CONTRACT DOCUMENTS AND SPECIFICATIONS FOR SECTOR 5 BEACH AND DUNE RESTORATION PROJECT

BID NO. 2019066

PREPARED FOR
THE BOARD OF COUNTY COMMISSIONERS
INDIAN RIVER COUNTY, FLORIDA
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JAMES W. ENNIS, P.E., PMP, ASSISTANT PUBLIC WORKS DIRECTOR

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BOARD OF COUNTY COMMISSIONERS

1801 27th Street
Vero Beach, Florida 32960

Telephone: (772) 567-8000 FAX: (772) 770-5140

ADVERTISEMENT FOR BIDS
INDIAN RIVER COUNTY

Sealed bids will be received by Indian River County until 2:00 P.M. on Tuesday, August 20, 2019. Each bid shall be submitted in a sealed envelope and shall bear the name and address of the bidder on the outside and the words **"SECTOR 5 BEACH AND DUNE RESTORATION PROJECT"** and **Bid No. 2019066".** Bids should be addressed to Purchasing Division, Room B1-301, 1800 27th Street, Vero Beach, Florida 32960. All bids will be opened publicly and read aloud at 2:00 P.M. All bids received after 2:00 P.M., on the day specified above, will not be accepted or considered.

INDIAN RIVER COUNTY BID NO. 2019066

PROJECT DESCRIPTION: Indian River County proposes to restore approximately 3.1 miles of coastline in the City of Vero Beach, Town of Indian River Shores, and unincorporated Indian River County by placing approximately 123,800 cubic yards of beach compatible sand to create a beach berm and dune. Salt-tolerant dune vegetation will be planted on the restored dunes. Beach compatible sand will be obtained from the Stewart Materials Fort Pierce mine, and shall meet the "Geotechnical Requirements" described in the Technical Specifications and Contract Documents. Upland staging and construction access areas are located at Tracking Station Park, Jaycee Park and Conn Beach, and Humiston Park.

All material and equipment furnished and all work performed shall be in strict accordance with the plans, specifications, and contract documents pertaining thereto. Detailed specifications are available at: www.demandstar.com or by selecting "Current Solicitations" at http://www.ircgov.com/Departments/Budget/Purchasing. All communications concerning this bid shall be directed to IRC Purchasing Division at purchasing@ircgov.com.

All bidders shall submit one (1) original and one (1) copy of the Bid Proposal forms provided within the specifications. Please note that the questionnaire must be filled out completely including the financial statement. BID SECURITY must accompany each Bid, and must be in the form of an AIA Document A310 Bid Bond, properly executed by the Bidder and by a qualified surety, or a certified check or a cashier's check, drawn on any bank authorized to do

business in the State of Florida. Bid Security must be in the sum of not less than **Five Percent (5%)** of the total amount of the bid, made payable to Indian River County Board of County Commissioners. In the event the Contract is awarded to the Bidder, Bidder will enter in a Contract with the County and furnish the required 100% Public Construction Bond and certificates of insurance within the timeframe set by the County. If Bidder fails to do so, the Bid Security shall be retained by the County as liquidated damages and not as penalty.

The County reserves the right to delay awarding of the Contract for a period of **ninety (90)** days after the bid opening, to waive informalities in any bid, or reject any or all bids in whole or in part with or without cause/or to accept the bid that, in its judgement, will serve the best interest of Indian River County, Florida. The County will not reimburse any Bidder for bid preparation costs.

A Pre-Bid Conference will be held on July 26, 2019 at 3 PM., in the first-floor conference room of the Public Works Office (A1-303) inside the Indian River County Administration Building located at 1801 27th Street, Vero Beach, Florida, 32960. ATTENDANCE AT THIS CONFERENCE IS HIGHLY ENCOURAGED.

INDIAN RIVER COUNTY

By: Jennifer Hyde
Purchasing Manager

For Publication in the Indian River Press Journal
Dates: July 14, 2019

For: Indian River Press Journal

Please furnish tear sheet and Affidavit of Publication to:

INDIAN RIVER COUNTY
PURCHASING DIVISION
1800 27th Street
Building "B"
Vero Beach, FL 32960

*** * END OF SECTION * ***

Statement of No Bid

Should you elect not to bid, please complete and send this page by email (purchasing@ircgov.com), fax (772-770-5140) or by mail to Indian River County Purchasing, 1800 27th Street, Vero Beach, FL 32960.

Please select all of the following that apply. Our decision not to bid on the subject project was based on:

- ☐ Project is located too far from our base of operations
- ☐ Project value too low
- ☐ Project specifications unclear (please explain below)
- ☐ Material availability may be a challenge
- ☐ Our current schedule will not allow us to perform
- ☐ Unable to meet insurance requirements
- ☐ Other:
- ☐ Other:

General comments regarding the bid and/or plans and specifications:

Bidder Information Form

Please return one copy of this form with your bid to assist us in learning more about where our solicitation opportunities are most often found.

