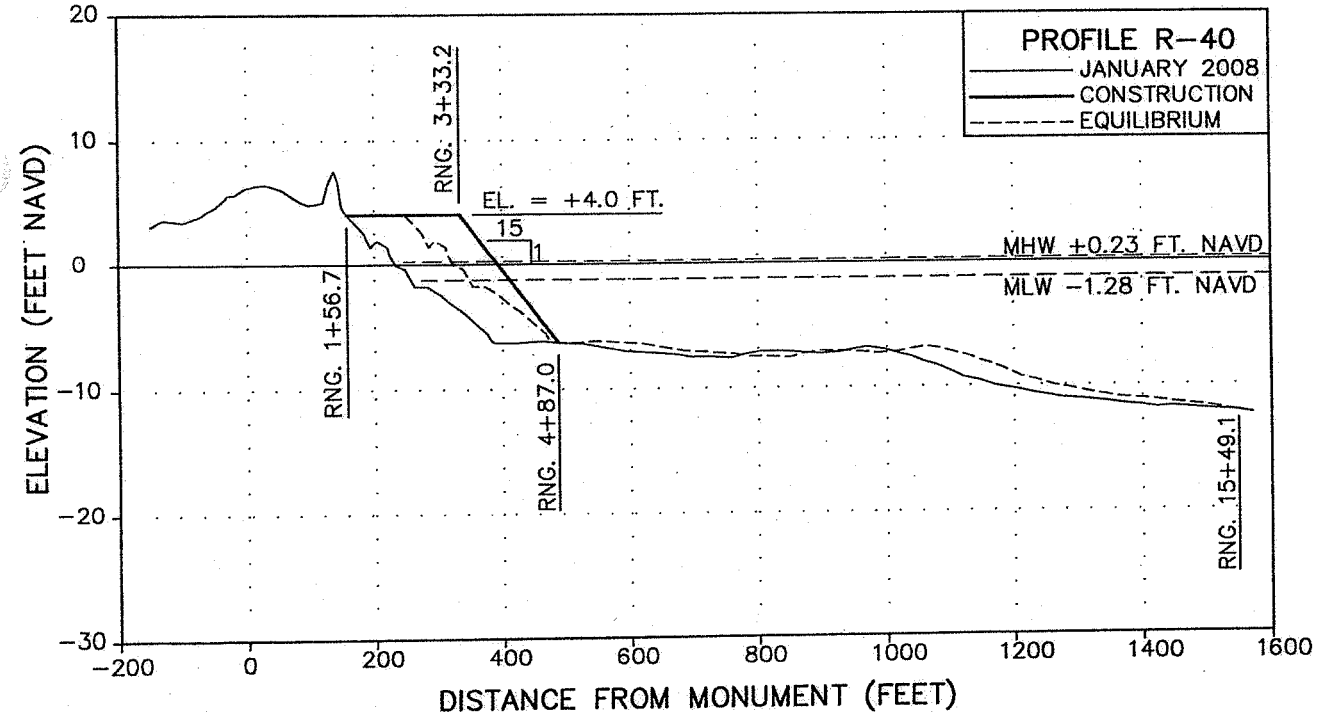
PH. (561) 391-8102
FAX (561) 391-9116
C.O.A. FL. #4503
C.O.A. LA. #2531
www.CoastalPlanning.net

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 9

H:\Manatee\...\PERMITS\84649_PROFILES.dwg - Oct 23, 2009 @ 1:54pm - rchasse

PERMIT # 281452001





NOTE:

MEAN HIGH WATER (MHW) AND MEAN LOW WATER (MLW) ELEVATIONS PUBLISHED IN NAVD 88, FROM LAND BOUNDARY INFORMATION SYSTEM (LABINS) BASED ON EPOCH 1983-2001 TIDE INTERPOLATION POINT IDENTIFICATION NUMBER 200904.

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FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/20/09
DATE

REVISIONS		
DATE	BY	DESCRIPTION
1/28/09	JRC	RAI #1

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
COQUINA BEACH SEGMENT
FILL PROFILES

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
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PH: (561) 391-9102
FAX: (561) 391-9116
C.O.A. FL. #4628
C.O.A. LA. #231
www.CoastalPlanning.net

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 10

PERMIT # 281452001

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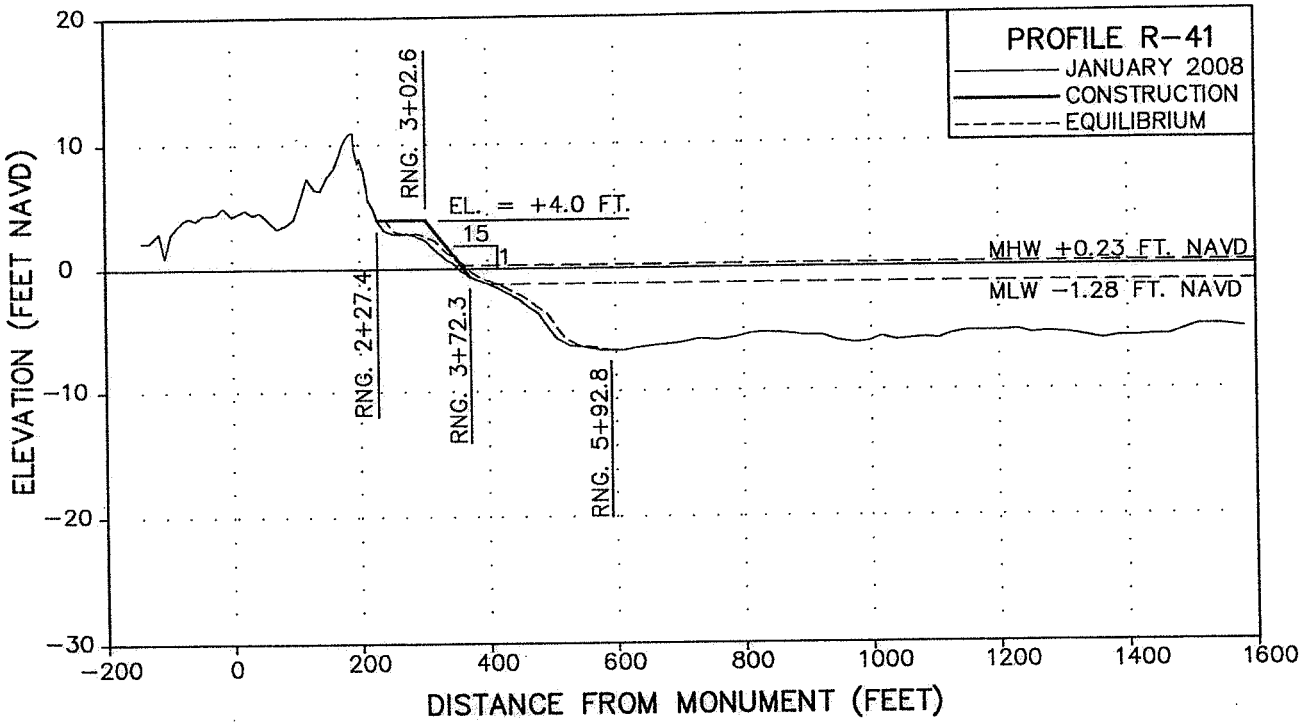

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
COQUINA BEACH SEGMENT
FILL PROFILES

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
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PH: (561) 391-8102
FAX: (561) 391-8106
C.O.A. FL. #4023
C.O.A. LA. #2351
www.CoastalPlanning.net

DATE: 4/12/07
BY: JRC
COMM NO.: 8446.49
SHEET: 11

NOTE:

MEAN HIGH WATER (MHW) AND MEAN LOW WATER (MLW) ELEVATIONS PUBLISHED IN NAVD 88, FROM LAND BOUNDARY INFORMATION SYSTEM (LABINS) BASED ON EPOCH 1983-2001 TIDE INTERPOLATION POINT IDENTIFICATION NUMBER 200904.

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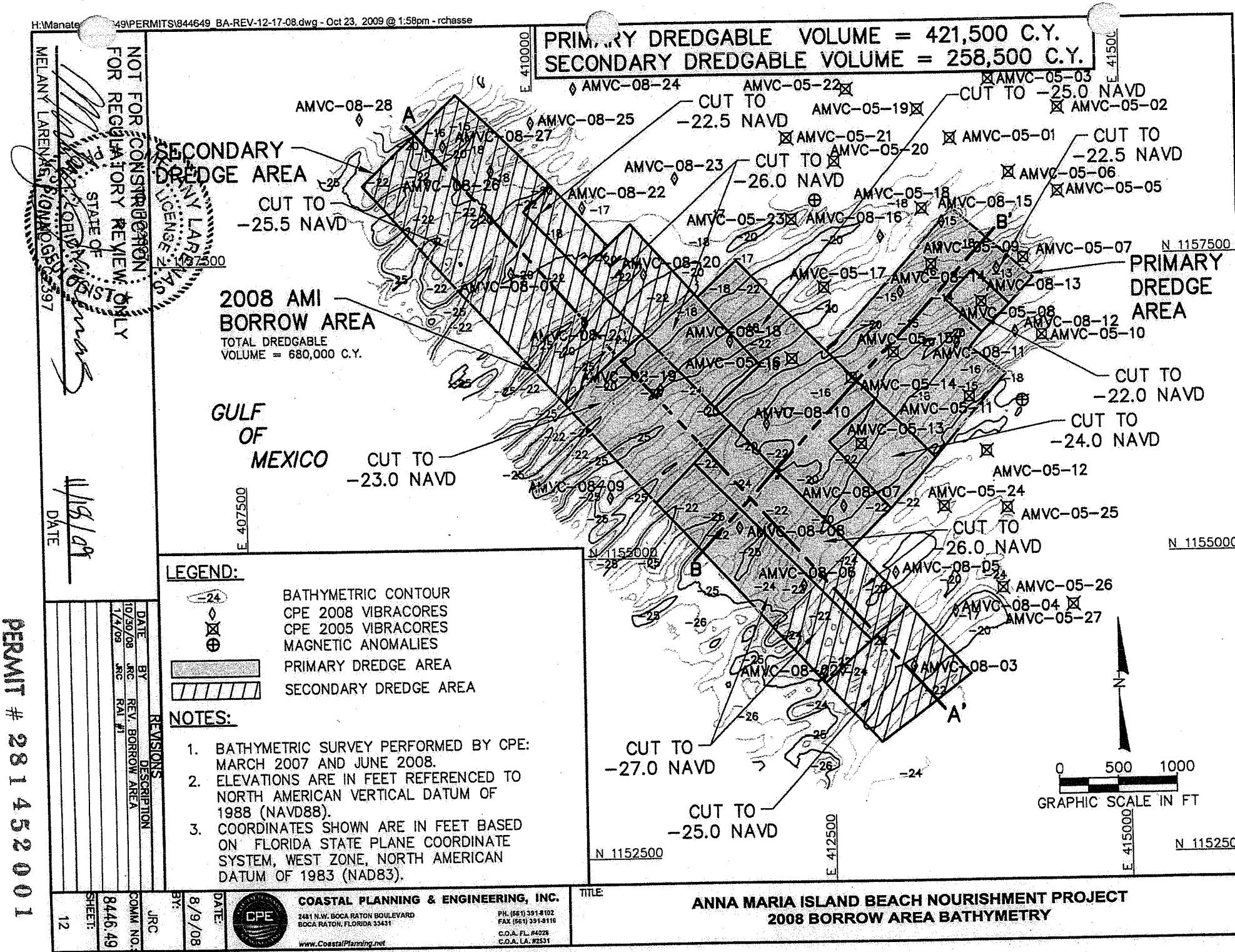
THOMAS P PIERRO P.E. NO. 64683

11/20/09
DATE

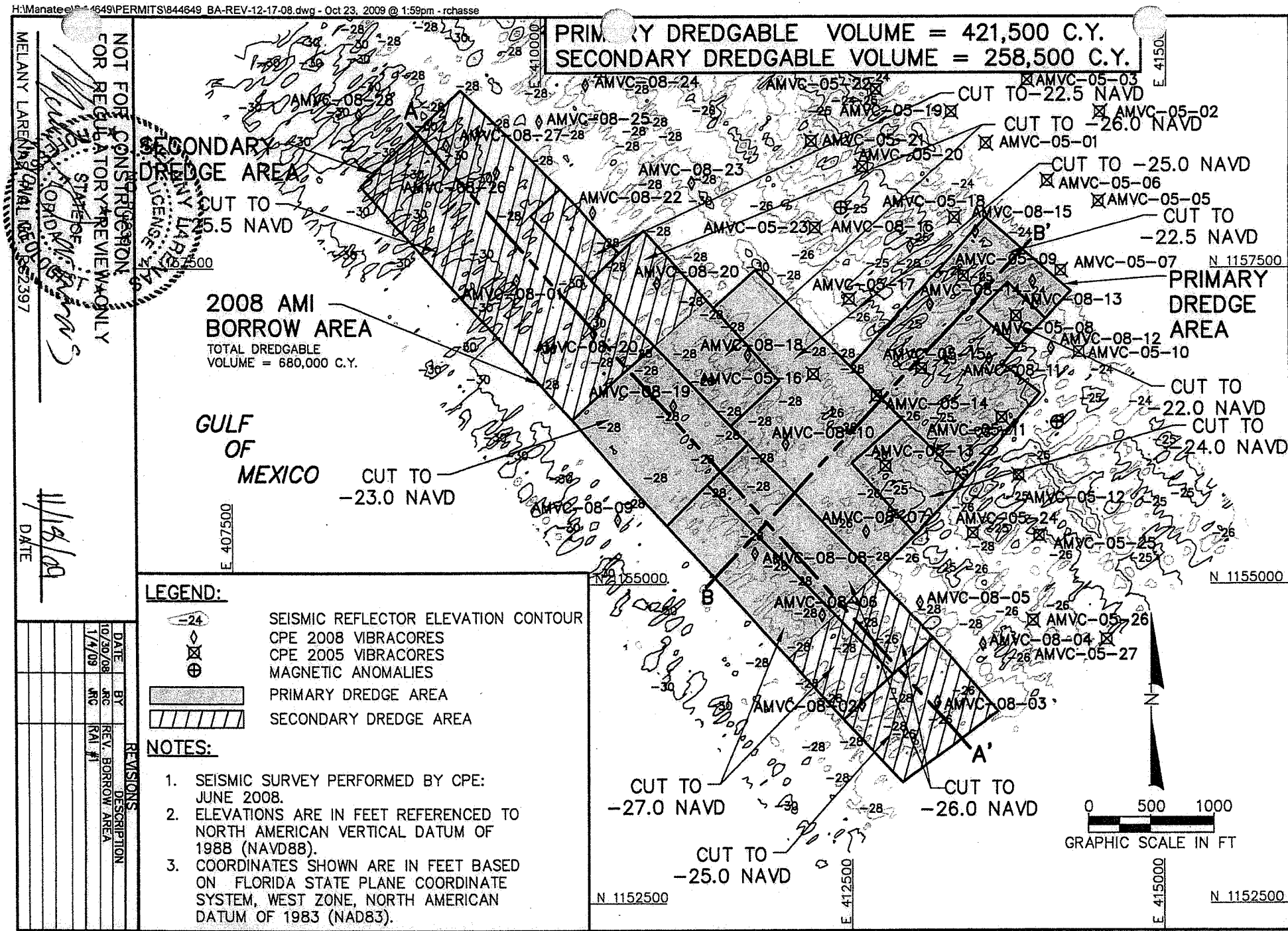
REVISIONS		
DATE	BY	DESCRIPTION
1/28/09	JRC	RAI #1

PERMIT # 281452001

H:\Manatee\49\PERMITS\844649 PROFILES.dwg - Oct 23, 2009 @ 1:55pm - rchasse


H:\Manate 49\PERMITS\844649_BA-REV-12-17-08.dwg - Oct 23, 2009 @ 1:58pm - rchasse
PRIMARY DREDGABLE VOLUME = 421,500 C.Y.
SECONDARY DREDGABLE VOLUME = 258,500 C.Y.
NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY
MELANY LARENAS, P.E. LICENSE NO. 62397
STATE OF FLORIDA
11/19/09
DATE
SECONDARY DREDGE AREA
CUT TO -25.5 NAVD
2008 AMI BORROW AREA
TOTAL DREDGABLE VOLUME = 680,000 C.Y.
GULF OF MEXICO
CUT TO -23.0 NAVD
CUT TO -22.5 NAVD
CUT TO -26.0 NAVD
CUT TO -25.0 NAVD
PRIMARY DREDGE AREA
CUT TO -22.0 NAVD
CUT TO -24.0 NAVD
CUT TO -26.0 NAVD
CUT TO -27.0 NAVD
CUT TO -25.0 NAVD
A
A'
B
B'
E 410000
E 415000
N 1157500
N 1155000
N 1152500
E 407500
E 412500
N 115250
0 500 1000
GRAPHIC SCALE IN FT
LEGEND:
BATHYMETRIC CONTOUR
CPE 2008 VIBRACORES
CPE 2005 VIBRACORES
MAGNETIC ANOMALIES
PRIMARY DREDGE AREA
SECONDARY DREDGE AREA
NOTES:
1. BATHYMETRIC SURVEY PERFORMED BY CPE: MARCH 2007 AND JUNE 2008.
2. ELEVATIONS ARE IN FEET REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. COORDINATES SHOWN ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
REVISIONS
DESCRIPTION
REV. BORROW AREA
RAI #1
BY
JRC
JRC
DATE
10/30/08
1/14/09
COMM NO.: 8446.49
BY: JRC
DATE: 8/9/08
SHEET: 12
COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-8102
FAX (561) 391-8116
C.O.A. FL. #4028
C.O.A. LA. #2531
www.CoastalPlanning.net
TITLE:
ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
2008 BORROW AREA BATHYMETRY
PERMIT # 28145200 1

H:\Manatee\844649\PERMITS\844649_BA-REV-12-17-08.dwg - Oct 23, 2009 @ 1:59pm - rchasse



NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

MELANY LARENAUD REGISTERED LICENSE NO. 62397 STATE OF FLORIDA

11/16/09
DATE

LEGEND:

- SEISMIC REFLECTOR ELEVATION CONTOUR
- CPE 2008 VIBRACORES
- CPE 2005 VIBRACORES
- MAGNETIC ANOMALIES
- PRIMARY DREDGE AREA
- SECONDARY DREDGE AREA

NOTES:

1. SEISMIC SURVEY PERFORMED BY CPE: JUNE 2008.
2. ELEVATIONS ARE IN FEET REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. COORDINATES SHOWN ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).