Please tell us how you found out this Request for Qualifications was released/available:

- ☐ Indian River Press Journal (TCPalm)
- ☐ Demandstar/Onvia
- ☐ Email from Purchasing Division
- ☐ Indian River County Web Site
- ☐ Planroom (Please provide the name): _____
- ☐ Other (please describe): _____

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SECTION 00200 - Instructions to Bidders

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SECTION 00200 - Instructions to Bidders

ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof:

A. Bidder--The individual or entity who submits a Bid directly to OWNER.

B. Issuing Office--The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

C. Successful Bidder--The lowest responsible Bidder submitting a responsive Bid to whom OWNER (on the basis of OWNER's evaluation as hereinafter provided) makes an award.

D. ENGINEER – References Project Engineer or their designee.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement for Bids or Invitation to Bid may be obtained from the Issuing Office.

2.02 Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER nor ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 OWNER and ENGINEER in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, within five days of OWNER's request Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below.

A. Bidder must have at least five years' experience in the construction of similar projects of this size and larger.
B. Bidder must have successfully constructed, as prime CONTRACTOR, at least three projects similar in scope to this project.
C. Bidder must have good recommendations from at least three clients similar to the OWNER.
D. The Bidder's superintendent and assistants must be qualified and experienced in similar projects in all categories.
E. Bidder must be able to provide evidence of authority to conduct business in the jurisdiction in which the project is located.

3.02 Each bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the contract.

3.03 The OWNER reserves the right to reject bids from Bidders that are unable to meet the listed required qualifications.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.

2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.01.A will be made available by OWNER to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in paragraph 4.02 of the General Conditions has been identified and established in paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to OWNER and ENGINEER by OWNERs of such Underground Facilities, including OWNER, or others.

4.03 Hazardous Environmental Condition

A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that ENGINEER has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in paragraph 4.03.A will be made available by OWNER to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in paragraph 4.06 of the General Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in paragraphs 4.02, 4.03, and 4.04 of the General Conditions.

Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in paragraph 4.06 of the General Conditions.

4.05 **"[This paragraph has been deleted intentionally]"**

4.06 **"[This paragraph has been deleted intentionally]"**

4.07 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, including any Addenda and the other related data identified in the Bidding Documents;

B. VISIT THE SITE AND BECOME FAMILIAR WITH AND SATISFY BIDDER AS TO THE GENERAL, LOCAL, AND SITE CONDITIONS THAT MAY AFFECT COST, PROGRESS, AND PERFORMANCE OF THE WORK;

C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, or performance of the Work;

D. carefully study all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and carefully study all reports and drawings of a Hazardous Environmental Condition, if any, at the Site which have been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions;

E. obtain and carefully study (or assume responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (overhead, surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

I. promptly give ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by ENGINEER is acceptable to Bidder; and

J. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by ENGINEER are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

5.01 The date, time, and location for a Pre-Bid conference is specified in the Advertisement for Bids. Representatives of OWNER and ENGINEER will be present to discuss the Project. Bidders are ***HIGHLY ENCOURAGED*** to attend and participate in the conference. ENGINEER will transmit to all prospective Bidders of record such Addenda as ENGINEER considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 - SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by OWNER unless otherwise provided in the Bidding Documents.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

7.01 CONE OF SILENCE. Potential bidders and their agents shall not communicate in any way with the Board of County Commissioners, County Administrator or any County staff other than Purchasing personnel in reference or relation to this solicitation. This restriction shall be effective from the time of bid advertisement until the Board of County Commissioners meets to authorize award. Such communication may result in disqualification.

7.02 All questions about the meaning or intent of the Bidding Documents are to be submitted to PURCHASING (purchasing@ircgov.com) in writing. Interpretations or clarifications considered necessary by ENGINEER in response to such questions will be issued by Addenda mailed or delivered to all parties through the Issuing Office as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not

be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.03 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by OWNER or ENGINEER.

ARTICLE 8 - BID SECURITY

8.01 Each Bid must be accompanied by Bid Security made payable to OWNER in the amount of five percent of the Bidder's maximum base bid price and in the form of a certified check; cashier's check; or an AIA Document A310 Bid Bond issued by a surety meeting the requirements of Paragraph 5.01 of the General Conditions. The Bid Bond shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. The Surety must be authorized to issue surety bonds in Florida. The Bidder shall require the attorney-in-fact who executes any Bond, to affix to each a current certified copy of their Power of Attorney, reflecting such person's authority as Power of Attorney in the State of Florida. Further, at the time of execution of the Contract, the Successful Bidder shall for all Bonds, provide a copy of the Surety's current valid Certificate of Authority issued by the United States Department of the Treasury under 31 United States Code sections 9304-9308. The Surety shall also meet the requirements of paragraphs 5.01 and 5.02 of the General Conditions.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, OWNER may annul the Notice of Award and the Bid security of that Bidder will be retained by the owner. The Bid Security of other Bidders whom OWNER believes to have a reasonable chance of receiving the award may be retained by OWNER until the earlier of seven days after the Effective Date of the Agreement or 91 days after the Bid opening, whereupon Bid Security furnished by such Bidders will be returned.