REVISIONS			
DESCRIPTION	BY	DATE
REV. BORROW AREA	JRC	10/30/08
RAI #1	JRC	1/4/09

SHEET: 13
COMM NO.: 8446.49
BY: JRC
DATE: 8/9/08

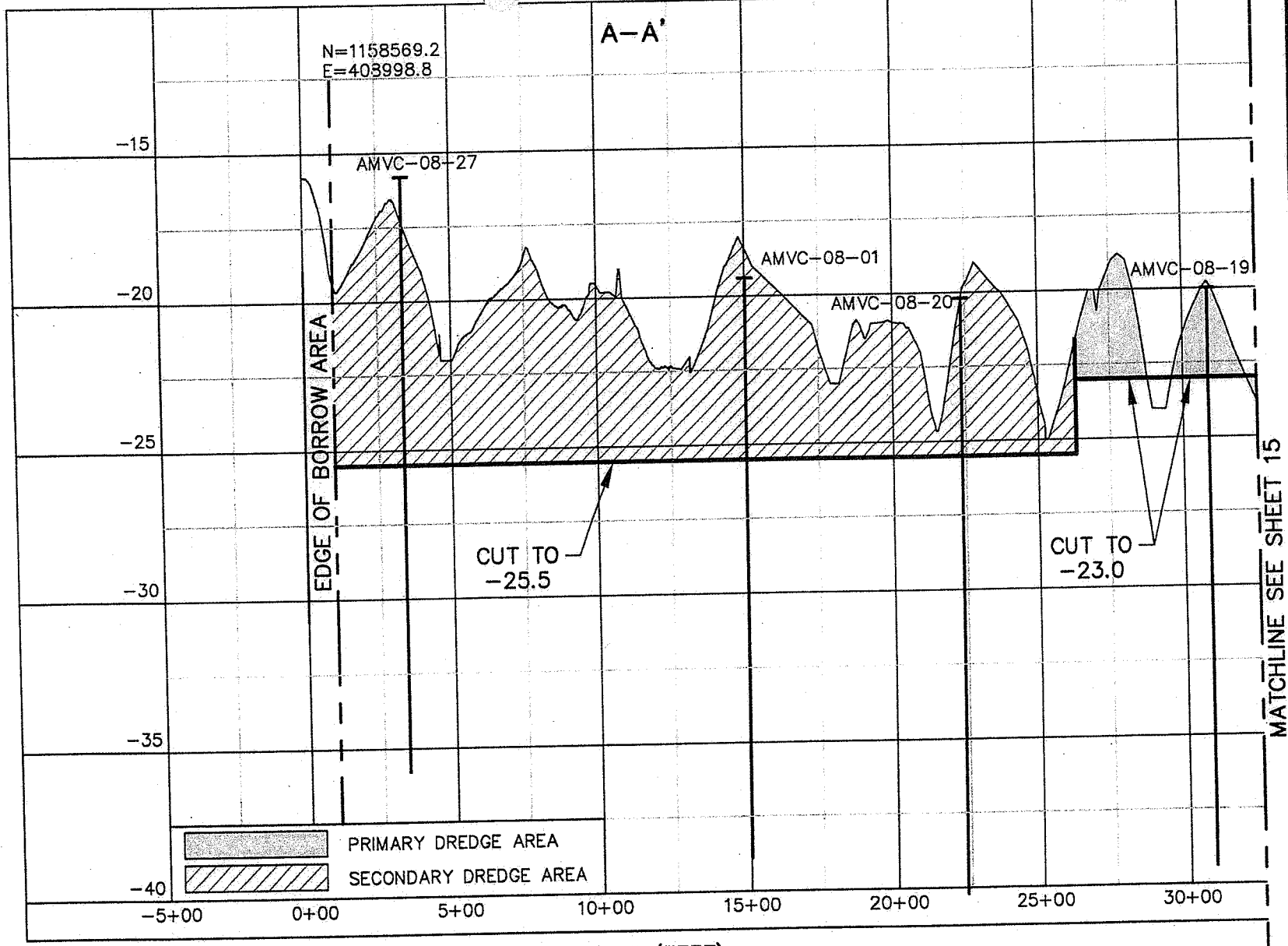
COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-8102
FAX (561) 391-9116
C.O.A. FL. #4028
C.O.A. LA. #2531
www.CoastalPlanning.net

TITLE:

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
2008 BORROW AREA SEISMIC REFLECTOR CONTOUR MAP

PERMIT # 28145200 1

H:\Manate[illegible]49\PERMITS\844649_BA_XS.dwg - Oct 23, 2009 @ 2:00pm - rchasse



NOTES:

1. CORES MAY NOT FALL DIRECTLY ON CROSS SECTION LINE, BUT ARE LOCATED SUFFICIENTLY CLOSE TO REPRESENT SIMILAR MATERIAL.
2. SEE SHEET 12 FOR LOCATION OF CROSS SECTION LINE.
3. ELEVATION BASED ON NAVD 88.

HORIZONTAL SCALE
0 200 500
GRAPHIC SCALE IN FT

VERTICAL SCALE
0 2.5 5
GRAPHIC SCALE IN FT

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

MELANY LARENAS, P.E. NO. 62397
STATE OF FLORIDA
PROFESSIONAL GEOLOGIST

11/18/09
DATE

PERMIT # 28145200 1

REVISIONS	BY	DATE
RAI #1	JRC	2/4/09

SHEET: 14
COMM. NO.: 8446.49
BY: JRC
DATE: 8/9/07

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
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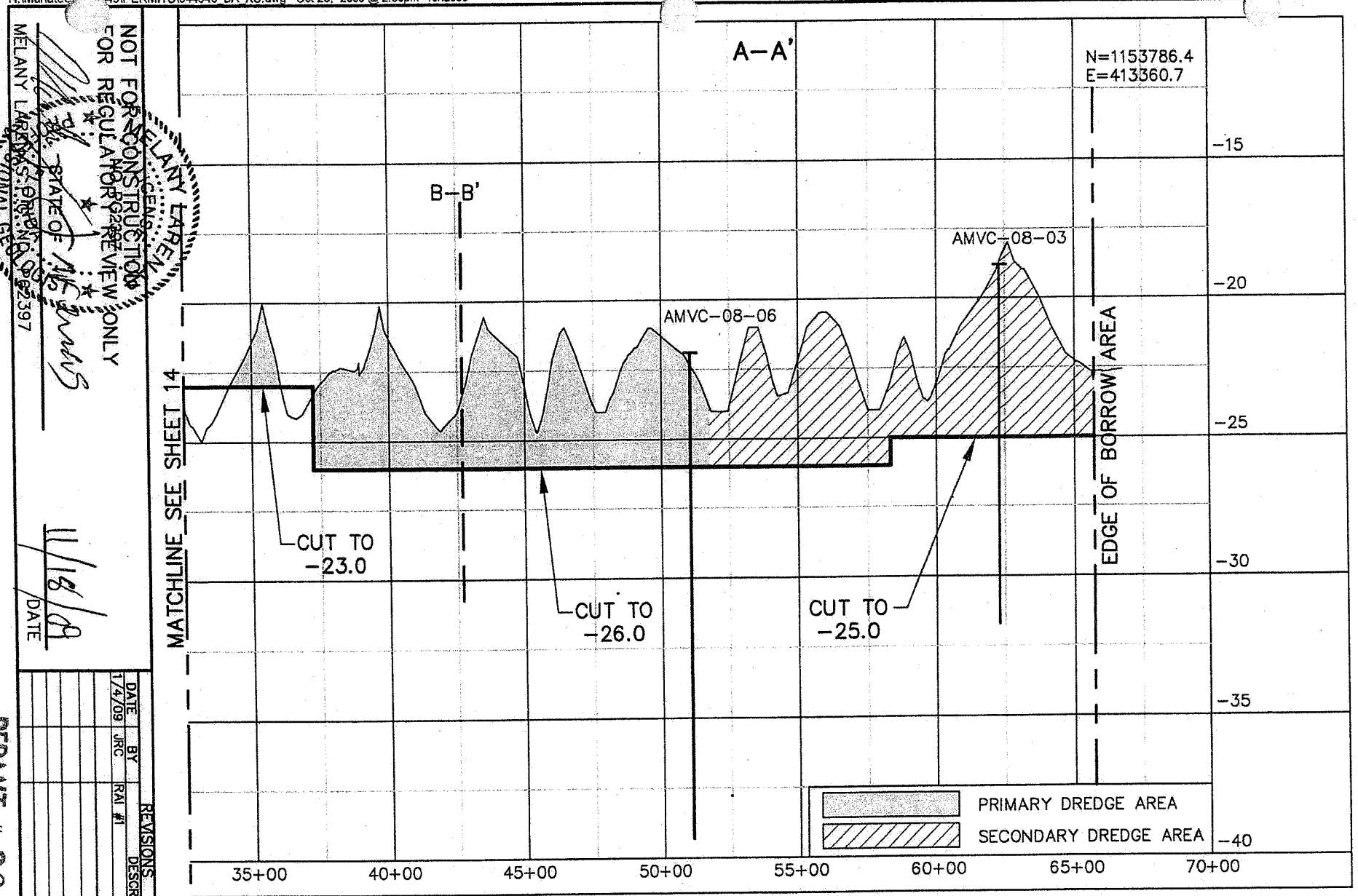
C.O.A. FL. #4028
C.O.A. LA. #2531
www.CoastalPlanning.net

TITLE:

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
2008 BORROW AREA CROSS SECTION A-A'

H:\Manatee\...\PERMITS\844649_BA_XS.dwg - Oct 23, 2009 @ 2:00pm - rchasse



NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

MELANY LAREAU
FLORIDA P.E. NO. 62397
STATE OF FLORIDA
PROFESSIONAL GEOLOGIST

11/18/09
DATE

PERMIT # 28145200 1

REVISIONS		
DESCRIPTION	BY	DATE
RAI #1	JRC	1/4/09

NOTES:
1. CORES MAY NOT FALL DIRECTLY ON CROSS SECTION LINE, BUT ARE LOCATED SUFFICIENTLY CLOSE TO REPRESENT SIMILAR MATERIAL.
2. SEE SHEET 12 FOR LOCATION OF CROSS SECTION LINE.
3. ELEVATION BASED ON NAVD 88.

HORIZONTAL SCALE
0 250 500
GRAPHIC SCALE IN FT

VERTICAL SCALE
0 2.5 5
GRAPHIC SCALE IN FT

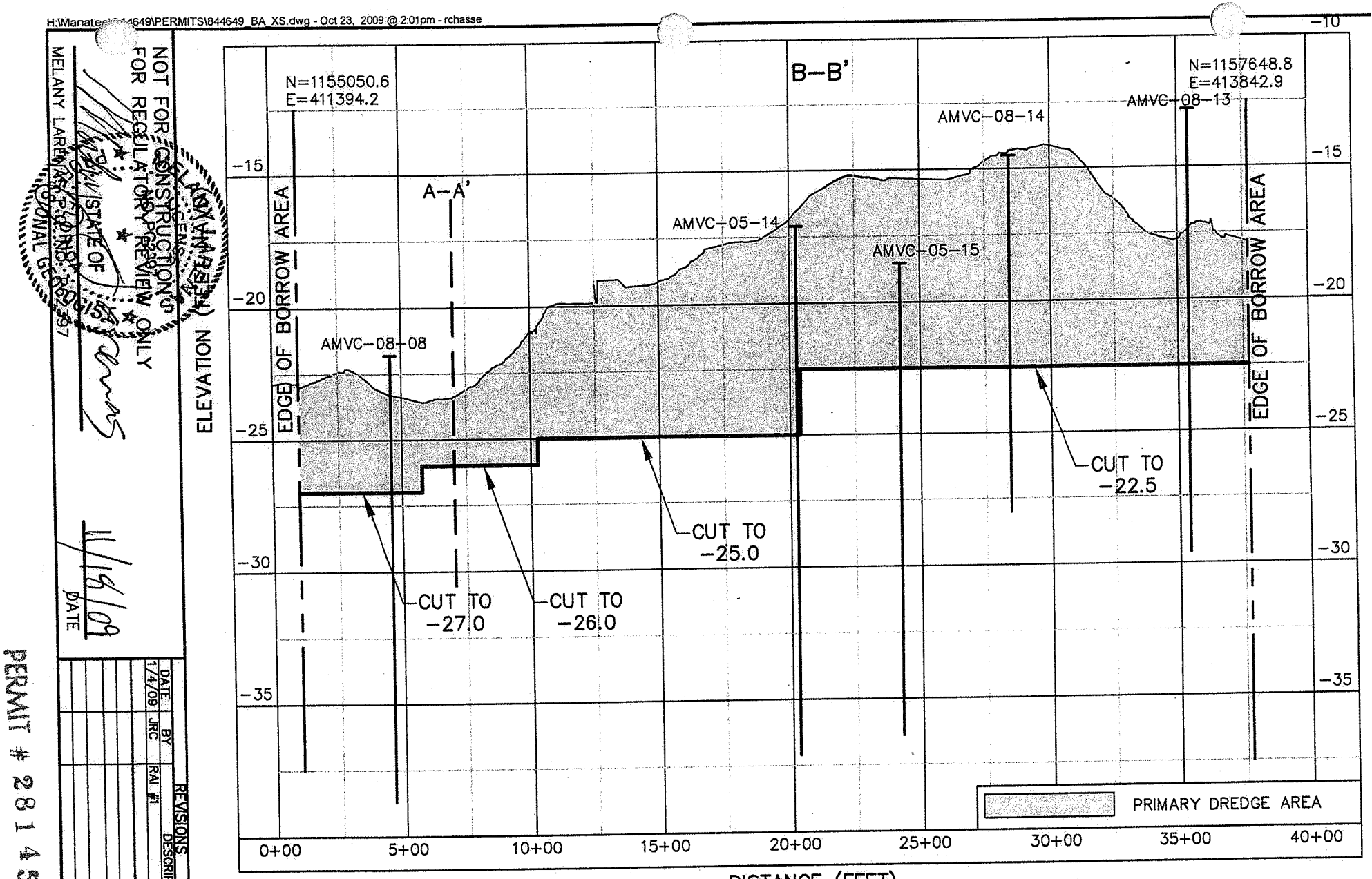
SHEET:	COMM. NO.:	BY:	DATE:
15	B446.49	JRC	8/9/07

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-8102
FAX (561) 391-9116
C.O.A. FL. #4028
C.O.A. LA. #2531
www.CoastalPlanning.net

TITLE:

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
2008 BORROW AREA CROSS SECTION A-A'

H:\Manatee\844649\PERMITS\844649_BA_XS.dwg - Oct 23, 2009 @ 2:01pm - rchasse



ELEVATION (NAVD)

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

MELANY LAREAU, P.E. STATE OF FLORIDA LIC. NO. 62997 PROFESSIONAL ENGINEER

11/19/09
DATE

REVISIONS			
DESCRIPTION	BY	DATE
RAI #1	JRC	1/4/09

NOTES:
1. CORES MAY NOT FALL DIRECTLY ON CROSS SECTION LINE, BUT ARE LOCATED SUFFICIENTLY CLOSE TO REPRESENT SIMILAR MATERIAL.
2. SEE SHEET 12 FOR LOCATION OF CROSS SECTION LINE.
3. ELEVATION BASED ON NAVD 88.

HORIZONTAL SCALE
0 250 500
GRAPHIC SCALE IN FT

VERTICAL SCALE
0 2.5 5
GRAPHIC SCALE IN FT

PERMIT # 28145200 1

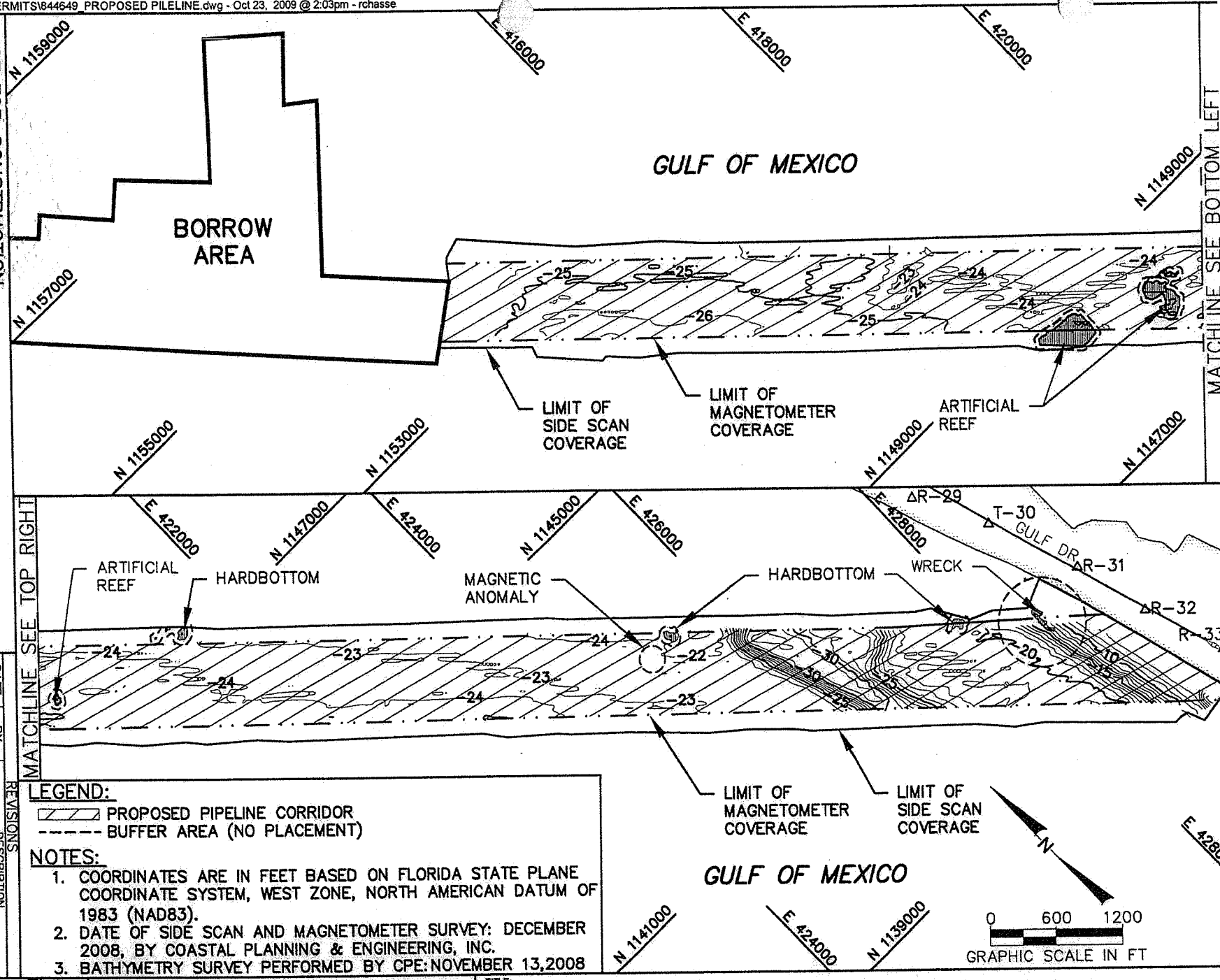
SHEET:	COMM. NO.:	BY:	DATE:
16	8446.49	JRC	8/9/07

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
PH. (561) 391-8102
FAX (561) 391-9116
C.O.A. FL. #4028
C.O.A. LA. #2531
www.CoastalPlanning.net

TITLE:

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
2008 BORROW AREA CROSS SECTION B-B'

H:\Manatee...549\PERMITS\844649_PROPOSED PILELINE.dwg - Oct 23, 2009 @ 2:03pm - rchasse



NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO, P.E. NO. 64683

11/20/09
DATE

PERMIT # 28145200 1

LEGEND:
- PROPOSED PIPELINE CORRIDOR
- BUFFER AREA (NO PLACEMENT)

NOTES:
1. COORDINATES ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
2. DATE OF SIDE SCAN AND MAGNETOMETER SURVEY: DECEMBER 2008, BY COASTAL PLANNING & ENGINEERING, INC.
3. BATHYMETRY SURVEY PERFORMED BY CPE: NOVEMBER 13,2008

REVISIONS	DESCRIPTION	BY	DATE

SHEET: 17
COMM NO.: 8446.49
BY: JRC
DATE: 2/4/09

COASTAL PLANNING & ENGINEERING, INC.
2481 N.W. BOCA RATON BOULEVARD
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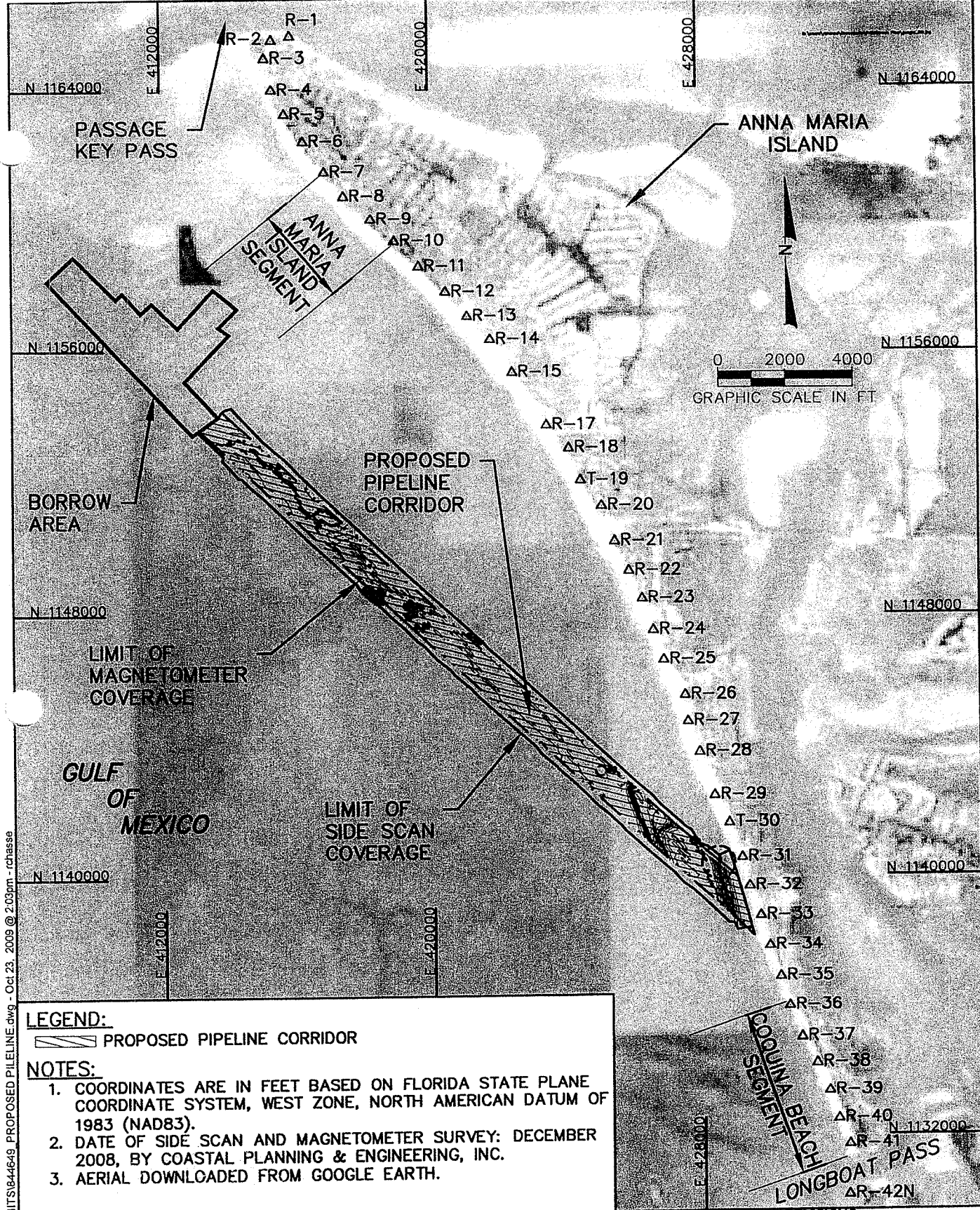
PH. (561) 391-8102
FAX (561) 391-8106
C.O.A. FL. #4028
C.O.A. LA. #2531
www.CoastalPlanning.net

TITLE:

ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
PIPELINE CORRIDOR DETAIL



ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT
PIPELINE CORRIDOR PLAN VIEW

LEGEND:

PROPOSED PIPELINE CORRIDOR

NOTES:

1. COORDINATES ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
2. DATE OF SIDE SCAN AND MAGNETOMETER SURVEY: DECEMBER 2008, BY COASTAL PLANNING & ENGINEERING, INC.
3. AERIAL DOWNLOADED FROM GOOGLE EARTH.

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FOR REGULATORY REVIEW ONLY

THOMAS P PIERRO P.E. NO. 64683

11/20/09
DATE

REVISIONS		
DATE	BY	DESCRIPTION

COASTAL PLANNING & ENGINEERING, INC.
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DATE: 2/4/09
BY: JRC
COMM NO.: 8446.49
SHEET: 18

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PERMIT # 281452001

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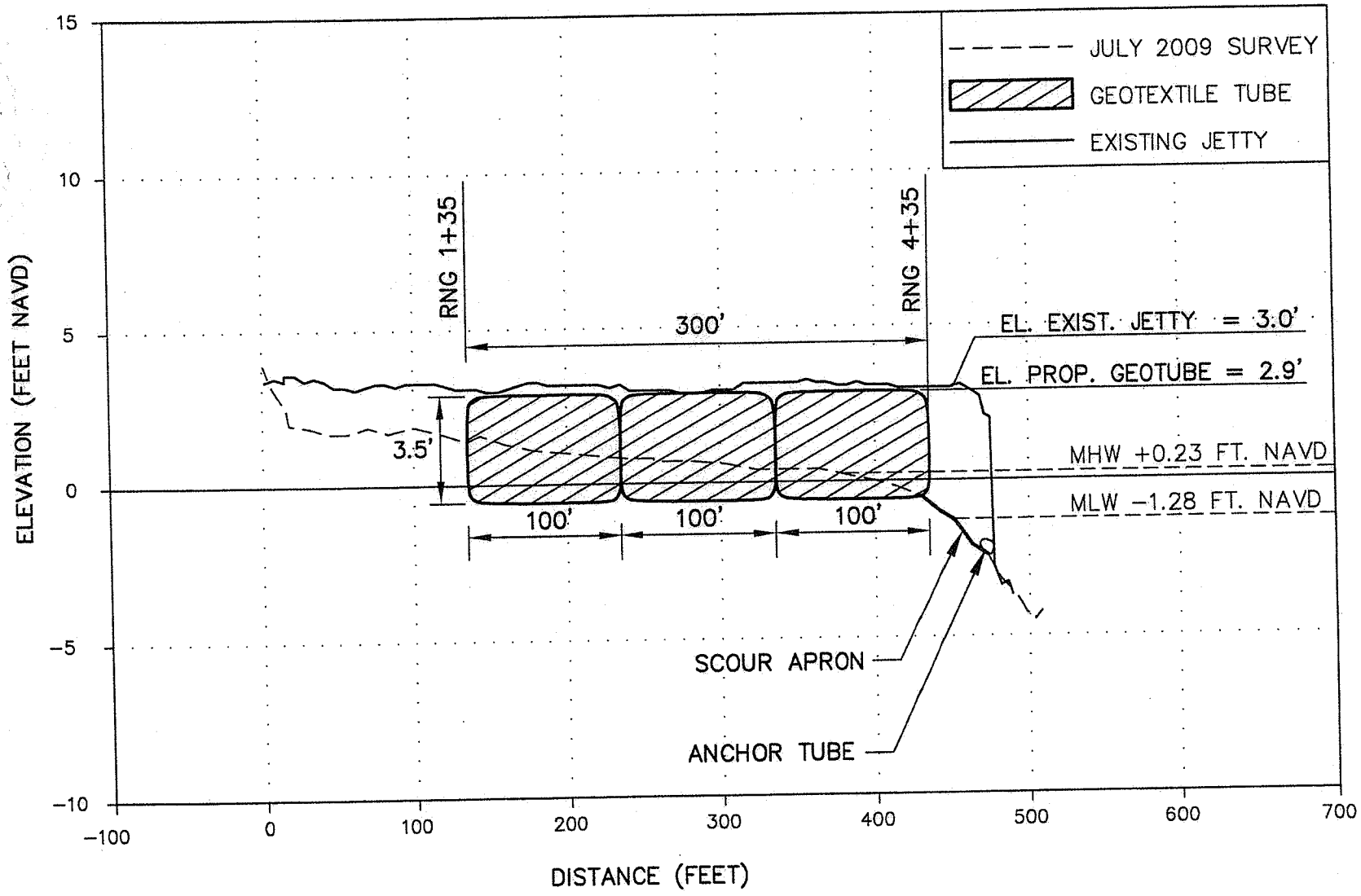
THOMAS P. PIERRO, P.E. NO. 64683

11/24/09
DATE



REVISIONS		
DESCRIPTION	BY	DATE
PER RAI #3	TP	9/28/09

PERMIT # 28145200 1

SHEET: 19	COMM. NO.: 8446.49	BY: AMB	DATE: 5/1/09	COASTAL PLANNING & ENGINEERING, INC.	TITLE: ANNA MARIA ISLAND BEACH NOURISHMENT PROJECT COQUINA BEACH SEGMENT GEOTEXTILE TUBE CROSS SECTION

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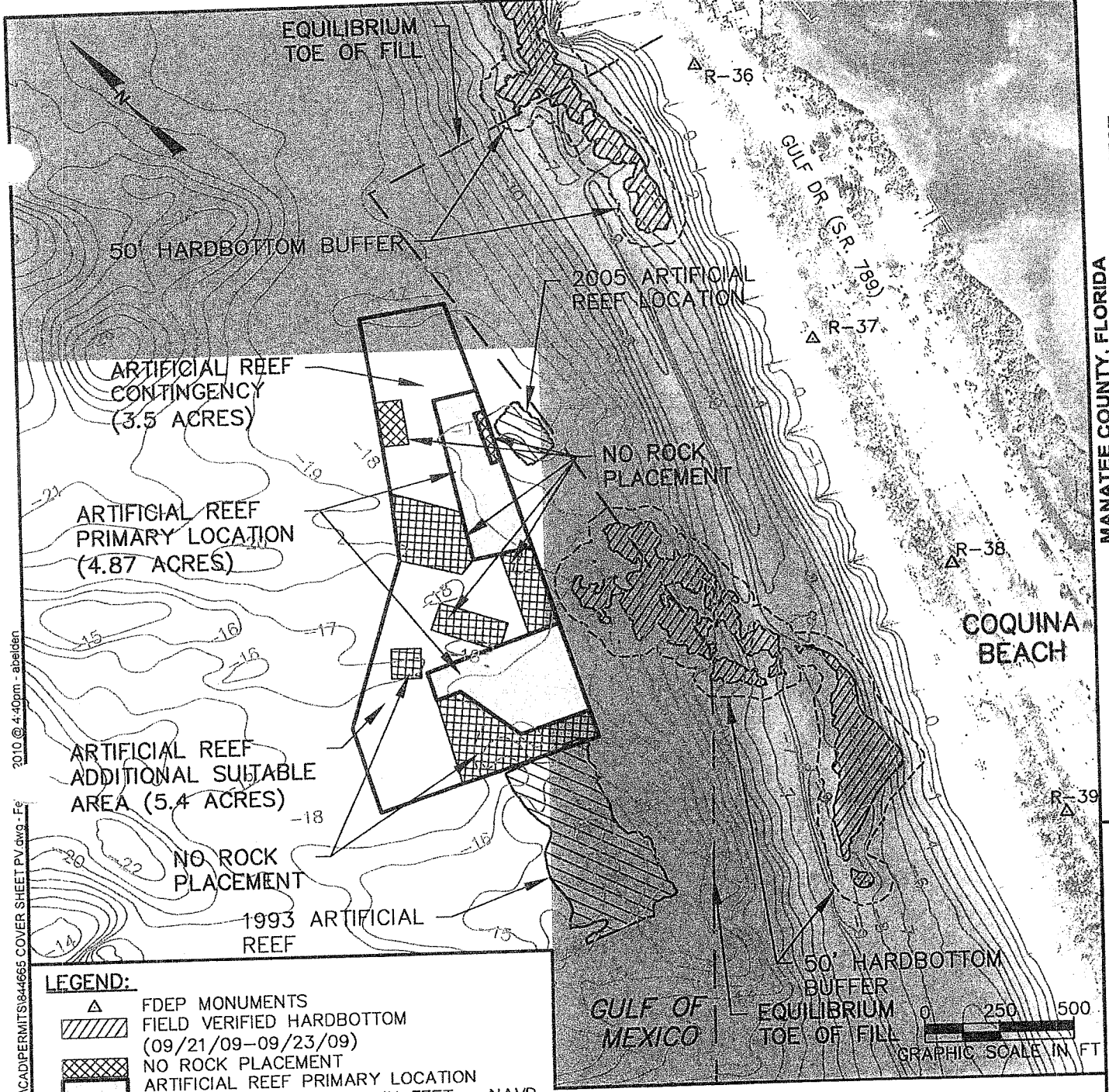

LEGEND:

- △ FDEP MONUMENTS
- FIELD VERIFIED HARDBOTTOM (09/21/09–09/23/09)
- NO ROCK PLACEMENT
- ARTIFICIAL REEF PRIMARY LOCATION
- −15 BATHYMETRIC CONTOURS IN FEET – NAVD

NOTES:

1. COORDINATES ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
2. ELEVATIONS ARE IN FEET REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
3. BATHYMETRIC SURVEY CONDUCTED BY CPE SEPTEMBER 2009. CONTOURS GENERALLY LANDWARD OF −5FT CONTOUR ARE FROM 2006 LIDAR SURVEY CONDUCTED BY JALBTX.
4. HARDBOTTOM BUFFER BASED ON A 50' MINIMUM OFFSET FROM EXPOSED HARDBOTTOM VERIFIED BY DIVER OBSERVATION (SEPT. 2009).
5. DATE OF AERIAL PHOTOGRAPH: FEBRUARY 2008.
6. SEE SHEETS 4 & 5 FOR ADDITIONAL DETAILS.

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THOMAS P PIERRO P.E. NO. 64683

2/26/2010
DATE

REVISIONS		
DATE	BY	DESCRIPTION
1/7/10	JRC	RAI #4
2/25/10	AMB	UPDATE PRIMARY LOCATION

MANATEE COUNTY, FLORIDA
COQUINA BEACH ARTIFICIAL REEF MITIGATION PROJECT
PLAN VIEW

COASTAL PLANNING & ENGINEERING, INC.
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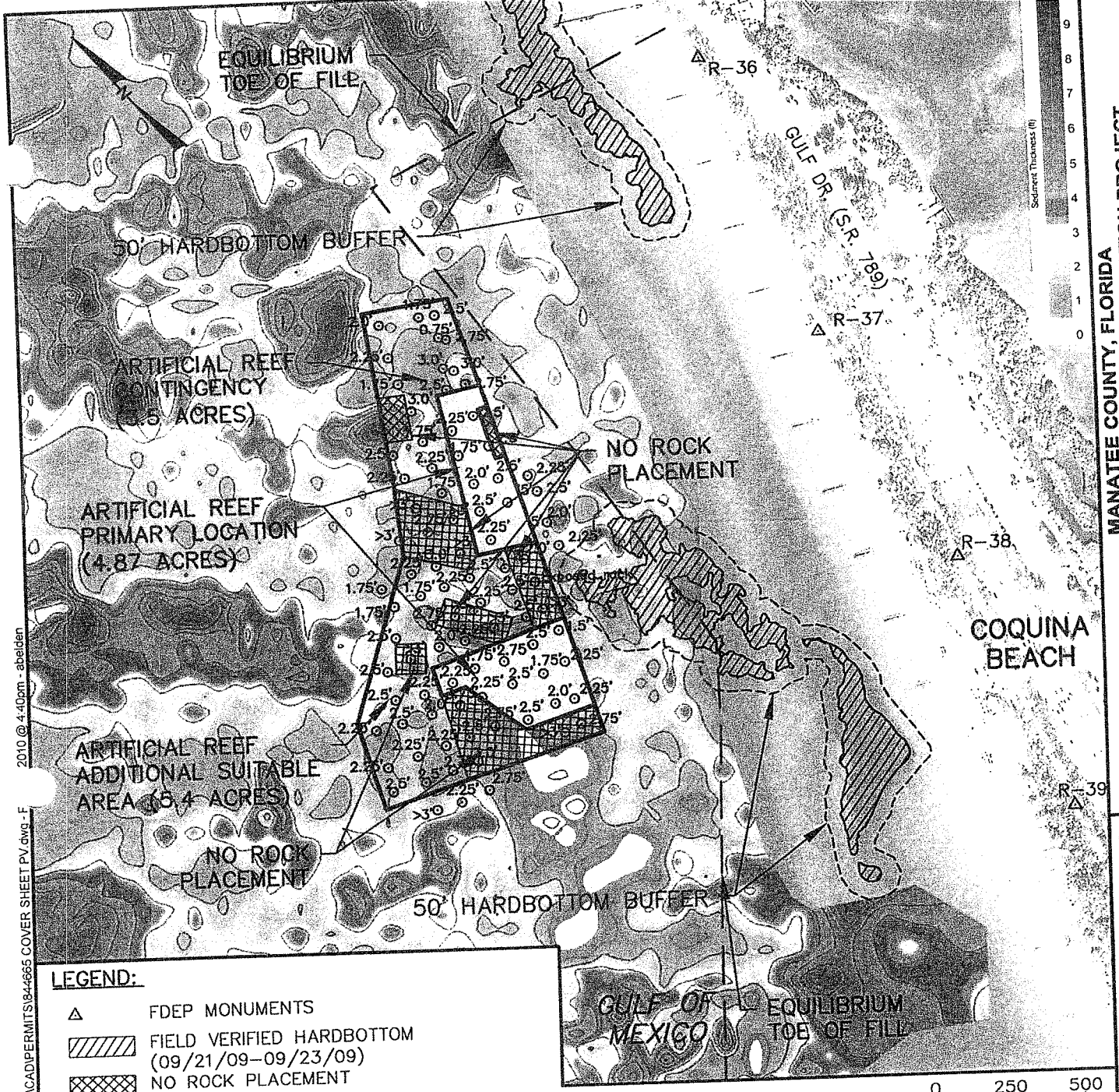
DATE: 10/2/09
BY: JRC
COMM NO.: 8446.65
SHEET: 2

2010 @ 4:40pm - abelden
P:\Manatee\[illegible]\5 - Coquina Beach Nourishment Project WA#14 CO#1\CAD\PERMITS\644665 COVER SHEET PV.dwg - Fe



MANATEE COUNTY, FLORIDA
COQUINA BEACH ARTIFICIAL REEF MITIGATION PROJECT
SEDIMENT THICKNESS MAP

LEGEND:

- △ FDEP MONUMENTS
- FIELD VERIFIED HARDBOTTOM (09/21/09–09/23/09)
- NO ROCK PLACEMENT
- ARTIFICIAL REEF PRIMARY LOCATION
- 2.75' SAND PROBE LOCATIONS AND SAND DEPTH IN FEET (10/8/09)

0 250 500
GRAPHIC SCALE IN FT

NOTES:

1. COORDINATES ARE IN FEET BASED ON FLORIDA STATE PLANE COORDINATE SYSTEM, WEST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).
2. HARDBOTTOM BUFFER BASED ON A 50' MINIMUM OFFSET FROM EXPOSED HARDBOTTOM VERIFIED BY DIVER OBSERVATION (SEPT. 2009).
3. DATE OF AERIAL PHOTOGRAPH: FEBRUARY 2008.
4. COLOR MAP BASED ON SEISMIC SURVEY PERFORMED BY CPE, SEPTEMBER, 2009.

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THOMAS P PIERRO P.E. NO. 64683

2/26/2010
DATE

REVISIONS		
DATE	BY	DESCRIPTION
1/7/10	JRC	RAI #4
2/25/10	AMB	UPDATE PRIMARY LOCATION

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DATE: 10/2/09
BY: JRC
COMM NO.: 8446.65
SHEET: 21

P:\Manatee\95 - Coquina Beach Nourishment Project WA#14 CO#1\CAD\PERMITS\844665 COVER SHEET PV.dwg - F 2010 @ 4:40pm - abelden

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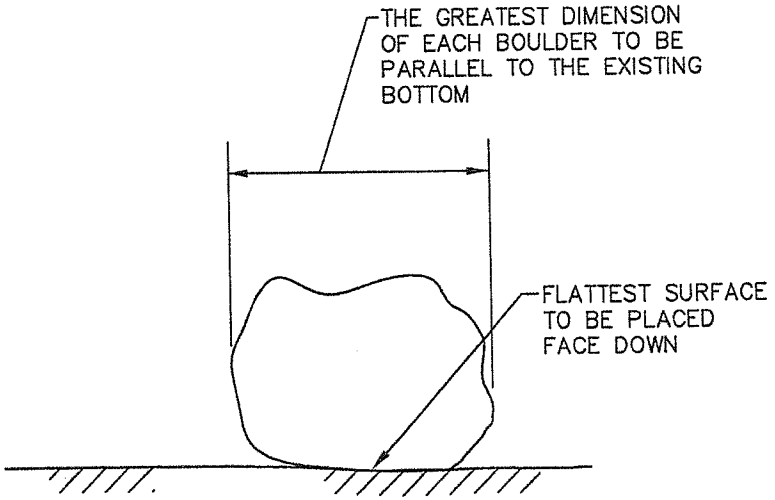
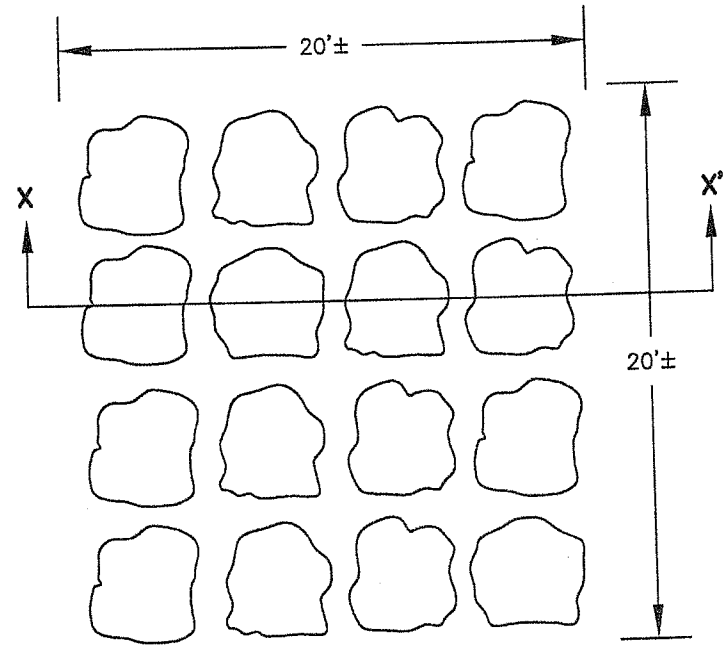
3/26/2010
DATE



BOULDER PLACEMENT ORIENTATION
SCALE: N.T.S.