8.03 Bid Security of other Bidders whom OWNER believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 9 - CONTRACT TIMES

9.01 The number of calendar days within which, or the dates by which, the Work is to be (a) Substantially Completed and (b) also completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 - LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, application for such acceptance will not be considered by ENGINEER until after the Effective Date of the Agreement. The procedure for submission of any such application by CONTRACTOR and consideration by ENGINEER is set forth in the General Conditions and may be supplemented in the General Requirements.

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to OWNER in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within seven (7) days after Bid opening, submit to OWNER a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by OWNER. If OWNER or ENGINEER, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, OWNER may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

12.02 If apparent Successful Bidder declines to make any such substitution, OWNER may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which OWNER or ENGINEER makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to OWNER and ENGINEER subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.

12.03 CONTRACTOR shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom CONTRACTOR has reasonable objection.

ARTICLE 13 - PREPARATION OF BID

13.01 The Bid form is included with the Bidding Documents.

13.02 All blanks on the Bid form shall be completed by printing in ink or by typewriter and the Bid signed. A Bid price shall be indicated for each section, Bid item, alternative, adjustment unit price item, and unit price item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate

seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown below the signature.

13.06 A Bid by an individual shall show the Bidder's name and official address.

13.07 A Bid by a joint venture shall be executed by each joint venturor in the manner indicated on the Bid form. The official address of the joint venture must be shown below the signature.

13.08 All names shall be typed or printed in ink below the signatures.

13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid form.

13.10 The address and telephone number for communications regarding the Bid shall be shown.

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number or county registration number for the state or county of the Project, if any, shall also be shown on the Bid form.

13.12 All supporting information requested in the Bid Form must be furnished. Do not leave any questions or requests unanswered.

13.13 In accordance with Florida Statutes Section 218.80, the "Public Bid Disclosure Act", Indian River County as OWNER is obligated to disclose all license, permit, impact, or inspection fees that are payable to Indian River County in connection with the construction of the Work by the accepted bidder. All permit, impact, or inspection fees payable to Indian River County in connection with the work on this County project will be paid by Indian River County, with the exception of re-inspection fees. The Bidder shall not include ANY PERMIT, IMPACT, NOR INSPECTION FEES payable to **Indian River County** in the bid.

ARTICLE 14 - BASIS OF BID; EVALUATION OF BIDS

14.01 Unit Price

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.

B. The total of all estimated prices will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid for the item. The final quantities and Contract Price will be determined in accordance with paragraph 11.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of

figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

14.02 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in paragraph 11.02 of the General Conditions.

14.03 The Bidder's attention is called to the fact that any estimate of quantities of work to be done and materials to be furnished under the Specifications as shown on the Bid Schedule, or elsewhere, is approximate only and not guaranteed. The OWNER does not assume any responsibility that the final quantities shall remain in strict accordance with the estimated quantities, nor shall the Bidder plead misunderstanding or deception because of such estimate of quantities or of the character, location of the work, or other conditions pertaining thereto.

ARTICLE 15 - SUBMITTAL OF BID

15.01 The Bid form is to be completed and submitted with the Bid security and the following data:

A. Sworn Statement under Section 105.08, Indian River County Code, on Disclosure of Relationships.

B. Sworn Statement under the Florida Trench Safety Act.

C. Qualifications Questionnaire.

D. List of Subcontractors.

F. Certification Regarding Prohibition Against Contracting with Scrutinized Companies

G. Contractor Equipment Schedule

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the advertisement or invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project Title and Bid Number (and, if applicable, the designated portion of the Project for which the Bid is submitted), Bid Number, the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If mail or other delivery system sends a Bid, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to Indian River County, Purchasing Division, 1800 27th Street, Vero Beach, Florida, 32960.