ARTIFICIAL REEF PLAN VIEW DETAIL (TYP.)
SCALE: N.T.S.

NOTES:

1. THE CONTRACTOR SHALL NOT WORK OR ANCHOR WITHIN 50 FEET OF ANY EXISTING HARDBOTTOM.
2. ALL BOULDERS SHALL BE PLACED IN A SINGLE LAYER AS CLOSE TOGETHER AS PRACTICAL WITH AN AVERAGE SPACING OF 1.5 FOOT, BUT NOT TO EXCEED 3 FEET. DO NOT STACK BOULDERS. SPACING BETWEEN BOULDERS WILL BE ADJUSTED PRIOR TO CONSTRUCTION BASED ON A SURVEY OF NATURAL HARDBOTTOM TO DETERMINE EXISTING SAND TO ROCK RATIO.
3. BOULDERS SHOULD BE PLACED WITH THE LONGEST DIMENSION OF EACH BOULDER PARALLEL TO THE BOTTOM.
4. PLACE THE FLATTEST OF THE TWO AVAILABLE SURFACES OF EACH BOULDER (SEE NOTE NO. 3) FACE DOWN.
5. PLAN VIEW AND CROSS-SECTION DETAIL PROVIDED FOR ILLUSTRATION OF INTENT OF SPECIFICATION, SOME VARIATION WITHIN ALLOWABLE TOLERANCES IS EXPECTED.

REVISIONS		
DESCRIPTION	BY	DATE

DATE:	10/2/09
BY:	RC
COMM NO.:	8446.65
SHEET:	23

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TITLE:
MANATEE COUNTY, FLORIDA
COQUINA BEACH ARTIFICIAL REEF MITIGATION PROJECT
DETAILS

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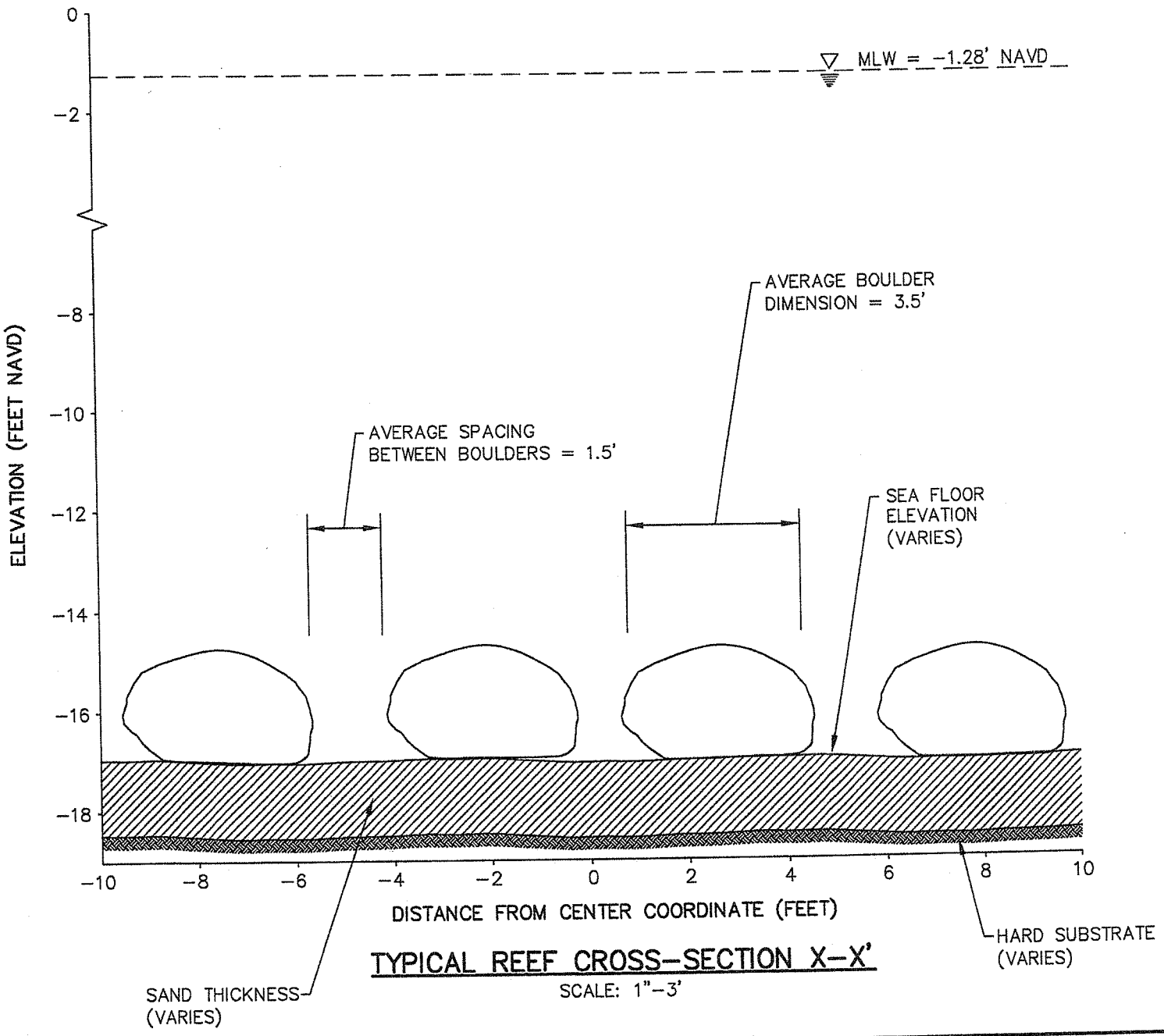
THOMAS P PIERRO P.E. NO. 64683

DATE 2/26/2010

REVISIONS		
DESCRIPTION	BY	DATE



TYPICAL REEF CROSS-SECTION X-X'

SCALE: 1"=3'

SHEET:	23
COMM. NO.:	8446.65
BY:	TM
DATE:	10/2/09

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TITLE:

MANATEE COUNTY, FLORIDA
COQUINA BEACH ARTIFICIAL REEF MITIGATION PROJECT
TYPICAL REEF CROSS-SECTION

Attachment B

USFWS **Biological Opinion**
dated November 16, 2010

United States Department of the Interior
U. S. FISH AND WILDLIFE SERVICE
7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:
FWS Log No. 41910-2009-F-0456

November 16, 2009

Colonel Alfred A. Pantano, Jr. District Engineer
Department of the Army
Jacksonville District Corps of Engineers
Tampa Regulatory Office
10117 Princess Palm Drive, Suite 120
Tampa, FL 33610

Dear Colonel Pantano:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) based on our review of the proposed sand placement on two segments of the beach: Coquina Beach and the City of Anna Maria Island, in Manatee County, Florida, and its effects on the Florida manatee (*Trichechus manatus*), piping plover (*Charadrius melodus*), and loggerhead (*Caretta caretta*) and green (*Chelonia mydas)* sea turtles in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your July 10, 2009, request for formal consultation was received on July 27, 2009.

This BO is for sand placement along Manatee County on the southern end of the island at Coquina Beach between Florida Department of Environmental Protection (FDEP) monuments R-35 + 790 feet and R-41 + 365 feet, and a portion of the beach in the City of Anna Maria at the northern end of the island between FDEP monuments R-7 to R-10.

The Corps determined that the proposed project may affect but was not likely to adversely affect, the Florida manatee and piping plover. The Corps also amended their determination for the loggerhead and green sea turtles. The Corps determined that the proposed project "may affect and is likely to adversely affect the loggerhead and green sea turtles. The Service concurred with these determinations.

Florida manatee

The Service concurs that, if the Standard Manatee Construction Conditions are implemented, then these activities are not likely to adversely affect the Florida manatee. We also conclude that these activities will not adversely modify its critical habitat. These

findings fulfill section 7 requirements of the Act in regard to manatees. In addition, because no incidental take of manatees is anticipated, no such authorization under the Marine Mammal Protection Act (MMPA) is needed.

Piping plover

The project area has not been consistently surveyed for wintering piping plovers per the Service's monitoring protocol. During the 1991 Florida Winter Piping Plover Census and incidental sighting in October 2009, non-breeding piping plovers were documented in areas within the proximity of the proposed project in Manatee County, Florida.

Natural organic material deposited on the beach (wrack) provides important foraging and roosting habitat for piping plovers and other shorebirds. It also serves to protect important shorebird habitat by helping stabilize beaches through reduction in erosive processes such as eolian sand transport. Protection of wrack can help to offset the direct and indirect impacts associated with beach nourishment and ensuing human disturbance.

The Service met with the applicant and FWC on September 8, 2009, to discuss areas within the project areas where natural organic material (wrack) can remain along the shoreline year-round.

The applicant agreed to the following conservation measures within the proposed project action:

1. The natural accumulation of wrack will remain on the south end of Anna Maria Island year-round (the area of beach along the no-swim area at the southern end of the island, south of R-40 + 410 feet). An exception to this will apply when the health of humans may be affected by events such as red tide and macro-algae blooms. The Service will be contacted when these issues need to be addressed. The Service and FWC will meet with Manatee County to discuss other options for minimizing the wrack removal within the project area if the above option is no longer feasible.

2. Vehicles including all-Terrain Vehicles (ATVs) traversing the beach, used by beach life-guards, beach maintenance employees, turtle watch volunteers and law enforcement will avoid the soft sand areas in the wrack protection zone and follow the FWC's Beach Driving Best Management Practices: (http://www.myfwc.com/CONSERVATION/ConservationYouLiving_w_Wildlife_BeachDriving.htm). Emergency vehicles shall have full access to the beach including the wrack protection zone.

3. Educational signs will be installed highlighting the importance of beach habitats to wildlife and explaining the importance of the wrack along the shoreline. The FWC will provide examples of the information to include on these signs.

Based on the preceding, the Service has determined that the proposed project "may affect but is not likely to adversely affect" the piping plover provided that applicant modified their

project plans to include the above measures to preserve piping plover feeding and roosting habitat within the project area.

Sea Turtles

The Service has determined that the proposed project may affect and is likely to adversely affect nesting loggerhead and green sea turtles. The Service has therefore completed the following BO that addresses the effects of the proposed action on the loggerhead and green sea turtles.

Consultation History

In 1992/93, approximately 2.32 million cubic yards of sand was placed along a 4.6 mile segment of the Anna Maria Island Coastline between FDEP monuments R-12 and R-36.

On June 27, 2001, the Service issued a BO for a Beach Nourishment Project at Anna Maria Island.
From March to May 2002, the first Anna Maria Island Beach Renourishment Project placed approximately 1.9 million cubic yards of sand along 5.2 miles of the Anna Maria Island shoreline. The 2002 project limits included the original 4.6 mile federally authorized and federally funded project area located between FDEP monuments R-12 and R-36. The County also nourished an additional 3,000 feet (previously unnourished) of beach within the City of Anna Maria between FDEP monuments R-7 and R-10.

On October 20, 2002 the Corps issued Permit Number 200003874 (IP-MN) for the city of Anna Maria Beach Renourishment Project extending between FDEP monuments R-7 and R-10.

In 2004, four hurricanes impacted the State of Florida. Two of the four hurricanes had a direct impact on Anna Maria Island. The wind and wave conditions associated with these storms accelerated the natural beach erosion process. The Corps, under Public Law 84-99 (PL 84-99), allocated emergency funds throughout the State of Florida for beach fill placement to replace the beach fill lost during the severe 2004 hurricane season.

On June 15, 2005, the Service issues a BO (05-1227) for the renourishment of 4.7 miles of beach on Anna Maria Island from FDEP monument R-12 to R-36. On December 7, 2005, the Service modified this BO to include 3000 linear feet of additional nourishment from FDEP monument R-7 to R-10 (41910-2006-F-0079).

On July 27, 2009, the Service received a letter from the Corps requesting concurrence of a "may affect, not likely to adversely affect" for nesting sea turtles. On August 6, 2009, the Service responded via email to the Corps, with an explanation of the impacts of nourishments to nesting and hatching sea turtles. On August 14, 2009, the Service received an email from the Corps, amending their determination to "may affect, likely to adversely affect" sea turtles. The Service concurred with this determination.

On September 8, 2009, the Service, FWC, applicant, and the Corps met on-site to discuss the specifics of the project.

The Service had sufficient information to issue this BO for the proposed project. Information for this BO was obtained by email correspondence, meetings, site visits, telephone conversations and other sources of information. A complete administrative record of this consultation is on file at the Service's Jacksonville Field Office.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Applicant has proposed to place approximately 169,000 cubic yards (cy) of beach compatible material along approximately 1.0 mile of Coquina Beach and to place approximately 25,000 cy of beach quality material along 0.6 miles of the City of Anna Maria segment of beach. The constructed beached will include a berm elevation of +4 feet NAVD on a slope of 1 foot vertical to 15 feet horizontal. The County proposes to use sand from a borrow area located approximately 3,000 feet west of the north end of Anna Maria Island. The borrow area contains sediment similar to the existing beach sediment.

The Applicant proposes to use sand taken from Longboat Pass navigation channel and ebb tidal shoal for the Coquina Beach segment of the project; and sand from the previously authorized borrow area at the north end of the island being used as the source of material for the City of Anna Maria project. CPE will conduct a detailed geophysical investigation, including sub-bottom profiling, at the proposed Longboat Pass sand sources in the near future to support the request for sand source delineation.

Material transport from the borrow areas to the project site will occur through a series of submerged, floating and shore-supported pipelines connected to a hydraulic cutterhead dredge. Once deposition of material occurs at the fill site, the contractor will move the sand using heavy equipment to shape the beach to the design cross-sections.

Conservation Measures

Sea Turtles

1. FWC and the local sponsor have an agreement to conduct sea turtle monitoring for a minimum of two additional nesting seasons after nourishment event if placed sand remains.

STATUS OF THE SPECIES/CRITICAL HABITAT

The Service has responsibility for implementing recovery of sea turtles when they come ashore to nest. This BO addresses nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. The National Oceanic and Atmospheric

Administration's National Marine Fisheries Service (NMFS) has jurisdiction over sea turtles in the marine environment.

Loggerhead Sea Turtle

The loggerhead sea turtle was federally listed as a threatened species on July 28, 1978 (43 FR 32800). The loggerhead occurs throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans.

The loggerhead sea turtle grows to an average weight of about 200 pounds and is characterized by a large head with blunt jaws. Adults and subadults have a reddish-brown carapace. Scales on the top of the head and top of the flippers are also reddish-brown with yellow on the borders. Hatchlings are a dull brown color (NMFS 2002a). The loggerhead feeds on mollusks, crustaceans, fish, and other marine animals.

The loggerhead occurs throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. It may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Coral reefs, rocky places, and ship wrecks are often used as feeding areas.

Within the Northwest Atlantic, the majority of nesting activity occurs from April through September, with a peak in June and July (Williams-Walls *et al.* 1983, Dodd 1988, Weishampel *et al.* 2006). Nesting occurs within the Northwest Atlantic along the coasts of North America, Central America, northern South America, the Antilles, Bahamas, and Bermuda, but is concentrated in the southeastern U.S. and on the Yucatán Peninsula in Mexico on open beaches or along narrow bays having suitable sand (Sternberg 1981, Ehrhart 1989, Ehrhart *et al.* 2003, NMFS and FWS 2008).

No critical habitat has been designated for the loggerhead sea turtle.

Green Sea Turtle

The green sea turtle was federally listed as on July 28, 1978 (43 FR 32800). Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. The green sea turtle has a worldwide distribution in tropical and subtropical waters.

The green sea turtle grows to a maximum size of about 4 feet and a weight of 440 pounds. It has a heart-shaped shell, small head, and single-clawed flippers. The carapace is smooth and colored gray, green, brown and black. Hatchlings are black on top and white on the bottom (NMFS 2002b). Hatchling green turtles eat a variety of plants and animals, but adults feed almost exclusively on seagrasses and marine algae.

Major green turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surinam. Within the U.S., green turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida,

particularly in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties (NMFS and Service 1991a). Nesting also has been documented along the Gulf coast of Florida from Escambia County through Franklin County in northwest Florida and from Pinellas County through Collier County in southwest Florida (FWC Statewide Nesting Beach Survey database). Green turtles have been known to nest in Georgia, but only on rare occasions (Georgia Department of Natural Resources statewide nesting database). The green turtle also nests sporadically in North Carolina and South Carolina (North Carolina Wildlife Resources Commission statewide nesting database; South Carolina Department of Natural Resources statewide nesting database). Unconfirmed nesting of green turtles in Alabama has also been reported (Bon Secour National Wildlife Refuge nesting reports).

Green sea turtles are generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. The green turtle is attracted to lagoons and shoals with an abundance of marine grass and algae. Open beaches with a sloping platform and minimal disturbance are required for nesting.

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys.

Life history

Loggerhead Sea Turtle

Loggerheads are long-lived, slow-growing animals that use multiple habitats across entire ocean
basins throughout their life history. This complex life history encompasses terrestrial, nearshore, and open ocean habitats. The three basic ecosystems in which loggerheads live are the:

1. Terrestrial zone (supralittoral) - the nesting beach where both oviposition (egg laying) and embryonic development and hatching occur.

2. Neritic zone - the inshore marine environment (from the surface to the sea floor) where water depths do not exceed 656 feet . The neritic zone generally includes the continental shelf, but in areas where the continental shelf is very narrow or nonexistent, the neritic zone conventionally extends to areas where water depths are less than 656 feet.

3. Oceanic zone - the vast open ocean environment (from the surface to the sea floor) where water depths are greater than 656 feet.

Maximum intrinsic growth rates of sea turtles are limited by the extremely long duration of the juvenile stage and fecundity. Loggerheads require high survival rates in the juvenile and adult stages, common constraints critical to maintaining long-lived, slow-growing species, to achieve positive or stable long-term population growth (Congdon et al. 1993; Heppell 1998; Crouse 1999; Heppell et al. 1999, 2003; Musick 1999).

The generalized life history of Atlantic loggerheads is shown in Figure 1 (from Bolten 2003).

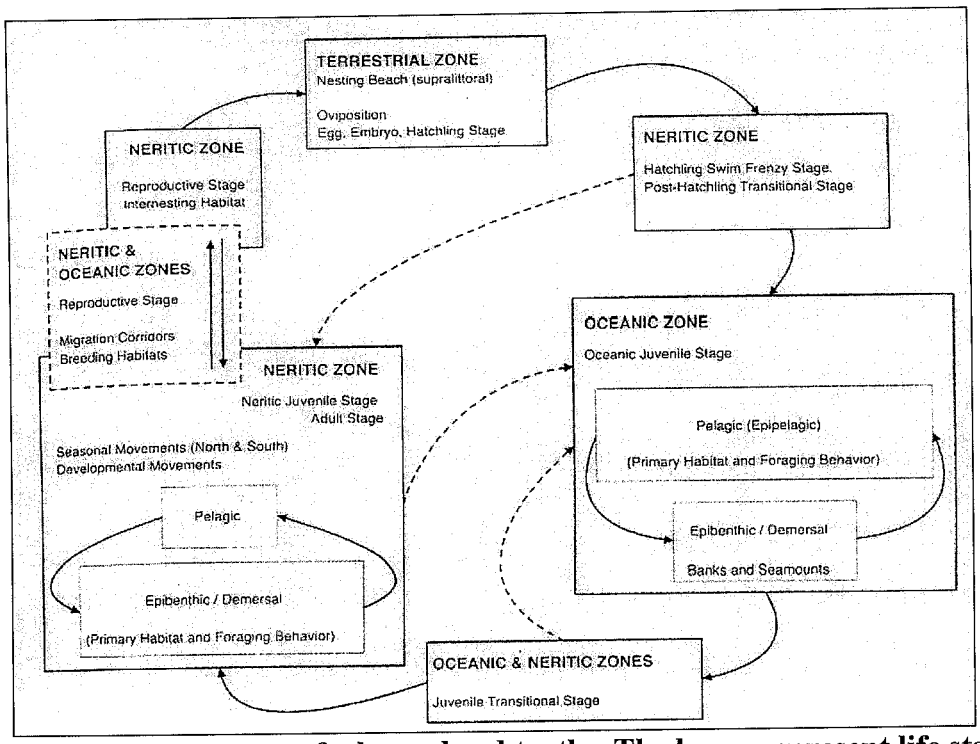

Figure 1. Life history stages of a loggerhead turtle. The boxes represent life stages and the corresponding ecosystems, solid lines represent movements between life stages and ecosystems, and dotted lines are speculative (Bolten 2003).

Numbers of nests and nesting females are often highly variable from year to year due to a number of factors including environmental stochasticity, periodicity in ocean conditions, anthropogenic effects, and density-dependent and density-independent factors affecting survival, somatic growth, and reproduction (Meylan 1982, Hays 2000, Chaloupka 2001, Solow et al. 2002). Despite these sources of variation, and because female turtles exhibit strong nest site fidelity, a nesting beach survey can provide a valuable assessment of changes in the adult female population, provided that the study is sufficiently long and effort and methods are standardized (Meylan 1982, Gerrodette and Brandon 2000, Reina et al. 2002). Table 1 summarizes key life history characteristics for loggerheads nesting in the U.S.

Table 1. Typical values of life history parameters for loggerheads nesting in the U.S. (NMFS and Service 2008).

Life History Trait	Data
Clutch size (mean)	100-126 eggs[1]
Incubation duration (varies depending on time of year and latitude)	Range = 42-75 days[2,3]
Pivotal temperature (incubation temperature that produces an equal number of males and females)	29.0°C[5]
Nest productivity (emerged hatchlings/total eggs) x 100 (varies depending on site specific factors)	45-70percent[2,6]
Clutch frequency (number of nests/female/season)	3-4 nests[7]
Internesting interval (number of days between successive nests within a season)	12-15 days[8]
Juvenile (<87 cm CCL) sex ratio	65-70percent female[4]
Remigration interval (number of years between successive nesting migrations)	2.5-3.7 years[9]
Nesting season	late April-early September
Hatching season	late June-early November
Age at sexual maturity	32-35 years[10]
Life span	>57 years[11]

[1] Dodd 1988.
[2] Dodd and Mackinnon (1999, 2000, 2001, 2002, 2003, 2004).
[3] B. Witherington, FWC, pers. comm. 2006 (information based on nests monitored throughout Florida beaches in 2005, n=865).
[4] National Marine Fisheries Service (2001); A. Foley, FWC, pers. comm. 2005.
[5] Mrosovsky (1988).
[6] B. Witherington, FWC, pers. comm. 2006 (information based on nests monitored throughout Florida beaches in 2005, n=1,680).
[7] Murphy and Hopkins (1984); Frazer and Richardson (1985); Ehrhart, unpublished data; Hawkes *et al.* 2005; Scott 2006; Tony Tucker, Mote Marine Laboratory, personal communication, 2008.
[8] Caldwell (1962), Dodd (1988).
[9] Richardson et al. (1978); Bjorndal et al. (1983); Ehrhart, unpublished data.
[10] M. Snover, NMFS, pers. comm. 2005.
[11] Dahlen et al. (2000).

Loggerheads nest on ocean beaches and occasionally on estuarine shorelines with suitable sand. Nests are typically laid between the high tide line and the dune front (Routa 1968,

Witherington 1986, Hailman and Elowson 1992). Wood and Bjorndal (2000) evaluated four environmental factors (slope, temperature, moisture, and salinity) and found that slope had the greatest influence on loggerhead nest-site selection on a beach in Florida. Loggerheads appear to prefer relatively narrow, steeply sloped, coarse-grained beaches, although nearshore contours may also play a role in nesting beach site selection (Provancha and Ehrhart 1987).

The warmer the sand surrounding the egg chamber, the faster the embryos develop (Mrosovsky and Yntema 1980). Sand temperatures prevailing during the middle third of the incubation period also determine the sex of hatchling sea turtles (Mrosovsky and Yntema 1980). Incubation temperatures near the upper end of the tolerable range produce only female hatchlings while incubation temperatures near the lower end of the tolerable range produce only male hatchlings.

Loggerhead hatchlings pip and escape from their eggs over a 1- to 3-day interval and move upward and out of the nest over a 2- to 4-day interval (Christens 1990). The time from pipping to emergence ranges from 4 to 7 days with an average of 4.1 days (Godfrey and Mrosovsky 1997). Hatchlings emerge from their nests en masse almost exclusively at night, and presumably using decreasing sand temperature as a cue (Hendrickson 1958, Mrosovsky 1968, Witherington et al. 1990). Moran *et al.* (1999) concluded that a lowering of sand temperatures below a critical threshold, which most typically occurs after nightfall, is the most probable trigger for hatchling emergence from a nest. After an initial emergence, there may be secondary emergences on subsequent nights (Carr and Ogren 1960, Witherington 1986, Ernest and Martin 1993, Houghton and Hays 2001).

Hatchlings use a progression of orientation cues to guide their movement from the nest to the marine environments where they spend their early years (Lohmann and Lohmann 2003). Hatchlings first use light cues to find the ocean. On naturally lighted beaches without artificial lighting, ambient light from the open sky creates a relatively bright horizon compared to the dark silhouette of the dune and vegetation landward of the nest. This contrast guides the hatchlings to the ocean (Daniel and Smith 1947, Limpus 1971, Salmon et al. 1992, Witherington 1997, Witherington and Martin 1996, Stewart and Wyneken 2004).
Loggerheads in the Northwest Atlantic display complex population structure based on life history stages. Based on mtDNA, oceanic juveniles show no structure, neritic juveniles show moderate structure, and nesting colonies show strong structure (Bowen *et al.* 2005). In contrast, a survey using microsatellite (nuclear) markers showed no significant population structure among nesting populations (Bowen *et al.* 2005), indicating that while females exhibit strong philopatry, males may provide an avenue of gene flow between nesting colonies in this region.

Green Sea Turtle

Green turtles deposit from one to nine clutches within a nesting season, but the overall average is about 3.3 nests. The interval between nesting events within a season varies around a mean of about 13 days (Hirth 1997). Mean clutch size varies widely among

populations. Average clutch size reported for Florida was 136 eggs in 130 clutches (Witherington and Ehrhart 1989). Only occasionally do females produce clutches in successive years. Usually two, three, four or more years intervene between breeding seasons (NMFS and Service 1991a). Age at sexual maturity is believed to be 20 to 50 years (Hirth 1997).

Population dynamics

Loggerhead Sea Turtle

The loggerhead occurs throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. However, the majority of loggerhead nesting is at the western rims of the Atlantic and Indian Oceans. The most recent reviews show that only two loggerhead nesting beaches have greater than 10,000 females nesting per year (Baldwin et al. 2003, Ehrhart et al. 2003, Kamezaki et al. 2003, Limpus and Limpus 2003, Margaritoulis et al. 2003): South Florida (U.S.) and Masirah (Oman). Those beaches with 1,000 to 9,999 females nesting each year are Georgia through North Carolina (U.S.), Quintana Roo and Yucatán (Mexico), Cape Verde Islands (Cape Verde, eastern Atlantic off Africa), and Western Australia (Australia). Smaller nesting aggregations with 100 to 999 nesting females annually occur in the Northern Gulf of Mexico (U.S.), Dry Tortugas (U.S.), Cay Sal Bank (Bahamas), Sergipe and Northern Bahia (Brazil), Southern Bahia to Rio de Janerio (Brazil), Tongaland (South Africa), Mozambique, Arabian Sea Coast (Oman), Halaniyat Islands (Oman), Cyprus, Peloponnesus (Greece), Island of Zakynthos (Greece), Turkey, Queensland (Australia), and Japan.

The loggerhead is commonly found throughout the North Atlantic including the Gulf of Mexico, the northern Caribbean, the Bahamas archipelago, and eastward to West Africa, the western Mediterranean, and the west coast of Europe.

The major nesting concentrations in the U.S. are found in South Florida. However, loggerheads nest from Texas to Virginia. Total estimated nesting in the U.S. has fluctuated between 49,000 and 90,000 nests per year from 1999-2008 (FWC, unpublished data; GDNR, unpublished data; SCDNR, unpublished data; NCWRC, unpublished data). About 80 percent of loggerhead nesting in the southeast U.S. occurs in six Florida counties (Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties). Adult loggerheads are known to make considerable migrations between foraging areas and nesting beaches (Schroeder et al. 2003, Foley et al. 2008). During non-nesting years, adult females from U.S. beaches are distributed in waters off the eastern U.S. and throughout the Gulf of Mexico, Bahamas, Greater Antilles, and Yucatán.

From a global perspective, the U.S. nesting aggregation is of paramount importance to the survival of the species as is the population that nests on islands in the Arabian Sea off Oman (Ross 1982, Ehrhart 1989). The status of the Oman loggerhead nesting population, reported to be the largest in the world (Ross 1979), is uncertain because of the lack of long-term standardized nesting or foraging ground surveys and its vulnerability to increasing development pressures near major nesting beaches and threats from fisheries interaction on

foraging grounds and migration routes (E. Possardt, Service, personal communication 2005). The loggerhead nesting aggregations in Oman and the U.S. account for the majority of nesting worldwide.

Green Sea Turtle

About 150 to 3,000 females are estimated to nest on beaches in the continental U.S. annually (FWC 2005). In the U.S. Pacific, over 90 percent of nesting throughout the Hawaiian archipelago occurs at the French Frigate Shoals, where about 200 to 700 females nest each year (NMFS and Service 1998a). Elsewhere in the U.S. Pacific, nesting takes place at scattered locations in the Commonwealth of the Northern Marianas, Guam, and American Samoa. In the western Pacific, the largest green turtle nesting aggregation in the world occurs on Raine Island, Australia, where thousands of females nest nightly in an average nesting season (Limpus et al. 1993). In the Indian Ocean, major nesting beaches occur in Oman where 30,000 females are reported to nest annually (Ross and Barwani 1995).

Status and Distribution

Loggerhead Sea turtle

Five recovery units (subpopulations) have been identified in the Northwest Atlantic based on genetic differences and a combination of geographic distribution of nesting densities and geographic separation (NMFS and FWS 2008):

1. Northern Recovery Unit (NRU) - defined as loggerheads originating from nesting beaches from the Florida-Georgia border through southern Virginia (the northern extent of the nesting range).

2. Peninsula Florida Recovery Unit (PFRU) - defined as loggerheads originating from nesting beaches from the Florida-Georgia border through Pinellas County on the west coast of Florida, excluding the islands west of Key West, Florida.

3. Dry Tortugas Recovery Unit (DTRU) - defined as loggerheads originating from nesting beaches throughout the islands located west of Key West, Florida.

4. Northern Gulf of Mexico Recovery Unit (NGMRU) - defined as loggerheads originating from nesting beaches from Franklin County on the northwest Gulf coast of Florida through Texas.

5. Greater Caribbean Recovery Unit (GCRU) - composed of loggerheads originating from all other nesting assemblages within the Greater Caribbean (Mexico through French Guiana, The Bahamas, Lesser Antilles, and Greater Antilles).

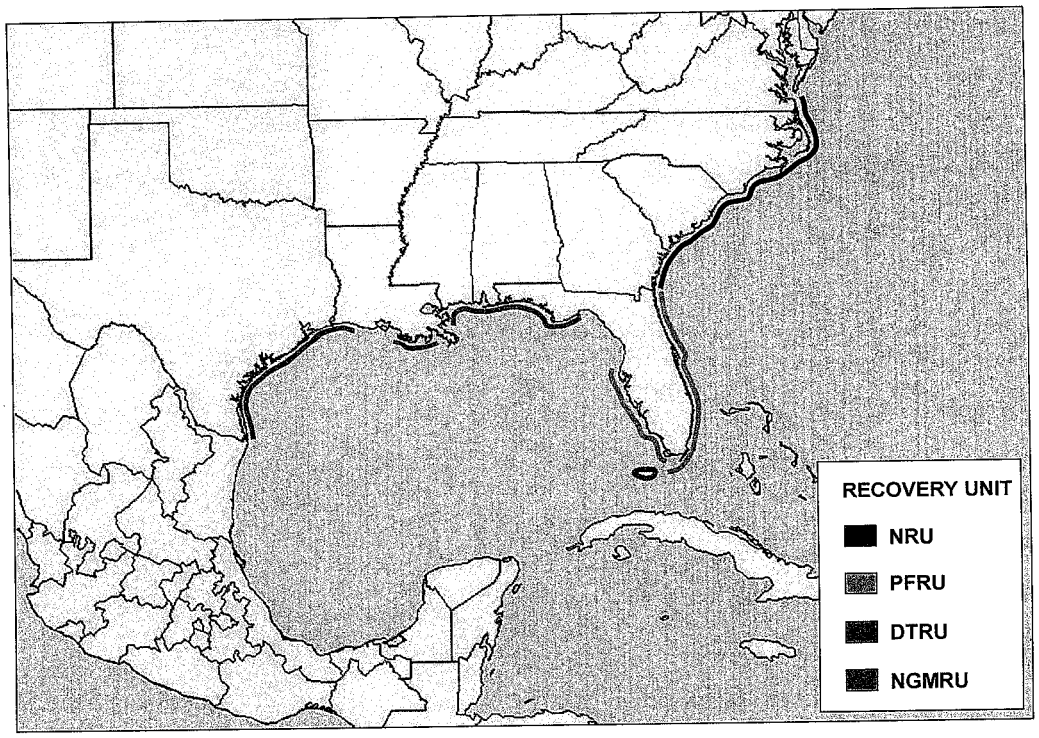

Figure 2. Map of the distribution of the loggerhead recovery units.

Mitochondrial DNA analyses show that there is limited exchange of females among these recovery units (Ehrhart 1989; Foote et al., 2000; Hawkes et al. 2005; J. Richardson, personal communication cited in NMFS 2001). Based on the number of haplotypes, the highest level of loggerhead mtDNA genetic diversity in the Northwest Atlantic has been observed in females of the Greater Caribbean Recovery Unit that nest at Quintana Roo, Mexico (Encalada et al. 1999; Nielsen et al. in press).

Nuclear DNA analyses show that there are no substantial subdivisions across the loggerhead nesting colonies in the southeastern United States. Male-mediated gene flow appears to be keeping the subpopulations genetically similar on a nuclear DNA level (Francisco-Pearce 2001).

Historically, the literature has suggested that the northern U.S. nesting beaches (NRU and NGMRU) produce a relatively high percentage of males and the more southern nesting beaches (PFRU, DTRU, and GCRU) a relatively high percentage of females (e.g., Hanson et al. 1998; NMFS 2001; Mrosovsky and Provancha 1989). The NRU and NGMRU were believed to play an important role in providing males to mate with females from the more female-dominated subpopulations to the south. However, in 2002 and 2003, researchers studied loggerhead sex ratios for two of the U.S. nesting subpopulations, the northern and

southern subpopulations (NGU and PFRU, respectively) (Blair 2005; Wyneken et al. 2005). The study produced interesting results. In 2002, the northern beaches produced more females and the southern beaches produced more males than previously believed. However, the opposite was true in 2003 with the northern beaches producing more males and the southern beaches producing more females in keeping with prior literature. Wyneken et al. (2005) speculated that the 2002 result may have been anomalous; however, the study did point out the potential for males to be produced on the southern beaches. Although this study revealed that more males may be produced on southern recovery unit beaches than previously believed, the Service maintains that the NRU and NGMRU play an important role in the production of males to mate with females from the more southern recovery units.

The NRU is the second largest loggerhead nesting aggregation in the Northwest Atlantic. Annual nest totals from northern beaches averaged 5,215 nests from 1989-2008, a period of near-complete surveys of NRU nesting beaches (Georgia Department of Natural Resources, unpublished data; North Carolina Wildlife Resources Commission, unpublished data, South Carolina Department of Natural Resources, unpublished data), representing approximately 1,272 nesting females per year (4.1 nests per female, Murphy and Hopkins 1984). The loggerhead nesting trend from daily beach surveys showed a significant decline of 1.3percent annually. Nest totals from aerial surveys conducted by the South Carolina Department of Natural Resources showed a 1.9percent annual decline in nesting in South Carolina since 1980. Overall, there is strong statistical data to suggest the NRU has experienced a long-term decline.

The PFRU is the largest loggerhead nesting assemblage in the Northwest Atlantic. A near-complete nest census of the PFRU undertaken from 1989 to 2007 reveals a mean of 64,513 loggerhead nests per year representing approximately 15,735 females nesting per year (4.1 nests per female, Murphy and Hopkins 1984) (Commission, unpublished data). This near-complete census provides the best statewide estimate of total abundance, but because of variable survey effort, these numbers cannot be used to assess trends. Loggerhead nesting trends are best assessed using standardized nest counts made at Index Nesting Beach Survey (INBS) sites surveyed with constant effort over time. An analysis of these data has shown a decline in nesting from 1989-2008 (Witherington et al. 2009). The analysis that reveals this decline uses nest-count data from 345 representative Atlantic-coast index zones (total length = 301 km) and 23 representative zones on Florida's southern Gulf coast (total length = 23 km). The spatial and temporal coverage (annually, 109 days and 368 zones) accounted for an average of 70percent of statewide loggerhead nesting activity between 1989 and 2008. Negative binomial regression models that fit restricted cubic spline curves to aggregated nest-counts were used in trend evaluations. Results of the analysis indicated that there had been a decrease of 26 percent over the 20-year period and a 41 percent decline since 1998. The mean annual rate of decline for the 20-year period was 1.6 percent.

The NGMRU is the third largest nesting assemblage among the four U.S. recovery units. Nesting surveys conducted on approximately 300 km of beach within the NGMRU (Alabama and Florida only) were undertaken between 1995 and 2007 (statewide surveys in Alabama began in 2002). The mean nest count during this 13-year period was 906 nests per year, which equates to about 221 females nesting per year (4.1 nests per female, Murphy

and Hopkins 1984) (Commission, unpublished data). Evaluation of long-term nesting trends for the NGMRU is difficult because of changed and expanded beach coverage. Loggerhead nesting trends are best assessed using standardized nest counts made at INBS sites surveyed with constant effort over time. There are 12 years (1997-2008) of Florida INBS data for the NGMRU (Commission, unpublished data). A log-linear regression showed a significant declining trend of 4.7percent annually.

The DTRU, located west of the Florida Keys, is the smallest of the identified recovery units. A near-complete nest census of the DTRU undertaken from 1995 to 2004, excluding 2002, (9 years surveyed) reveals a mean of 246 nests per year, which equates to about 60 females nesting per year (4.1 nests per female, Murphy and Hopkins 1984) (Commission, unpublished data). Surveys after 2004 did not include principal nesting beaches within the recovery unit (i.e., Dry Tortugas National Park). The nesting trend data for the DTRU are from beaches that are not part of the INBS program but are part of the Statewide Nesting Beach Survey (SNBS) program. There are 9 years of data for this recovery unit. A simple linear regression accounting for temporal autocorrelation revealed no trend in nesting numbers. Because of the annual variability in nest totals, a longer time series is needed to detect a trend.

The GCRU is composed of all other nesting assemblages of loggerheads within the Greater Caribbean. Statistically valid analyses of long-term nesting trends for the entire GCRU are not available because there are few long-term standardized nesting surveys representative of the region. Additionally, changing survey effort at monitored beaches and scattered and low-level nesting by loggerheads at many locations currently precludes comprehensive analyses. The most complete data are from Quintana Roo andYucatán, Mexico, where an increasing trend was reported over a 15-year period from 1987-2001 (Zurita et al. 2003). However, since 2001, nesting has declined and the previously reported increasing trend appears not to have been sustained (Julio Zurita, personal communcation, 2006). Other smaller nesting populations have experienced declines over the past few decades (e.g., Amorocho 2003).