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

16.02 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with OWNER and promptly thereafter demonstrates to the reasonable satisfaction of OWNER that there was a material and substantial mistake in the preparation of its Bid, that Bidder may

withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 - OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but OWNER may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 - AWARD OF CONTRACT

19.01 OWNER reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. OWNER further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. OWNER may also reject the Bid of any Bidder if OWNER believes that it would not be in the best interest of the Project to make an award to that Bidder. OWNER also reserves the right to waive all technicalities and informalities not involving price, time, or changes in the ork and to negotiate contract terms with the Successful Bidder. The County will not reimburse any Bidder for bid preparation costs. Owner reserves the right to cancel the award of any Contract at any time before the execution of such Contract by all parties without any liability to the Owner. For and in consideration of the Owner considering Bids submitted, the Bidder, by submitting its Bid, expressly waives any claim to damages, of any kind whatsoever, in the event the Owner exercises its right to cancel the award in accordance herewith.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, OWNER will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award. It is the OWNER's intent to accept alternates (if any are accepted) in the order in which they are listed on the Bid form, but OWNER may accept them in any order or combination.

19.04 In evaluating Bidders, OWNER will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 OWNER may conduct such investigations as OWNER deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.

19.06 If the Contract is to be awarded, OWNER will award the Contract to the Bidder whose Bid is in the best interests of the Project.

19.07 OWNER has no local ordinance or preferences, as set forth in FS 255.0991 (2) in place, therefore no preference prohibited by that section will be considered in the acceptance, review or award of this bid.

19.08 Any actual or prospective bidder or proposer who is aggrieved in connection with the bidding and/or selection process may protest to the OWNER's Purchasing Manager. The protest shall be submitted in writing to the Purchasing Manager within seven (7) calendar days after the bidder or proposer knows or should have known of the facts giving rise to the protest.

19.09 CONTRACTOR certifies that it and its related entities as defined by Florida law are not on the Scrutinized Companies that Boycott Israel List, created pursuant to s. 215.4725 of the Florida Statutes, and are not engaged in a boycott of Israel. In addition, if this agreement is for goods or services of one million dollars or more, CONTRACTOR certifies that it and its related entities as defined above by Florida law are not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to Section 215.473 of the Florida Statutes and are not engaged in business operations in Cuba or Syria.

OWNER may terminate this Contract if CONTRACTOR is found to have submitted a false certification as provided under section 287.135(5), Florida Statutes, been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or been engaged in business operations in Cuba or Syria, as defined by section 287.135, Florida Statutes.

OWNER may terminate this Contract if CONTRACTOR, including all wholly owned subsidiaries, majority-owned subsidiaries, and parent companies, that exist for the purpose of making profit, is found to have been placed on the Scrutinized Companies that Boycott Israel List or is engaged in a boycott of Israel as set forth in section 215.4725, Florida Statutes.

Accordingly, firms responding to this solicitation shall return with their response an executed copy of the attached "Certification Regarding Prohibition Against Contracting With Scrutinized Companies." Failure to return this executed form with submitted bid/proposal/statement of qualifications will result in the response being deemed non-responsive and eliminated from consideration.

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth OWNER's requirements as to Public Construction Bond and insurance. When the Successful Bidder delivers the executed Agreement to OWNER, it must be accompanied by the required insurance certificate(s) and Bond, unless the Bond has been waived due to the total contract being less than $100,000.

ARTICLE 21 - SIGNING OF AGREEMENT

21.01 When OWNER gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within fifteen (15) days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to OWNER**.**

21.02 OWNER shall return one fully signed counterpart to Successful Bidder.

21.03 Should Bidder to whom the Contract has been awarded refuse or fail to complete the requirements of Article 21.01 above, the additional time in calendar days, required to correctly complete the documents will be deducted, in equal amount, from the Contract time. Or, the OWNER may elect to revoke the Award and the OWNER shall hold the Bid Bond for consequential damages incurred, and the Contract may be awarded as the OWNER desires.

*** * END OF SECTION * ***

SECTION 00300 - Bid Package Contents

THIS PACKAGE CONTAINS:

SECTION TITLE	SECTION NUMBER
Bid Form	00310
Bid Bond	00430
Sworn Statement on Disclosure of Relationships	00452
Sworn Statement Under the Florida Trench Safety Act	00454
Qualifications Questionnaire	00456
List of Subcontractors	00458
Certification Regarding Prohibition Against Contracting with Scrutinized Companies	00460
Contractor Equipment Schedule	00462

SUBMIT ONE (1) ORIGINAL AND ONE (1) COPY OF THIS COMPLETE PACKAGE WITH YOUR BID

*** * END OF SECTION * ***

SECTION 00310 - Bid Form

PROJECT IDENTIFICATION:

Project Name: **SECTOR 5 BEACH AND DUNE RESTORATION PROJECT**

Bid Number: 2019066

Project Description: Indian River County proposes to restore approximately 3.1 miles of coastline in the City of Vero Beach, Town of Indian River Shores, and unincorporated Indian River County by placing approximately 123,800 cubic yards of beach compatible sand to create a beach berm and dune. Salt-tolerant dune vegetation will be planted on the restored dunes. Beach compatible sand will be obtained from the Stewart Materials Fort Pierce mine, and shall meet the "Geotechnical Requirements" described in the Technical Specifications and Contract Documents. Upland staging and construction access areas are located at Tracking Station Park, Jaycee Park and Conn Beach, and Humiston Park.