Recovery Criteria

DEMOGRAPHIC RECOVERY CRITERIA:

1. Number of Nests and Number of Nesting Females
   - **a.** Northern Recovery Unit
     - (1) There is statistical confidence (95percent) that the annual rate of increase over a generation time of 50 years is 2percent or greater resulting in a total annual number of nests of 14,000 or greater for this recovery unit (approximate distribution of nests is NC=14percent [2,000], SC=66percent [9,200], and GA=20percent [2,800]).
     - (2) This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).

b. Peninsular Florida Recovery Unit
   (1) There is statistical confidence (95percent) that the annual rate of increase over a generation time of 50 years is statistically detectable (1percent) resulting in a total annual number of nests of 106,100 or greater for this recovery unit.
   (2) This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).

c. **Dry Tortugas Recovery Unit**
   (1) There is statistical confidence (95percent) that the annual rate of increase over a generation time of 50 years is 3percent or greater resulting in a total annual number of nests of 1,100 or greater for this recovery unit.
   (2) This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).

d. **Northern Gulf of Mexico Recovery Unit**
   (1) There is statistical confidence (95percent) that the annual rate of increase over a generation time of 50 years is 3percent or greater resulting in a total annual number of nests of 4,000 or greater for this recovery unit (approximate distribution of nests (2002-2007) is FL= 92percent [3,700] and AL=8percent [300]).
   (2) This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).

e. **Greater Caribbean Recovery Unit**
   (1) The total annual number of nests at a minimum of three nesting assemblages, averaging greater than 100 nests annually (e.g., Yucatán, Mexico; Cay Sal Bank, The Bahamas) has increased over a generation time of 50 years.

   (2) This increase in number of nests must be a result of corresponding increases in number of nesting females (estimated from nests, clutch frequency, and remigration interval).

2. **Trends in Abundance on Foraging Grounds**
A network of in-water sites, both oceanic and neritic, distributed across the foraging range is established and monitoring is implemented to measure abundance. There is statistical confidence (95percent) that a composite estimate of relative abundance from these sites is increasing for at least one generation.

3. **Trends in Neritic Strandings Relative to In-water Abundance**
Stranding trends are not increasing at a rate greater than the trends in in-water relative abundance for similar age classes for at least one generation.

LISTING FACTOR RECOVERY CRITERIA:

1. **Present or Threatened Destruction, Modification, or Curtailment of a Species Habitat or Range**
   a. **Terrestrial**
      (1) Beach armoring, shoreline stabilization structures, and all other barriers to nesting are categorized and inventoried for areas under U.S. jurisdiction. A peer-reviewed strategy is developed and implemented to ensure that the percentage of nesting beach free of barriers to nesting is stable or increasing relative to baseline levels.
      (2) Beach sand placement projects conducted in areas under U.S. jurisdiction are in compliance with state and FWS criteria and are conducted in a manner that accommodates loggerhead needs and does not degrade or eliminate nesting habitat.
      (3) At least 982 miles of loggerhead nesting beaches and adjacent uplands (current amount as identified in Appendix 4) under U.S. jurisdiction are maintained within conservation lands in public (Federal, state, or local) or private (NGO and private conservation lands) ownership that are managed in a manner compatible with sea turtle nesting.
      (4) A peer-reviewed model is developed that describes the effects of sea level rise on loggerhead nesting beaches, and steps have been taken to mitigate such effects.
      (5) Nesting beaches outside U.S. jurisdiction are managed for compatibility with loggerhead nesting.
   b. **Marine (estuarine, neritic, and oceanic)**
      A peer-reviewed, comprehensive strategy is developed and implemented to identify, prioritize, and protect marine habitats (e.g., feeding, migratory, inter-nesting) important to loggerheads.

2. **Overutilization for Commercial, Recreational, Scientific, or Educational Purposes**
   a. Legal harvest (both commercial and subsistence) in the Caribbean, Atlantic, and Mediterranean is identified and quantified. A strategy is developed and implemented to eliminate legal harvest through international agreements.
   b. A scientifically based nest management plan outlining strategies for protecting nests (under U.S. jurisdiction) from natural and manmade impacts is developed and implemented.

3. **Disease or Predation**
   a. Ecologically sound predator control programs are implemented to ensure that the annual rate of mammalian predation on nests (under U.S. jurisdiction) is 10percent or below within each recovery unit based on standardized surveys.
   b. A peer-reviewed strategy is developed to recognize, respond to, and investigate mass/unusual mortality or disease events.

4. **Inadequacy of Existing Regulatory Mechanisms**
   a. Light management plans, which meet minimum standards identified in the Florida Model Lighting Ordinance (Florida Administrative Code Rule 62B-55), are developed, fully implemented, and effectively enforced on nesting beaches under U.S. jurisdiction. Annual percentage of total nests with hatchlings disoriented or misoriented by artificial lighting does not exceed 10percent based on standardized surveys.
   b. Specific and comprehensive Federal legislation is developed, promulgated, implemented, and enforced to ensure long-term (including post-delisting) protection of loggerheads and their terrestrial and marine habitats, including protection from fishery interactions.
   c. State and local legislation is developed and/or maintained, promulgated, implemented, and enforced to ensure long-term (including post-delisting) protection of loggerheads and their terrestrial and marine habitats, including protection from fishery interactions.
   d. Foreign nations with significant loggerhead foraging or migratory habitat have implemented national legislation and have acceded to international and multi-lateral agreements to ensure long-term protection of loggerheads and their habitats. Nations that have important foraging or migratory habitat include Canada, Mexico, Cuba, The Bahamas, Turks and Caicos Islands, Nicaragua, Panama, Colombia, Spain, Portugal, Morocco, and Cape Verde Islands.
   e. Nations that conduct activities affecting loggerheads in foraging or migratory habitats in the North Atlantic Basin and the western Mediterranean have implemented national legislation and have acceded to international and multi-lateral agreements to ensure long-term protection of loggerheads and their habitats throughout the high seas and in foreign EEZs.

5. **Other Natural or Manmade Factors Affecting Its Continued Existence**
   a. A peer-reviewed strategy is developed and fully implemented to minimize fishery interactions and mortality for each domestic commercial fishing gear type that has loggerhead bycatch.
   b. A peer-reviewed strategy is developed and fully implemented in cooperation with relevant nations to minimize fishery interactions and mortality of loggerheads in foreign EEZs and on the high seas.
   c. A peer-reviewed strategy is developed and fully implemented to quantify, monitor, and minimize effects of trophic changes on loggerheads (e.g., diet, growth rate, fecundity) from fishery harvests and habitat alterations.
   d. A peer-reviewed strategy is developed and fully implemented to quantify, monitor, and minimize the effects of marine debris ingestion and entanglement in U.S. territorial waters, the U.S. EEZ, foreign EEZs, and the high seas.
   e. A peer-reviewed strategy is developed and fully implemented to minimize vessel strike mortality in U.S. territorial waters and the U.S. EEZ.

Green Turtle

Nesting data collected as part of the Florida SNBS program (2000-2006) show that a mean of approximately 5,600 nests are laid each year in Florida. Nesting occurs in 26 counties with a peak along the east coast, from Volusia through Broward Counties. The green turtle nesting population of Florida (Florida green turtle) is increasing based on 19 years (1989-2007) of INBS data from throughout the state. The increase in nesting in Florida is likely a result of several factors, including: (1) a Florida statute enacted in the early 1970s that prohibited the killing of green turtles in Florida; (2) the species listing under the ESA in 1973, affording complete protection to eggs, juveniles, and adults in all U.S. waters; (3) the passage of Florida's constitutional net ban amendment in 1994 and its subsequent enactment, making it illegal to use any gillnets or other entangling nets in state waters; (4) the likelihood that the majority of Florida adult green turtles reside within Florida waters where they are fully protected; (5) the protections afforded Florida green turtles while they inhabit the waters of other nations that have enacted strong sea turtle conservation measures (e.g., Bermuda); and (6) the listing of the species on Appendix I of Convention on International Trade of Endangered Species (CITES), which stopped international trade and reduced incentives for illegal trade from the U.S.

Recovery Criteria

The U.S. Atlantic population of green sea turtles can be considered for delisting when, over a period of 25 years the following conditions are met:

1. The level of nesting in Florida has increased to an average of 5,000 nests per year for at least six years. Nesting data shall be based on standardized surveys.

2. At least 25 percent (65 miles) of all available nesting beaches (260 miles) are in public ownership and encompass at least 50 percent of the nesting activity.

3. A reduction in stage class mortality is reflected in higher counts of individuals on foraging grounds.

4. All priority one tasks identified in the recovery plan have been successfully implemented.

The current "Recovery Plan for the U.S. Population of Atlantic Green Turtle (Chelonia mydas)" was completed in 1991, the Recovery Plan for U.S. Pacific Populations of the Green Turtle (Chelonia mydas)" was completed in 1998, and the "Recovery Plan for U.S. Pacific Populations of the East Pacific Green Turtle (*Chelonia mydas*)" was completed in 1998. The recovery criteria contained in the plans, while not strictly adhering to all elements of the Recovery Planning Guidelines (Service and NOAA), are a viable measure of the species status.

Common threats to sea turtles in Florida

Anthropogenic (human) factors that impact hatchlings and adult female turtles on land, or the success of nesting and hatching include: beach erosion, armoring and nourishment; artificial lighting; beach cleaning; increased human presence; recreational beach equipment; beach driving; coastal construction and fishing piers; exotic dune and beach vegetation; and poaching. An increased human presence at some nesting beaches or close to nesting beaches has led to secondary threats such as the introduction of exotic fire ants, feral hogs, dogs, and an increased presence of native species (*e.g.*, raccoons, armadillos, and opossums), which raid and feed on turtle eggs. Although sea turtle nesting beaches are protected along large expanses of the western North Atlantic coast, other areas along these coasts have limited or no protection.

Anthropogenic threats in the marine environment include oil and gas exploration and transportation; marine pollution; underwater explosions; hopper dredging, offshore artificial lighting; power plant entrainment and/or impingement; entanglement in debris; ingestion of marine debris; marina and dock construction and operation; boat collisions; poaching and fishery interactions.

Fibropapillomatosis, a disease of sea turtles characterized by the development of multiple tumors on the skin and internal organs, is also a mortality factor, particularly for green turtles. This disease has seriously impacted green turtle populations in Florida, Hawaii, and other parts of the world. The tumors interfere with swimming, eating, breathing, vision, and reproduction, and turtles with heavy tumor burdens may die.

Climate change is evident from observations of increases in average global air and ocean temperatures, widespread melting of snow and ice, and rising sea level, according to the Intergovernmental Panel on Climate Change Report (IPCC 2007a). The IPCC Report (2007) describes changes in natural ecosystems with potential wide-spread effects on many organisms, including marine mammals and migratory birds. The potential for rapid climate change poses a significant challenge for fish and wildlife conservation. Species' abundance and distribution are dynamic, relative to a variety of factors, including climate. As climate changes, the abundance and distribution of fish and wildlife will also change. Highly specialized or endemic species are likely to be most susceptible to the stresses of changing climate. Based on these findings and other similar studies, the Department of the Interior (DOI) requires agencies under its direction to consider potential climate change effects as part of their long-range planning activities (Service 2007).

Temperatures are predicted to rise from 2°C to 5°C for North America by the end of this century (IPCC 2007a,b). Other processes to be affected by this projected warming include rainfall (amount, seasonal timing and distribution), storms (frequency and intensity), and sea level rise.

Climatic changes in Florida could amplify current land management challenges involving habitat fragmentation, urbanization, invasive species, disease, parasites, and water management. Global warming will be a particular challenge for endangered, threatened,

and other "at risk" species. It is difficult to estimate, with any degree of precision, which species will be affected by climate change or exactly how they will be affected. The Service will use Strategic Habitat Conservation planning, an adaptive science-driven process that begins with explicit trust resource population objectives, as the framework for adjusting our management strategies in response to climate change (Service 2006). As the level of information increases concerning the effects of global climate change on sea turtles, the Service will have a better basis to address the nature and magnitude of this potential threat and will more effectively evaluate these effects to the range-wide status of sea turtles.

Analysis of the species/critical habitat likely to be affected

The proposed action has the potential to adversely affect nesting females, nests, and hatchlings within the proposed project area. The effects of the proposed action on sea turtles will be considered further in the remaining sections of this biological opinion. Potential effects include destruction of nests deposited within the boundaries of the proposed project, harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities, disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting, behavior modification of nesting females due to escarpment formation within the project area during a nesting season resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs. The quality of the placed sand could affect the ability of female turtles to nest, the suitability of the nest incubation environment, and the ability of hatchlings to emerge from the nest.

Critical habitat has not been designated in the continental United States; therefore, the proposed action would not result in an adverse modification.

ENVIRONMENTAL BASELINE

Status of the species within the action area

Loggerhead Sea Turtle

The loggerhead sea turtle nesting and hatching season for Southern Gulf of Mexico beaches extends from April 1 through November 30. Incubation ranges from about 45 to 95 days.

The Manatee County project area has a significant number of loggerhead nests. The project lies within the Anna Maria Island area. Between 97 and 179 loggerhead nests were deposited annually on the Anna Maria Island beaches from 2003 through 2008.

Green Sea Turtle

The green sea turtle nesting and hatching season for Southern Gulf of Mexico beaches extends from May 15 through October 31. Incubation ranges from about 45 to 75 days.

The Manatee County project lies within the Anna Maria Island beaches area. One green turtle nest was deposited on Anna Maria Island in 2002. No green turtles were reported on Anna Maria Island from 2003 through 2008.

Factors affecting the species environment within the action area

Coastal Development

Loss of nesting habitat related to coastal development has had the greatest impact on nesting sea turtles in Florida. Beachfront development not only causes the loss of suitable nesting habitat, but can result in the disruption of powerful coastal processes accelerating erosion and interrupting the natural shoreline migration (National Research Council 1990a). This may in turn cause the need to protect upland structures and infrastructure by armoring, groin placement, beach emergency berm construction and repair, and beach nourishment which cause changes in, additional loss or impact to the remaining sea turtle habitat.

Hurricanes

Hurricanes were probably responsible for maintaining coastal beach habitat upon which sea turtles depend through repeated cycles of destruction, alteration, and recovery of beach and dune habitat. Hurricanes generally produce damaging winds, storm tides and surges, and rain and can result in severe erosion of the beach and dune systems. Overwash and blowouts are common on barrier islands. Hurricanes and other storms can result in the direct or indirect loss of sea turtle nests, either by erosion or washing away of the nests by wave action or inundation or "drowning" of the eggs or hatchlings developing within the nest or indirectly by loss of nesting habitat. Depending on their frequency, storms can affect sea turtles on either a short-term basis (nests lost for one season and/or temporary loss of nesting habitat) or long term, if frequent (habitat unable to recover). How hurricanes affect sea turtle nesting also depends on its characteristics (winds, storm surge, rainfall), the time of year (within or outside of the nesting season), and where the northeast edge of the hurricane crosses land.

Because of the limited remaining nesting habitat, frequent or successive severe weather events could threaten the ability of certain sea turtle populations to survive and recover. Sea turtles evolved under natural coastal environmental events such as hurricanes. The extensive amount of pre-development coastal beach and dune habitat allowed sea turtles to survive even the most severe hurricane events. It is only within the last 20 to 30 years that the combination of habitat loss to beachfront development and destruction of remaining habitat by hurricanes has increased the threat to sea turtle survival and recovery. On developed beaches, typically little space remains for sandy beaches to become re-established after periodic storms. While the beach itself moves landward during such storms, reconstruction or persistence of structures at their pre-storm locations can result in a major loss of nesting habitat.

Erosion

The designation of a Critically Eroded Beach is a planning requirement of the State's Beach Erosion Control Funding Assistance Program. A segment of beach shall first be designated as critically eroded in order to be eligible for State funding. A critically eroded area is a segment of the shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreational interests, wildlife habitat, or important cultural resources are threatened or lost. Critically eroded areas may also include peripheral segments or gaps between identified critically eroded areas which, although they may be stable or be slightly eroded now, their inclusion is necessary for continuity of management of the coastal system or for the design integrity of adjacent beach management projects (FDEP 2005). It is important to note, that for an erosion problem area to be critical, there shall exist a threat to or loss of one of four specific interests – upland development, recreation, wildlife habitat, or important cultural resources. The total of critically eroded beaches statewide in Florida for 2007 is 388 miles of 497 miles of shoreline. Seventy-eight (78) percent of the State's shoreline is considered to be critically eroded.

Beachfront Lighting

Artificial beachfront lighting may cause disorientation (loss of bearings) and misorientation (incorrect orientation) of sea turtle hatchlings. Visual signs are the primary sea-finding mechanism for hatchlings (Mrosovsky and Carr 1967; Mrosovsky and Shettleworth 1968; Dickerson and Nelson 1989; Witherington and Bjorndal 1991). Artificial beachfront lighting is a documented cause of hatchling disorientation and misorientation on nesting beaches (Mann 1977; FWC 2006). The emergence from the nest and crawl to the sea is one of the most critical periods of a sea turtle's life. Hatchlings that do not make it to the sea quickly become food for ghost crabs, birds, and other predators or become dehydrated and may never reach the sea. Some types of beachfront lighting attract hatchlings away from the sea while some lights cause adult turtles to avoid stretches of brightly illuminated beach. Research has documented significant reduction in sea turtle nesting activity on beaches illuminated with artificial lights (Witherington 1992). During the 2007 sea turtle nesting season in Florida, over 64,000 turtle hatchlings were documented as being disoriented (**Table 2**) (FWC/FWRI 2007, http://www.myfwc.com/seaturtle/Lighting/Light_Disorient.htm). Exterior and interior lighting associated with condominiums had the greatest impact causing approximately 42 percent of documented hatchling disorientation/misorientation. Other causes included urban sky glow and street lights (http://www.myfwc.com/seaturtle/Lighting/Light_Disorient.htm).

Table 2. Documented Disorientations along the Florida coast.

Year	Total Number of Hatchling Disorientation Events	Total Number of Hatchlings Involved in Disorientation Events	Total Number of Adult Disorientation Events
2001	743	28,674	19
2002	896	43,226	37
2003	1,446	79,357	18
2004	888	46,487	24
2005	976	41,521	50
2006	1,521	71,798	40
2007	1,410	64,433	25
2008	1192	49,623	62

Predation

Depredation of sea turtle eggs and hatchlings by natural and introduced species occurs on almost all nesting beaches. Depredation by a variety of predators can considerably decrease sea turtle nest hatching success. The most common predators in the southeastern United States are ghost crabs (*Ocypode quadrata*), raccoons (*Procyon lotor*), feral hogs (*Sus scrofa*), foxes (*Urocyon cinereoargenteus* and *Vulpes vulpes*), coyotes (*Canis latrans*), armadillos (*Dasypus novemcinctus*), cats (*Felis catus)*, and fire ants (*Solenopsis* spp.) (Dodd 1988, Stancyk 1995). Raccoons are particularly destructive on the Atlantic coast and may take up to 96 percent of all nests deposited on a beach (Davis and Whiting 1977, Hopkins and Murphy 1980, Stancyk et al. 1980, Talbert et al. 1980, Schroeder 1981, Labisky et al. 1986). As nesting habitat dwindles, it is essential that nest production be naturally maximized so the turtles may continue to exist in the wild.

In response to increasing depredation of sea turtle nests by coyote, fox, hog, and raccoon, multi-agency cooperative efforts have been initiated and are ongoing throughout Florida, particularly on public lands.

Climate Change

Based on the present level of available information concerning the effects of global climate change on the status of sea turtles, the Service acknowledges the potential for changes to occur in the action area, but presently has no basis to evaluate if or how these changes are affecting sea turtles or its designated critical habitat. Nor does our present knowledge allow the Service to project what the future effects from global climate change may be or the magnitude of these potential effects.

EFFECTS OF THE ACTION

This section is an analysis of the beneficial, direct, and indirect effects of the proposed actions on nesting sea turtles, nests, eggs, and hatchling sea turtles within the Action Area. The analysis includes effects interrelated and interdependent of the project activities. An interrelated activity is an activity that is part of a proposed action and depends on the proposed activity. An interdependent activity is an activity that has no independent utility apart from the action.

Factors to be considered

The proposed projects will occur within habitat that is used by sea turtles for nesting and may be constructed during a portion of the sea turtle nesting season. Long-term and permanent impacts could include a change in the nest incubation environment from the restoration/nourishment material. Short-term and temporary impacts to sea turtle nesting activities could result from project work occurring on the nesting beach during the active nesting or hatching period, changes in the physical characteristics of the beach from the placement of the beach restoration/nourishment material and change in the nest incubation environment from the material.

Proximity of action: Sand placement activities would occur within and adjacent to nesting habitat for sea turtles and dune habitats that ensure the stability and integrity of the nesting beach. Specifically, the project would potentially impact loggerhead and green nesting females, their nests, and hatchling sea turtles.

Distribution: Sand placement activities that may impact nesting and hatchling sea turtles and sea turtle nests would occur along Gulf of Mexico and Atlantic Ocean coasts.

Timing: The timing of the sand placement activities could directly and indirectly impact nesting females, their nests, and hatchling sea turtles when conducted between March 1 and November 30.

Nature of the effect: The effects of the sand placement activities may change the nesting behavior of adult female sea turtles or diminish the nesting or nest success, change the behavior of hatchling sea turtles resulting in nests or hatching events being missed during the daily survey of the Action Area. Sand placement can also change the incubation conditions within the nest. Any decrease in productivity and/or survival rates would contribute to the vulnerability of the sea turtles nesting in Florida.

Duration: The sand placement activity may be a one-time activity or a multiple-year activity and each sand placement project may take between 3 and 7 months to complete. Thus, the direct effects would be expected to be short-term in duration. Indirect effects from the activity may continue to impact nesting and hatchling sea turtles and sea turtle nests in subsequent nesting seasons.

Disturbance frequency: Sea turtle populations in Florida may experience decreased nesting success, hatching success and hatchling emerging success that could result from the sand placement activities being conducted at night during one nesting season or during the earlier or latter parts of two nesting seasons.

Disturbance intensity and severity: Depending on the need (including post-disaster work) and the timing of the sand placement activities during sea turtle nesting season, effects to the sea turtle populations of Florida, and potentially the U.S. populations, could be important.

Analyses for effects of the action

Beneficial Effects

The placement of sand on a beach with reduced dry fore-dune habitat may increase sea turtle nesting habitat if the placed sand is highly compatible (i.e., grain size, shape, color, etc.) with naturally occurring beach sediments in the area, and compaction and escarpment remediation measures are incorporated into the project. In addition, a nourished beach that is designed and constructed to mimic a natural beach system may benefit sea turtles more than an eroding beach it replaces.

Adverse Effects

Through many years of research, it has been documented that beach nourishment can have adverse effects on nesting female sea turtles and hatchlings. Results of monitoring sea turtle nesting and beach nourishment activities provide additional information on how sea turtles respond to nourished beaches, minimization measures, and other factors that influence nesting, hatching, and emerging success. Science-based information on sea turtle nesting biology and review of empirical data on beach nourishment monitoring is used to manage beach nourishment activities to eliminate or reduce impacts to nesting and hatchling sea turtles and sea turtle nests so that beach nourishment can be accomplished (**Table 3**). Measures can be incorporated pre-, during, and post-construction to reduce impacts to sea turtles. Because of the long history of sea turtle monitoring in Florida, it is not necessary to require studies on each project beach to document those effects each time.

Table 3. Effects of beach nourishment on sea turtles and minimization measures.

FACTOR	DURING CONSTRUCTION	POST CONSTRUCTION	SEA TURTLE BEHAVIOR	MINIMIZATION		
				PRE	DURING	POST
Barriers - physical and visual	Low nesting success	Abort nesting	Shift nests seaward, abort nesting Barrier to hatching		Equipment stored off the beach at night, project timing outside nesting season in high density nesting areas (Broward to Brevard)	Remove equipment from the beach after project is completed.
Nest relocation	Lower hatching and emergency success		Shift nests seaward	Design	Implement	Reconfigure Natural reworking
Construction lighting	Nest site selection and Disorientation.		Shift nests seaward Misorientation landward rather than seaward	Design	Implement	Reconfigure Natural reworking
Profile		Escarpments Nest site selection Hatchling orientation	Shift nests seaward Misorientation landward rather than seaward	Design	Implement	Reconfigure Natural reworking
Elevation		Nest site selection, Unnatural profile, Disorientation.	Shift nests seaward	Design	Implement	Natural reworking
Barriers - physical and visual		Escarpments	Abort nesting	Design	Implement	Reconfigure Natural reworking
Substrate		Compaction Cementation	Abort nesting Barrier to	Material quality	QA/QC Plan	Tilling Removal of

		Color	hatching Change in incubation length/sex ratio		Limit equipment driving over beach fill	unsuitable material
Lights		Landward development	Confusion of nesting females, Dis- and mis-orientation of hatchlings	Install Wildlife Lighting	Stop gap, lights off during times of nest hatching	Install Wildlife Lighting

Direct Effects

Direct effects are those direct or immediate effects of a project on the species or its habitat. Placement of sand on a beach in and of itself may not provide suitable nesting habitat for sea turtles. Although beach nourishment may increase the potential nesting area, significant negative impacts to sea turtles may result if protective measures are not incorporated during project construction. Nourishment during the nesting season, particularly on or near high density nesting beaches, can cause increased loss of eggs and hatchlings and, along with other mortality sources, may significantly impact the long-term survival of the species. For instance, projects conducted during the nesting and hatching season could result in the loss of sea turtles through disruption of adult nesting activity and by burial or crushing of nests or hatchlings. While a nest monitoring and egg relocation program would reduce these impacts, nests may be inadvertently missed (when crawls are obscured by rainfall, wind, and/or tides) or misidentified as false crawls during daily patrols. In addition, nests may be destroyed by operations at night prior to beach patrols being performed. Even under the best of conditions, about 7 percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder 1994).

1. *Nest relocation*

Besides the potential for missing nests during surveys and a nest relocation program, there is a potential for eggs to be damaged by nest movement or relocation, particularly if eggs are not relocated within 12 hours of deposition (Limpus et al. 1979). Nest relocation can have adverse impacts on incubation temperature (and hence sex ratios), gas exchange parameters, hydric environment of nests, hatching success, and hatchling emergence (Limpus et al. 1979; Ackerman 1980; Parmenter 1980; Spotila et al. 1983; McGehee 1990). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. Water availability is known to influence the incubation environment of the embryos and hatchlings of turtles with flexible-shelled eggs, which has been shown to affect nitrogen excretion (Packard et al. 1984), mobilization of calcium (Packard and Packard 1986), mobilization of yolk nutrients (Packard et al. 1985), hatchling size (Packard et al. 1981; McGehee 1990), energy reserves in the yolk at hatching (Packard et al. 1988), and locomotory ability of hatchlings (Miller et al. 1987).

In a 1994 Florida study comparing loggerhead hatching and emergence success of relocated nests with nests in their original location, Moody (1998) found that hatching success was lower in relocated nests at 9 of 12 beaches evaluated. In addition, emergence success was lower in relocated nests at 10 of 12 beaches surveyed in 1993 and 1994. Many of the direct effects of beach nourishment may persist over time. These direct effects include increased susceptibility of relocated nests to catastrophic events, the consequences of potential increased beachfront development, changes in the physical characteristics of the beach, the formation of escarpments, repair/replacement of groins and jetties and future sand migration.

2. *Equipment*

Heavy machinery on beach
The use of heavy machinery on beaches during a construction project may also have adverse effects on sea turtles. Equipment left on the nesting beach overnight can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls and unnecessary energy expenditure.

Driving on the beach for the project
The operation of motor vehicles or equipment on the beach to complete the project work at night affects sea turtle nesting by: interrupting or colliding with a female turtle on the beach; headlights disorienting or misorienting emergent hatchlings; vehicles running over hatchlings attempting to reach the ocean; and vehicle tracks traversing the beach interfering with hatchlings crawling to the ocean. Apparently, hatchlings become diverted not because they cannot physically climb out of the rut (Hughes and Caine 1994), but because the sides of the track cast a shadow and the hatchlings lose their line of sight to the ocean horizon (Mann 1977). The extended period of travel required to negotiate tire tracks and ruts may increase the susceptibility of hatchlings to dehydration and depredation during migration to the ocean (Hosier et al. 1981). Driving directly above or over incubating egg clutches or on the beach can cause sand compaction which may result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings, decreasing nest success and directly killing pre-emergent hatchlings (Mann 1977; Nelson and Dickerson 1987; Nelson 1988).

Depending on when the dune project is completed dune vegetation may have become established in the vicinity of dune restoration sites. The physical changes and loss of plant cover caused by vehicles on vegetated areas or dunes can lead to various degrees of instability and cause dune migration. As vehicles move over the sand, sand is displaced downward, lowering the substrate. Since the vehicles also inhibit plant growth, and open the area to wind erosion, the beach and dunes may become unstable. Vehicular traffic on the beach or through dune breaches or low dunes may cause acceleration of overwash and erosion (Godfrey et al. 1978). Driving along the beachfront should be between the low and high tide water lines. To minimize the impacts to the beach and recovering dunes, transport and access to the dune restoration sites should be from the road. However, if the work needs to be conducted from the beach, the areas for the truck transport and bulldozer/bobcat equipment to work in should be designated and marked.

3. Artificial lighting

Visual cues are the primary sea-finding mechanism for hatchling sea turtles (Mrosovsky and Carr 1967; Mrosovsky and Shettleworth 1968; Dickerson and Nelson 1989; Witherington and Bjorndal 1991). When artificial lighting is present on or near the beach, it can misdirect hatchlings once they emerge from their nests and prevent them from reaching the ocean (Philibosian 1976; Mann 1977; FWC sea turtle disorientation database). In addition, a significant reduction in sea turtle nesting activity has been documented on beaches illuminated with artificial lights (Witherington 1992). Therefore, construction lights along a project beach and on the dredging vessel may deter females from coming ashore to nest, misdirect females trying to return to the surf after a nesting event, and misdirect emergent hatchlings from adjacent non-project beaches.

The newly created wider and flatter beach berm exposes sea turtles and their nests to lights that were less visible, or not visible, from nesting areas before the beach nourishment leading to a higher mortality of hatchlings. Review of over 10 years of empirical information from beach nourishment projects indicates that the number of sea turtles impacted by lights increases on the post-construction berm. A review of a selected nourished beaches in Florida (South Brevard, North Brevard, Captiva Island, Ocean Ridge, Boca Raton, Town of Palm Beach, Longboat Key, and Bonita Beach) indicated disorientation reporting increased by approximately 300 percent ($\pm$ 282 std. dev.) the first nesting season after project construction and up to 542 percent (+ 872 std. dev.) the second year compared to pre-nourishment reports (Trindell et al. 2005).

Specific examples of increased lighting disorientations after a beach nourishment project include Brevard and Palm Beach counties, Florida. A nourishment project in Brevard County, completed in 2002, showed an increase of 130 percent in disorientations in the nourished area. Disorientations on beaches in the County that were not nourished remained constant (R. Trindell, FWC, personal communication 2007). This same result was also documented in 2003 when another beach in Brevard County was nourished and the disorientations increased by 480 percent (R. Trindell, FWC, personal communication 2007). Installing appropriate beachfront lighting is the most effective method to decrease the number of disorientations on any developed beach including nourished beaches.

A shoreline protection project was constructed at Ocean Ridge in Palm Beach County, Florida between August 1997 and April 1998. Lighting disorientation events increased after nourishment. In spite of continued aggressive efforts to identify and correct lighting violations in 1998 and 1999, 86 percent of the disorientation reports were in the nourished area in 1998 and 66percent of the reports were in the nourished area in 1999 (Howard and Davis 1999).

While the effects of artificial lighting have not been specifically studied on each beach that is nourished in Florida, based on the experience of increased artificial lighting disorientations on other Florida beaches, impacts are expected to potentially occur on all nourished beaches statewide.

Changing to sea turtle compatible lighting can be easily accomplished at the local level through voluntary compliance or by adopting appropriate regulations. Of the 27 coastal counties in Florida where sea turtles are known to nest, 19 have passed beachfront lighting ordinances in addition to 58 municipalities (FWC 2007b, http://myfwc.com/seaturtle/Lighting/Light_Ordinance.htm). Local governments have realized that adopting a lighting ordinance is the most effective method to address artificial lighting along the beachfront.

Indirect Effects

Indirect effects are those effects that are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Effects from the proposed project may continue to affect sea turtle nesting on the project beach and adjacent beaches in future years.

1. *Increased susceptibility to catastrophic events*

Nest relocation within a nesting season may concentrate eggs in an area making them more susceptible to catastrophic events. Hatchlings released from concentrated areas also may be subject to greater predation rates from both land and marine predators, because the predators learn where to concentrate their efforts (Glenn 1998; Wyneken et al. 1998).

2. *Increased beachfront development*

Pilkey and Dixon (1996) state that beach replenishment frequently leads to more development in greater density within shorefront communities that are then left with a future of further replenishment or more drastic stabilization measures. Dean (1999) also notes that the very existence of a beach nourishment project can encourage more development in coastal areas. Following completion of a beach nourishment project in Miami during 1982, investment in new and updated facilities substantially increased tourism there (National Research Council 1995). Increased building density immediately adjacent to the beach often resulted as much larger ones that accommodated more beach users replaced older buildings. Overall, shoreline management creates an upward spiral of initial protective measures resulting in more expensive development which leads to the need for more and larger protective measures. Increased shoreline development may adversely affect sea turtle nesting success. Greater development may support larger populations of mammalian predators, such as foxes and raccoons, than undeveloped areas (National Research Council 1990a), and can also result in greater adverse effects due to artificial lighting, as discussed above.

3. *Changes in the physical environment*

Beach nourishment may result in changes in sand density (compaction), beach shear resistance (hardness), beach moisture content, beach slope, sand color, sand grain size, sand grain shape, and sand grain mineral content if the placed sand is dissimilar from the original beach sand (Nelson and Dickerson 1988a). These changes could result in adverse impacts

on nest site selection, digging behavior, clutch viability, and hatchling emergence (Nelson and Dickerson 1987; Nelson 1988).

Beach nourishment projects create an elevated, wider and unnatural flat slope berm (beach). Sea turtles nest closer to the water the first few years after nourishment because of the altered profile (and perhaps unnatural sediment grain size distribution) (Ernest and Martin 1999, Trindell 2005) (**Figure 3**).

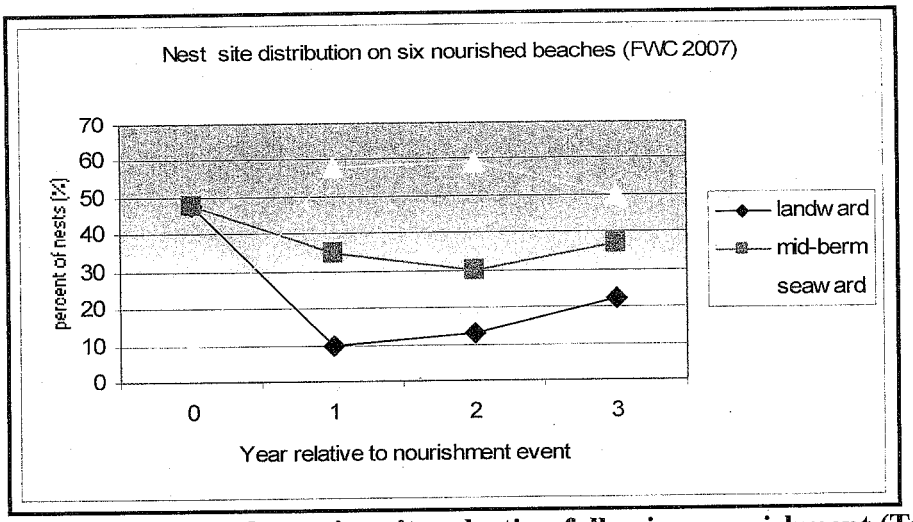

Figure 3. Review of sea turtle nesting site selection following nourishment (Trindell 2005).

Beach compaction and unnatural beach profiles resulting from beach nourishment activities could negatively impact sea turtles regardless of the timing of projects. Very fine sand and/or the use of heavy machinery can cause sand compaction on nourished beaches (Nelson et al. 1987; Nelson and Dickerson 1988a). Significant reductions in nesting success (i.e., false crawls occurred more frequently) have been documented on severely compacted nourished beaches (Fletemeyer 1980; Raymond 1984; Nelson and Dickerson 1987; Nelson et al. 1987), and increased false crawls may result in increased physiological stress to nesting females. Sand compaction may increase the length of time required for female sea turtles to excavate nests and cause increased physiological stress to the animals (Nelson and Dickerson 1988b). Nelson and Dickerson (1988c) concluded that, in general, beaches nourished from offshore borrow sites are harder than natural beaches, and while some may soften over time through erosion and accretion of sand, others may remain hard for 10 years or more.

These impacts can be minimized by using suitable sand and by tilling (minimum depth of 36 inches) compacted sand after project completion. The level of compaction of a beach can be assessed by measuring sand compaction using a cone penetrometer (Nelson 1987). Tilling of a nourished beach with a root rake may reduce the sand compaction to levels comparable to unnourished beaches. However, a pilot study by Nelson and Dickerson (1988c) showed that a tilled nourished beach will remain uncompacted for up to one year. Multi-year beach compaction monitoring and, if necessary, tilling would ensure that project impacts on sea turtles are minimized.

A change in sediment color on a beach could change the natural incubation temperatures of nests in an area, which, in turn, could alter natural sex ratios. To provide the most suitable sediment for nesting sea turtles, the color of the nourished sediments shall resemble the natural beach sand in the area. Natural reworking of sediments and bleaching from exposure to the sun would help to lighten dark nourishment sediments; however, the timeframe for sediment mixing and bleaching to occur could be critical to a successful sea turtle nesting season.

4. *Escarpment formation*

On nourished beaches, steep escarpments may develop along their water line interface as they adjust from an unnatural construction profile to a more natural beach profile (Coastal Engineering Research Center 1984; Nelson et al. 1987). These escarpments can hamper or prevent access to nesting sites (Nelson and Blihovde 1998). Researchers have shown that female sea turtles coming ashore to nest can be discouraged by the formation of an escarpment, leading to situations where they choose marginal or unsuitable nesting areas to deposit eggs (*e.g.*, in front of the escarpments, which often results in failure of nests due to prolonged tidal inundation). This impact can be minimized by leveling any escarpments prior to the nesting season.

5. *Construction of Groins and jetties*

Groins and jetties are shore-perpendicular structures that are designed to trap sand that would otherwise be transported by longshore currents. Jetties are defined as structures placed to keep sand from flowing into channels (Kaufman and Pilkey 1979; Komar 1983). In preventing normal sand transport, these structures accrete updrift beaches while causing accelerated beach erosion downdrift of the structures (Komar 1983; Pilkey et al. 1984; National Research Council 1987), a process that results in degradation of sea turtle nesting habitat. As sand fills the area updrift from the groin or jetty, some littoral drift and sand deposition on adjacent downdrift beaches may occur due to spillover. However, these groins and jetties often force the stream of sand into deeper offshore water where it is lost from the system (Kaufman and Pilkey 1979). The greatest changes in beach profile near groins and jetties are observed close to the structures, but effects eventually may extend many kilometers along the coast (Komar 1983).

Jetties are placed at ocean inlets to keep transported sand from closing the inlet channel. Together, jetties and inlets are known to have profound effects on adjacent beaches (Kaufman and Pilkey 1979). Witherington et al. (2005) found a significant negative relationship between loggerhead nesting density and distance from the nearest of 17 ocean inlets on the Atlantic coast of Florida. The effect of inlets in lowering nesting density was observed both updrift and downdrift of the inlets, leading researchers to propose that beach instability from both erosion and accretion may discourage loggerhead nesting.

Construction or repair of groins and jetties during the nesting season may result in the destruction of nests, disturbance of females attempting to nest, and disorientation of emerging hatchlings from project lighting. Following construction, the presence of groins

and jetties may interfere with nesting turtle access to the beach, result in a change in beach profile and width (downdrift erosion, loss of sandy berms, and escarpment formation), trap hatchlings, and concentrate predatory fishes, resulting in higher probabilities of hatchling predation.

Escarpments may develop on beaches between groins as the beaches equilibrate to their final profiles. These escarpments are known to prevent females from nesting on the upper beach and can cause them to choose unsuitable nesting areas, such as seaward of an escarpment. These nest sites commonly receive prolonged tidal inundation and erosion, which results in nest failure (Nelson and Blihovde 1998). As groin structures fail and break apart, they spread debris on the beach, which may further impede nesting females from accessing suitable nesting sites and trap both hatchlings and nesting turtles.

Species' response to a proposed action

The following summary illustrates sea turtle responses to and recovery from a nourishment project comprehensively studied by Ernest and Martin (1999). A significantly larger proportion of turtles emerging on nourished beaches abandoned their nesting attempts than turtles emerging on natural or pre-nourished beaches. This reduction in nesting success is most pronounced during the first year following project construction and is most likely the result of changes in physical beach characteristics associated with the nourishment project (*e.g.,* beach profile, sediment grain size, beach compaction, frequency and extent of escarpments). During the first post-construction year, the time required for turtles to excavate an egg chamber on untilled, hard-packed sands increases significantly relative to natural conditions. However, tilling (minimum depth of 36 inches) is effective in reducing sediment compaction to levels that did not significantly prolong digging times. As natural processes reduced compaction levels on nourished beaches during the second post-construction year, digging times returned to natural levels (Ernest and Martin 1999).