THIS BID IS SUBMITTED TO:

INDIAN RIVER COUNTY
PURCHASING DIVISION
1800 27th Street, BUILDING B
VERO BEACH, FLORIDA 32960

1.01 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

2.01 Bidder accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of OWNER.

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of all which is hereby acknowledged.

Addendum Date	Addendum Number

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of a Hazardous Environmental Condition, if any, which have been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.

E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Bidder has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by ENGINEER is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

4.01 Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

5.01 Bidder shall complete the Work in accordance with the Contract Documents for the price(s) contained in the Bid Schedule:

Sector 5 - Beach and Dune Restoration Project					
Bid Schedule					
Bid Item No.	**Description**	**Unit**	**Quantity**	**Unit Price**	**Extended Price**
1	Mobilization/Demobilization	LS	1		$ -
2	Environmental Compliance	LS	1		$ -
3	Supply/Deliver/Place Sand	TN	185,700		$ -
4	Supply/Deliver/Place Dune Vegetation	EA	128,800		$ -
5	Site Restoration & Grading	LS	1		$ -
6	Pre-Placement & Post-Placement Surveys	LS	1		$ -
				Total Bid Schedule Construction Cost	**$ -**

Contractors are bidding on a lump sum basis for the purpose of determining the lowest responsive and responsible bidder. Payments will be made based on unit prices of actual work furinished and installed. Where a discrepancy exists between the unit price and the extended price, the unit price will prevail. Where there is a discrepancy between the numerical and written lump sum bid, the written lump sum bid will prevail.

The lump sum bid shall include the total cost for the work specified in this solicitation, consisting of furnishing all materials, labor, equipment, supervision, mobilization, overhead, and profit required, in accordance with the bid documents.

Total Bid Construction Cost:

Written Amount: _____

A. The Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

B. The Owner reserves the right to omit or add to the construction of any portion or portions of the work heretofore enumerated or shown on the plans. Furthermore, the Owner reserves the right to omit in its entirety any one or more items of the Contract without forfeiture of Contract or claims for loss of anticipated profits or any claims by the Contractor on account of such omissions.

C. Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided. The quantities actually required to complete the contract and work may be less or more than so estimated, and, if so, no action for damages or for loss of profits shall accrue to the Contractor by reason thereof.

D. Unit Prices have been computed in accordance with paragraph 11.03.B of the General Conditions.

E. If Bidder believes that the cost of any item of the Work has not been established by the Bid Form, then Bidder shall include that cost in some other applicable bid item, so that Bidder's proposal for the project reflects Bidder's total price for completing the Work in its entirety.

6.01 Bidder agrees that the Work will be substantially completed and ready for final payment in accordance with paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified, which shall be stated in the Agreement.

7.01 The following documents are attached to and made a condition of this Bid:

A. Itemized Bid Schedule;

B. Required Bid security in the form of _____;

C. Section 00452 - Sworn Statement under Section 105.08, Indian River Code, on Disclosure of Relationships;

D. Section 00454 - Sworn Statement Under the Florida Trench Safety Act;

E. Section 00456 - Qualifications Questionnaire;

F. Section 00458 - List of Subcontractors;

G. Section 00460 - Certification Regarding Prohibition Against Contracting with Scrutinized Companies;

H. Section 00462 – Contractor Equipment Schedule; and

8.01 The terms used in this Bid with initial capital letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

9.01 By signing this form, Bidder acknowledges that it has read and understood all information contained herein.

SUBMITTED on _____, 20___.

State Contractor License No. _____

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's signature)
Doing business as: _____
Business address: _____
_____
Phone No.: _____ FAX No.: _____
Email: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Business address: _____
_____
Phone No.: _____ FAX No.: _____
Email: _____

A Corporation

Corporation Name: _____ (SEAL)
State of Incorporation: _____
Type (General Business, Professional, Service, Limited Liability):_____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest _____
(Signature of Corporate Secretary)

Business address: _____
_____
Phone No.: _____ FAX No.: _____
Email: _____

Date of Qualification to do business is _____.

A Joint Venture

Joint Venture Name: _____ (SEAL)

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Business address: _____

_____

Phone No.: _____ FAX No.: _____
Email: _____

Joint Venture Name: _____ (SEAL)

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____
Title: _____
Business address: _____

_____

Phone No.: _____ FAX No.: _____
Email: _____

Phone and FAX Number, and Address for receipt of official communications:

_____

_____

(Each joint venturor must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

*** * END OF SECTION * ***

SECTION 00430

AIA DOCUMENT A310 BID BOND

The Contractor shall use the document form entitled “AIA Document A310 Bid Bond.”

END OF SECTION

SECTION 00452

SWORN STATEMENT UNDER SECTION 105.08, INDIAN RIVER COUNTY CODE, ON DISCLOSURE OF RELATIONSHIPS

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICER AUTHORIZED TO ADMINISTER OATHS.

1. This sworn statement MUST be submitted with Bid, Proposal or Contract No. 2019066

   for Sector 5 Beach and Dune Restoration Project

2. This sworn statement is submitted by: _____

   _____

   (Name of entity submitting Statement)

   whose business address is:

   _____

3. My name is _____
   (Please print name of individual signing)

   and my relationship to the entity named above is _____

4. I understand that an "affiliate" as defined in Section 105.08, Indian River County Code, means:

   The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of the entity.

5. I understand that the relationship with a County Commissioner or County employee that must be disclosed as follows:

   Father, mother, son, daughter, brother, sister, uncle, aunt, first cousin, nephew, niece, husband, wife, father-in-law, mother-in-law, daughter-in-law, son-in-law, brother-in-law, sister-in-law, stepfather, stepmother, stepson, stepdaughter, stepbrother, stepsister, half brother, half sister, grandparent, or grandchild.

6. Based on information and belief, the statement, which I have marked below, is true in relation to the entity submitting this sworn statement. [Please indicate which statement applies.]

_____ Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, have any relationships as defined in section 105.08, Indian River County Code, with any County Commissioner or County employee.

_____ The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents, who are active in management of the entity have the following relationships with a County Commissioner or County employee:

Name of Affiliate or entity	Name of County Commissioner or employee	Relationship

_____
(Signature)

_____
(Date)

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 20___, by _____, who is personally known to me or who has produced _____ as identification.

NOTARY PUBLIC

SIGN: _____

PRINT: _____
Notary Public, State at large
My Commission Expires:

(Seal)

SECTION 00454 - Sworn Statement Under the Florida Trench Safety Act

THIS FORM MUST BE SIGNED BY THE BIDDER WHO WILL BE RESPONSIBLE FOR THE EXCAVATION WORK ("BIDDER"), OR ITS AUTHORIZED REPRESENTATIVE, IN THE PRESENCE OF A NOTARY PUBLIC AUTHORIZED TO ADMINISTER OATHS.

1. This Sworn Statement is submitted for the Sector 5 Beach and Dune Restoration Project.
2. This Sworn Statement is submitted by _____
(Legal Name of Entity Submitting Sworn Statement)
_____,
hereinafter "BIDDER". The BIDDER's address is _____
_____.
BIDDER's Federal Employer Identification Number (FEIN) is _____.
3. My name is _____ and my relationship to the BIDDER
(Print Name of Individual Signing)
is _____.
(Position or Title)
I certify, through my signature at the end of this Sworn Statement, that I am an authorized representative of the BIDDER.
4. The Trench Safety Standards that will be in effect during the construction of this Project are contained within the Trench Safety Act, Section 553.60 et.seq. Florida Statutes and refer to the applicable Florida Statue(s) and/or OSHA Regulation(s) and include the "effective date" in the citation(s). Reference to and compliance with the applicable Florida Statute(s) and OSHA Regulation(s) is the complete and sole responsibility of the BIDDER. Such reference will not be checked by OWNER or ENGINEER and they shall have no responsibility to review or check the BIDDER's compliance with the Trench Safety Standards.
5. The BIDDER assures the OWNER that it will comply with the applicable Trench Safety Standards.
6. The BIDDER has allocated and included in its bid the total amount of $_____, based on the linear feet of trench to be excavated over five (5) feet deep, for compliance with the applicable Trench Safety Standards, and intends to comply with said standards by instituting the following specific method(s) of compliance on this Project: _____
_____
_____
_____
_____.
The determination of the appropriate method(s) of compliance is the complete and sole responsibility of the BIDDER. Such methods will not be checked by the OWNER or ENGINEER for accuracy, completeness, or any other purpose. The OWNER and ENGINEER shall have no responsibility to review or check the BIDDER's compliance with the Trench Safety Standards.
7. The BIDDER has allocated and included in its bid the total amount of $_____ based on the square feet of shoring to be used for compliance with shoring safety requirements and intends to comply with said shoring requirements by instituting the following specific method(s) of compliance on this Project: _____
_____
_____
_____
_____.

The determination of the appropriate method(s) of compliance is the complete and sole responsibility of the BIDDER. Such methods will not be checked by the OWNER or ENGINEER for accuracy, completeness or any other purpose. The OWNER and ENGINEER shall have no responsibility to review or check the BIDDER's compliance with the Trench Safety Standards.