During the first post-construction year, nests on nourished beaches are deposited significantly seaward of the toe of the dune and significantly landward of the tide line than nests on natural beaches. More nests are washed out on the wide, flat beaches of the nourished treatments than on the narrower steeply sloped natural beaches. This phenomenon may persist through the second post-construction year monitoring and resulting from the placement of nests near the seaward edge of the beach berm where dramatic profile changes, caused by erosion and scarping, occurred as the beach equilibrate to a more natural contour.

The principal effect of beach nourishment on sea turtle reproduction is a reduction in nesting success during the first year following project construction. Although most studies have attributed this phenomenon to an increase in beach compaction and escarpment formation, Ernest and Martin (1999) indicated that changes in beach profile may be more important. Regardless, as a nourished beach is reworked by natural processes in subsequent years and adjusts from an unnatural construction profile to a natural beach profile, beach compaction and the frequency of escarpment formation decline, and nesting and nesting success return to levels found on natural beaches.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service is not aware of any cumulative effects in the project area.

CONCLUSION

After reviewing the current status of the loggerhead and green turtle, the environmental baseline for the action area, the effects of the proposed beach nourishment, and the cumulative effects, the Service's BO is that the beach nourishment project, as proposed, is not likely to jeopardize the continued existence of the loggerhead and green sea turtle, and is not likely to destroy or adversely modify designated critical habitat. No critical habitat has been designated for the loggerhead and green sea turtle, in the continental United States; therefore, none will be affected.

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For loggerheads, the PFRU averages 64,513 nests per year. The entire recovery unit occurs within Florida and consists of approximately 1,166 miles of shoreline. Of the available nesting habitat within the PFRU, sand placement activities will occur on 1.6 miles of nesting shoreline.
For greens, the proposed project will affect only 1.6 linear miles of the approximately 1,400 miles of available sea turtle nesting habitat in the southeastern U.S.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing

duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

The Service anticipates the proposed action will impact 1.6 linear miles of nesting sea turtle beach habitat, which will result in take of nesting loggerhead and green sea turtles. Anticipated take consists of: (1) destruction of all nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the proposed project; (2) destruction of all nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project; (3) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site; (4) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; (5) misdirection of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (6) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (7) destruction of nests from escarpment leveling within a nesting season when such leveling has been approved by the Fish and Wildlife Service.

Incidental take is anticipated for only the 1.6 linear miles of beach that has been identified for sand placement. The Service anticipates incidental take of sea turtles will be difficult to detect for the following reasons: (1) the turtles nest primarily at night and all nests are not found because [a] natural factors, such as rainfall, wind, and tides may obscure crawls and [b] human-caused factors, such as pedestrian and vehicular traffic, may obscure crawls, and result in nests being destroyed because they were missed during a nesting survey and egg relocation program; (2) the total number of hatchlings per undiscovered nest is unknown; (3) the reduction in percent hatching and emerging success per relocated nest over the natural nest site is unknown; (4) an unknown number of females may avoid the project beach and be forced to nest in a less than optimal area; (5) lights may misdirect an unknown number of hatchlings and cause death; and (6) escarpments may form and cause an unknown number of females from accessing a suitable nesting site. However, the level of take of these species can be anticipated by the disturbance and renourishment of suitable turtle nesting beach habitat because: (1) turtles nest within the project site; (2) beach renourishment will likely occur during a portion of the nesting season; (3) the renourishment project will modify the incubation substrate, beach slope, and sand compaction; and (4) artificial lighting will deter and/or misdirect nesting females and hatchlings.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species. Critical habitat has not been designated in the project area; therefore, the project will not result in destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of loggerhead and green sea turtles.

1. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence and beach mouse burrow construction shall be used for sand placement.

2. All derelict concrete, metal, coastal armoring geotextile material or other debris shall be removed from the beach prior to any sand placement.

3. A post-construction survey(s) of all artificial lighting visible from the project beach shall be completed by the local sponsor or applicant. This information shall be provided to the Service and the FWC.

4. A meeting between representatives of the contractor, the Service, the FWC, and the permitted sea turtle surveyor, and other species surveyors as appropriate, shall be held prior to the commencement of work on this project.

5. During the sea turtle nesting season, daytime surveys for nesting sea turtles shall be conducted. If nests are constructed in the area of beach nourishment, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation. Nest relocation shall not occur upon completion of the project.

6. Beach compaction shall be monitored and tilling (non-vegetated areas to a minimum depth of 36 inches) shall be conducted if needed immediately after completion of the sand placement project and prior to the next three nesting seasons to reduce the likelihood of impacting sea turtle nesting and hatching activities. (NOTE: Out-year beach compaction monitoring and tilling are not required if placed material no longer remains on the dry beach.)

7. Escarpment formation shall be monitored and leveling shall be conducted if needed immediately after completion of the sand placement project and prior to the next three nesting seasons to reduce the likelihood of impacting nesting and hatchling sea turtles.

8. Construction equipment and materials shall be stored in a manner that will minimize impacts to nesting and hatchling sea turtles to the maximum extent practicable.

9. Lighting associated with the project construction shall be minimized to reduce the

possibility of disrupting and disorienting nesting and/or hatchling sea turtles.

10. During the sea turtle nesting season, the contractor shall not extend the beach fill more than 500 feet along the shoreline between dusk and the following day until the daily nesting survey has been completed and the beach cleared for fill advancement. An exception to this may occur if there is a permitted sea turtle surveyor present on-site at night to monitor and report any sea turtles that may emerge within the project area.

11. A report describing the actions taken to implement the terms and conditions of this incidental take statement shall be submitted to the Service by July 31 of the year following completion of the proposed work for each year when the activity has occurred.

12. The Service and the FWC shall be notified if a sea turtle adult, hatchling, or egg, or beach mouse is harmed or destroyed as a direct or indirect result of the project.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill is material that maintains the general character and functionality of the material occurring on the beach and in the adjacent dune and coastal system. Such material shall be predominately of carbonate, quartz or similar material with a particle size distribution ranging between 0.062mm and 4.76mm (classified as sand by either the Unified Soils or the Wentworth classification), shall be similar in color and grain size distribution (sand grain frequency, mean and median grain size and sorting coefficient) to the material in the historic beach sediment at the disposal site, and shall not contain:

    1a. Greater than 5 percent, by weight, silt, clay or colloids passing the #230 sieve;

    1b. Greater than 5 percent, by weight, fine gravel retained on the #4 sieve (- 2.25φ);

    1c. Coarse gravel, cobbles or material retained on the 3/4 inch sieve in a percentage or size greater than found on the native beach;

    1d. Construction debris, toxic material or other foreign matter; and

    1e. Material that will result in cementation of the beach.

2. All derelict concrete, metal, and coastal armoring geotextile material and other debris shall be removed from the beach prior to any sand placement to the maximum extent

practicable. If debris removal activities take place during the sea turtle nesting season (April 15 through September 30), the work shall be conducted during daylight hours only and shall not commence until completion of the sea turtle survey each day.

3. A survey shall be conducted of all lighting visible from the beach placement area by the local sponsor or applicant, using standard techniques for such a survey, between May 1 and May 15, and between July 15 and August 1, in the year following construction. A summary report of the surveys shall be submitted to the Service by December 1 of each year in which surveys are conducted. After the annual report is completed, a meeting shall be set up with the applicant or local sponsor, county or municipality, FWC and the Service to discuss the survey report, as well as any documented sea turtle disorientations in or adjacent to the project area.

4. A meeting between representatives of the contractor, the Service, the FWC, the permitted sea turtle surveyor, and other species surveyors as appropriate, shall be held prior to the commencement of work on projects. At least 10-business days advance notice shall be provided prior to conducting this meeting. The meeting will provide an opportunity for explanation and/or clarification of the sea turtle and beach mouse protection measures as well as additional guidelines when construction occurs during the sea turtle nesting season, such as storing equipment, minimizing driving, feral cat observation and reporting within the work area as well as follow up meetings during construction.

5. For sand placement projects that occur during the period from May 1 through October 31, daily early morning (before 9 a.m.) surveys shall be conducted, and eggs shall be relocated per the requirements below (7a to 7c).

   Nesting surveys shall be initiated 65 days prior to nourishment or dredged channel material placement activities or by April 1 whichever is later. Nesting surveys shall continue through the end of the project or through November 30 whichever is earlier. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirement listed in 5a through 5c below.

   5a. Nesting surveys and egg relocations will only be conducted by persons with prior experience and training in these activities and who are duly authorized to conduct such activities through a valid permit issued by FWC, pursuant to F.A.C 68E-1. Please contact FWC's Marine Turtle Management Program in Tequesta at (561) 575-5408 for information on the permit holder in the project area. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (in all time zones). The contractor shall not extend the beach fill more than 500 feet along the shoreline between dusk and the following day until a daily nesting survey has been completed and the beach cleared for fill advancement. This measure will ensure that construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures.

5b. Only those nests that may be affected by sand placement activities will be relocated. Nest relocation shall not occur upon completion of the project. Nests requiring relocation shall be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Relocated nests shall not be placed in organized groupings. Relocated nests shall be randomly staggered along the length and width of the beach in settings that are not expected to experience daily inundation by high tides or known to routinely experience severe erosion and egg loss, or subject to artificial lighting. Nest relocations in association with construction activities shall cease when construction activities no longer threaten nests.

5c. Nests deposited within areas where construction activities have ceased or will not occur for 65 days or nests laid in the nourished berm prior to tilling shall be marked and left in place unless other factors threaten the success of the nest. The turtle permit holder shall install an on-beach marker at the nest site and/or a secondary marker at a point as far landward as possible to assure that future location of the nest will be possible should the on-beach marker be lost. No activity will occur within this area nor will any activities occur which could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and the nest has not been disturbed by the project activity.

6. Sand compaction shall be monitored in the area of sand placement immediately after completion of the project and prior to April 15 for 3 subsequent years. Sand compaction shall be monitored in accordance with a protocol agreed to by the Service, FWC, and the applicant or local sponsor. At a minimum, the protocol provided under 6a and 6b below shall be followed. If tilling is required, the area shall be tilled to a depth of 36 inches. All tilling activity shall be completed prior to those dates listed above.

Each pass of the tilling equipment shall be overlapped to allow thorough and even tilling. If the project is completed during the nesting season, tilling will not be performed in areas where nests have been left in place or relocated. (NOTE: The requirement for compaction monitoring can be eliminated if the decision is made to till regardless of post-construction compaction levels. Additionally, out-year compaction monitoring and remediation are not required if placed material no longer remains on the dry beach.) A report on the results of the compaction monitoring shall be submitted to the Service's field office prior to any tilling actions being taken.

6a. Compaction sampling stations shall be located at 500-foot intervals along the project area. One station shall be at the seaward edge of the dune/bulkhead line (when material is placed in this area), and one station shall be midway between the dune line and the high water line (normal wrack line).

6b. At each station, the cone penetrometer shall be pushed to a depth of 6, 12, and 18 inches three times (three replicates). Material may be removed from the hole if necessary to ensure accurate readings of successive levels of sediment. The

penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lie over less compact layers. Replicates shall be located as close to each other as possible, without interacting with the previous hole and/or disturbed sediments. The three replicate compaction values for each depth shall be averaged to produce final values for each depth at each station. Reports will include all 18 values for each transect line, and the final 6 averaged compaction values.

6c. If the average value for any depth exceeds 500 pounds per square inch (psi) for any two or more adjacent stations, then that area shall be tilled immediately prior to the following dates listed above.

6d. If values exceeding 500 psi are distributed throughout the project area but in no case do those values exist at two adjacent stations at the same depth, then consultation with the Service will be required to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling will not be required.

6e. Tilling shall occur landward of the wrack line and avoid all vegetated areas 3 square feet or greater with a 3 square foot buffer around the vegetated areas.

7. Visual surveys for escarpments along the project area shall be made immediately after completion of the sand placement project and during March 15 to April 15 for 3 subsequent years if sand from the project area still remains on the beach.

   Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of at least 100 feet shall be leveled and the beach profile shall be reconfigured to minimize scarp formation by April 15. Any escarpment removal shall be reported by location. If the project is completed during the sea turtle nesting and hatching season, escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. The Service shall be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service or FWC will provide a brief written authorization that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken shall be submitted to the Service's Field Office. (NOTE: Out-year escarpment monitoring and remediation are not required if placed material no longer remains on the dry beach).

8. Staging areas for construction equipment shall be located off the beach, if off-beach staging areas are available, during the sea turtle nesting season. Nighttime storage of construction equipment not in use shall be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes that are placed on the beach shall be located as far landward as possible without compromising the

integrity of the existing or reconstructed dune system. Pipes placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune. Temporary storage of pipes shall be off the beach to the maximum extent possible. If the pipes shall be on the beach, they shall be placed in a manner that will minimize the impact to nesting habitat and shall not compromise the integrity of the dune systems.

9. Direct lighting of the beach and nearshore waters shall be limited to the immediate construction area during the sea turtle nesting season and shall comply with safety requirements.
Lighting on offshore or onshore equipment shall be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the water's surface and nesting beach while meeting all Coast Guard, EM 385-1-1, and OSHA requirements. Light intensity of lighting equipment shall be reduced to the minimum standard required by OSHA for General Construction areas, in order not to misdirect sea turtles. Shields shall be affixed to the light housing and be large enough to block light from all lamps from being transmitted outside the construction area.

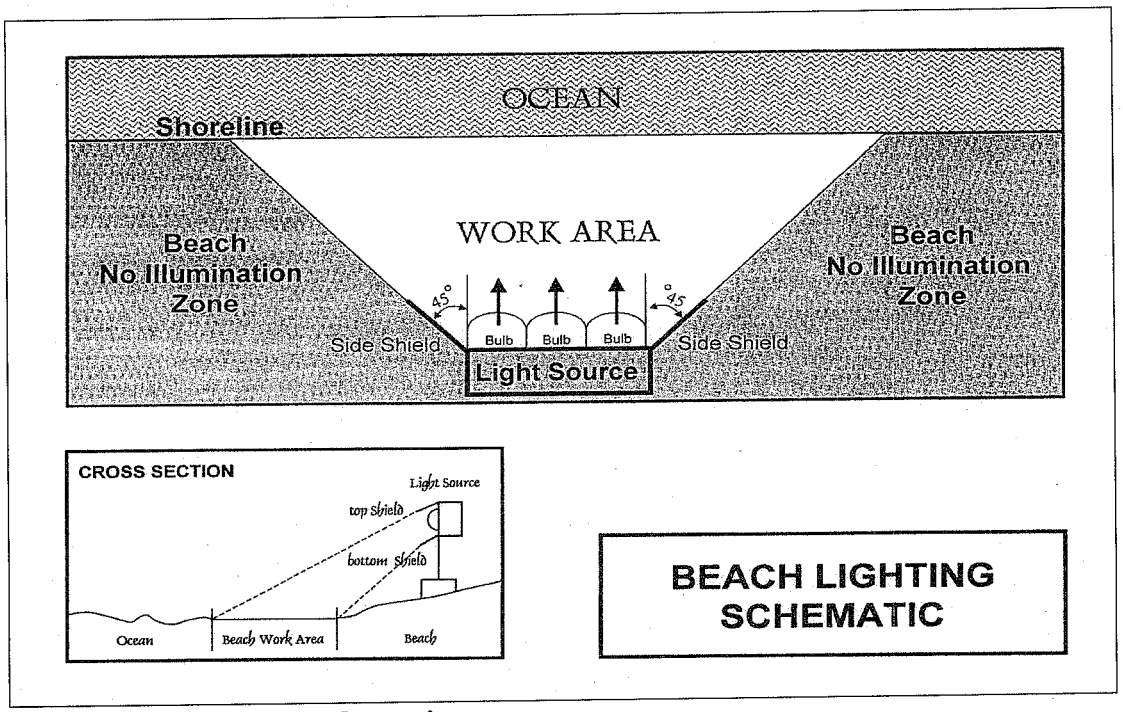

Figure 4. Beach lighting schematic.

10. During the sea turtle nesting season, the contractor shall not extend the beach fill more than 500 feet along the shoreline between dusk and the following day until the daily nesting survey has been completed and the beach cleared for fill advancement. An exception to this may occur if there is permitted sea turtle surveyor present on-site to ensure no nesting and hatching sea turtles are present within the extended work area. If the 500 feet is not feasible for the project, an agreed upon distance will be decided on during the preconstruction meeting. Once the beach has been cleared and the necessary nest relocations have been completed, the contractor will be allowed to proceed with the

placement of fill during daylight hours until dusk at which time the 500-foot length limitation shall apply.

11. A report describing the projects conducted during the year and actions taken to implement the reasonable and prudent measures and terms and conditions of this incidental take statement shall be submitted to the Service by March 1 of the following year of completing the proposed work for each year when the activity has occurred. This report will include the following information:

Table 4. Information to include in the report following the project completion.

All projects	Project location (include Florida DEP R-Monuments)
	Project description
	Dates of actual construction activities
	Names and qualifications of personnel involved in sea turtle nesting surveys and relocation activities (separate the nests surveys for nourished and non-nourished areas)
	Descriptions and locations of self-release beach sites
	Nest survey and relocation results

12. In the event a sea turtle nest is excavated during construction activities, the permitted person responsible for egg relocation for the project shall be notified immediately so the eggs can be moved to a suitable relocation site.

    Upon locating a dead or injured sea turtle adult, hatchling, egg, or beach mouse that may have been harmed or destroyed as a direct or indirect result of the project, the Corps, permittee, and/or local sponsor shall be responsible for notifying FWC Wildlife Alert at 1-888-404-FWCC (3922) and the Service Office immediately.

    Care shall be taken in handling injured sea turtles, eggs or beach mice to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

The Service believes that incidental take will be limited to the 1.6 linear miles of beach that have been identified for sand placement. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that no more than the following types of incidental take will result from the proposed action: (1) destruction of all nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the proposed project; (2) destruction of all nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed

project; (3) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site; (4) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; (5) disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (6) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (7) destruction of nests from escarpment leveling within a nesting season when such leveling has been approved by the Service. The amount or extent of incidental take for sea turtles will be considered exceeded if the project results in more than a one-time placement of sand on the 1.6 linear miles of beach that have been identified for sand placement. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a) (1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Appropriate native salt-resistant dune vegetation should be established on the restored dunes. The FDEP, Bureau of Beaches and Wetland Resources, can provide technical assistance on the specifications for design and implementation.

2. Surveys for nesting success of sea turtles should be continued for a minimum of 3 years following beach nourishment to determine whether sea turtle nesting success has been adversely impacted.

3. Educational signs should be placed where appropriate at beach access points explaining the importance of the area to sea turtles and/or the life history of sea turtle species that nest in the area.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal

agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding this BO, please contact Ann Marie Lauritsen of this office at (904) 525-0661.

Sincerely,

for David L. Hankla
Field Supervisor

Cc: Robbin Trindell- FWC
Ken Graham- Service/Atlanta

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Attachment C

National Marine Fisheries Service's
"*Sea Turtle and Smalltooth Sawfish Construction Conditions*"

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
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Attachment D

"Standard Manatee Conditions for In-Water Work - July 2005"

STANDARD MANATEE CONDITIONS FOR IN-WATER WORK

2009

The permittee shall comply with the following conditions intended to protect manatees from direct project effects:

a. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act, the Endangered Species Act, and the Florida Manatee Sanctuary Act.

b. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the immediate area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

c. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

d. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

e. Any collision with or injury to a manatee shall be reported immediately to the FWC Hotline at 1-888-404-FWCC. Collision and/or injury should also be reported to the U.S. Fish and Wildlife Service in Jacksonville (1-904-731-3336) for north Florida or Vero Beach (1-772-562-3909) for south Florida.

f. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Awareness signs that have already been approved for this use by the Florida Fish and Wildlife Conservation Commission (FWC) must be used (see MyFWC.com). One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 81/2" by 11" explaining the requirements for "Idle Speed/No Wake" and the shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities.

CAUTION: MANATEE HABITAT

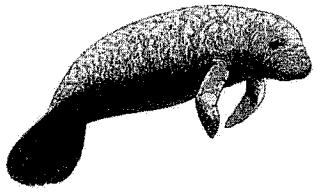
All project vessels

IDLE SPEED / NO WAKE

When a manatee is within 50 feet of work
all in-water activities must

SHUT DOWN

Report any collision with or injury to a manatee:



Wildlife Alert:

1-888-404-FWCC(3922)

cell *FWC or #FWC