8. The BIDDER, in submitting this bid, represents that it has obtained and considered all available geotechnical information, has utilized said geotechnical information and that, based on such information and the BIDDER's own information, the BIDDER has sufficient knowledge of the Project's surface and subsurface site conditions and characteristics to assure BIDDER's compliance with the applicable Trench Safety Standards in designing the trench safety system(s) for the Project.

BIDDER: _____

By: _____

Position or Title: _____

Date: _____

STATE OF _____
COUNTY OF _____

Personally appeared before me, the undersigned authority, _____ who after first being sworn by me, affixed his/her signature in the space provided above on this _____ day of _____, 20____.

_____
Notary Public, State at large
My Commission Expires:

*** * END OF SECTION * ***

SECTION 00456 – QUALIFICATIONS QUESTIONNAIRE

NOTICE: THE OWNER RETAINS THE DISCRETION TO REJECT THE BIDS OF NON-RESPONSIBLE BIDDERS.

Project Name: **Sector 5 Beach and Dune Restoration Project**

1. Bidder's Name / Address: _____
   _____

2. Bidder's Telephone & FAX Numbers: _____
   _____

3. Licensing and Corporate Status:
   a. Is Contractor License current? _____
   b. Bidder's Contractor License No: _____ [Attach a copy of Contractor's License to the bid]
   c. Attach documentation from the State of Florida Division of Corporations that indicates the business entity's status is active and that lists the names and titles of all officers.

4. Number of years the firm has performed business as a Contractor in construction work of the type involved in this contract: _____

5. What is the last project OF THIS NATURE that the firm has completed?
   _____
   _____

6. Has the firm ever failed to complete work awarded to you? _____

   [If your answer is "yes", then attach a separate page to this questionnaire that explains the circumstances and list the project name, Owner, and the Owner's telephone number for each project in which the firm failed to complete the work.]

7. Has the firm ever been assessed liquidated damages? _____

   [If your answer is "yes", then attach a separate page to this questionnaire that explains the circumstances and list the project name, Owner, and the Owner's telephone number for each project in which liquidated damages have been assessed.]

8. Has the firm ever been charged by OSHA for violating any OSHA regulations? _____

   [If your answer is "yes", then attach a separate page to this questionnaire that explains the circumstances and list the project name, Owner, and the Owner's telephone number for each project in which OSHA violations were alleged.]

9. Has the firm implemented a drug-free workplace program in compliance with Florida Statute 287.087? _____

   (In the case of a tie, preference will be given to businesses with drug-free workplace programs)

10. Has the firm ever been charged with noncompliance of any public policy or rules? _____

    [If your answer is "yes", then attach a separate page to this questionnaire that explains the circumstances and list the project name, Owner, and the Owner's telephone number for each project.]

11. Attach to this questionnaire, a notarized financial statement and other information that documents the firm's financial strength and history.

12. Has the firm ever defaulted on any of its projects? _____

    [If your answer is "yes", then attach a separate page to this questionnaire that explains the circumstances and list the project name, Owner, and the Owner's telephone number for each project in which a default occurred.]

13. Attach a separate page to this questionnaire that summarizes the firm's current workload and that demonstrates its ability to meet the project schedule.

14. Name of person who inspected the site of the proposed work for the firm:

    Name: _____ Date of Inspections: _____

15. Name of on-site Project Foreman: _____

    Number of years of experience with similar projects as a Project Foreman: _____

16. Name of Project Manager: _____

    Number of years of experience with similar projects as a Project Manager: _____

17. State your total bonding capacity: _____

18. State your bonding capacity per job:_____

19. Please provide name, address, telephone number, and contact person of your bonding company:_____

[The remainder of this page was left blank intentionally]

19. Complete the following table for SIMILAR projects:

Name of Project	Date Completed	Owner	Contact Person: Name/ Email Address/Phone	Original Contract Amount	Final Contract Amount

[NOTE: If requested by the County, the Bidder shall furnish references, and other information, sufficiently comprehensive to permit an appraisal of its abilities as a contractor.]

By: _____
(Signature)

_____
(Position or Title)

_____
(Date)

*** * END OF SECTION * ***

SECTION 00458 - LIST OF SUBCONTRACTORS

The Bidder **MUST** list below the name and address of each Subcontractor who will perform work under this Contract in excess of one-half percent of the total bid price, and shall also list the portion of the work which will be done by such Subcontractor. After the opening of Bids, additions, changes or substitutions will not be allowed unless approved by Indian River County after a request for such a change has been submitted in writing by the Contractor, which shall include reasons for such request. Subcontractors must be properly licensed and hold a valid Certificate of Competency.

Documentation Submitted for the **Sector 5 Beach and Dune Restoration Project**

	Work to be Performed	Subcontractor's Name/Address	Portion of Work (%)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			

Note: Attach additional sheets if required.

*** * END OF SECTION * ***

SECTION 00460 – CERTIFICATION REGARDING PROHIBITION AGAINST CONTRACTING WITH SCRUTINIZED COMPANIES

I hereby certify that neither the undersigned entity, nor any of its wholly owned subsidiaries, majority-owned subsidiaries, parent companies, or affiliates of such entities or business associations, that exists for the purpose of making profit have been placed on the Scrutinized Companies that Boycott Israel List created pursuant to s. 215.4725 of the Florida Statutes, or are engaged in a boycott of Israel.

In addition, if this solicitation is for a contract for goods or services of one million dollars or more, I hereby certify that neither the undersigned entity, nor any of its wholly owned subsidiaries, majority-owned subsidiaries, parent companies, or affiliates of such entities or business associations, that exists for the purpose of making profit are on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to s. 215.473 of the Florida Statutes, or are engaged in business operations in Cuba or Syria as defined in said statute.

I understand and agree that the County may immediately terminate any contract resulting from this solicitation upon written notice if the undersigned entity (or any of those related entities of respondent as defined above by Florida law) are found to have submitted a false certification or any of the following occur with respect to the company or a related entity: (i) it has been placed on the Scrutinized Companies that Boycott Israel List, or is engaged in a boycott of Israel, or (ii) for any contract for goods or services of one million dollars or more, it has been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or it is found to have been engaged in business operations in Cuba or Syria.

Name of Respondent:_____

By:_____
(Authorized Signature)

Title:_____

Date:_____

Section 00460

CONTRACTOR EQUIPMENT SCHEDULE

The BIDDER is requested to state below the number and types of equipment proposed for use in the Project. This schedule shall include equipment owned/rental and/or operated by the BIDDER and by any Subcontractor responsible for more than ten percent (10%) of the total work. Indicate on the form below if the equipment is owned or operated by the BIDDER or a Subcontractor.

EQUIPMENT ITEM	NUMBER	CAPACITY	OWNER/OPERATOR OR STATE RENTAL

BOARD OF COUNTY COMMISSIONERS

Month Day, 20_ VIA OVERNIGHT DELIVERY

Persons Name
Vendor name
Vendor address
City/State, Zip

NOTICE OF AWARD

Reference: Indian River County Bid # 2019066
Project Name: Sector 5 Beach and Dune Restoration Project

Dear Mr. _____,

I am pleased to inform you that on __XXX___, 20__, the Board of County Commissioners awarded the above referenced project to your company. The following documents are required before the applicable County department can issue a "Notice to Proceed" letter.

1. Payment and Performance Bonds each in the amount of **100%** of the contract amount. ($XXXX.00)
2. Certificate of Insurance, **must** name Indian River County as an additional insured and **must** provide for a 30 day Notice of Cancellation.
3. Agreement, execute the enclosed **two (2)** copies.

In accordance with section 255.05(1)(a), Florida Statutes, you are required to execute a Public Construction Bond for the above referenced project. Please submit the Bond and the Certificate of Insurance to this office at the address provided below no later than Date **XX, 20 .** Failure to comply with the established deadline for submittal of required documents may be grounds for cancellation of the award.

Enclosed are two copies of the Agreement. Please execute both copies and return them together with the required bonds and Certificate of Insurance to the Purchasing Office.
Thank you for your prompt attention and if you have any questions, please do not hesitate to contact our office.

Sincerely,

_____
Jennifer Hyde, Purchasing Manager

cc: Kendra Cope, M.S., Coastal Engineering Division
Richard B. Szpyrka, P.E., Public Works Director
James W. Ennis, P.E., PMP, Assistant Public Works Director

SECTION 00520 - Agreement (Public Works)

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SECTION 00520 - Agreement (Public Works)

THIS AGREEMENT is by and between INDIAN RIVER COUNTY, a Political Subdivision of the State of Florida organized and existing under the Laws of the State of Florida, (hereinafter called OWNER)

and _____
(hereinafter called CONTRACTOR).

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1 - WORK

1.01 CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Project Description: Indian River County proposes to restore approximately 3.1 miles of coastline in the City of Vero Beach, Town of Indian River Shores, and unincorporated Indian River County by placing approximately 123,800 cubic yards of beach compatible sand to create a beach berm and dune. Salt-tolerant dune vegetation will be planted on the restored dunes. Beach compatible sand will be obtained from the Stewart Materials Fort Pierce mine, and shall meet the "Geotechnical Requirements" described in the Technical Specifications and Contract Documents. Upland staging and construction access areas are located at Tracking Station Park, Jaycee Park and Conn Beach, and Humiston Park.
Work on this project must comply with all local, state, and federal regulating agency criteria and permits.

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Project Name: Sector 5 Beach and Dune Restoration Project
Bid Number: 2019066

ARTICLE 3 – ENGINEER

3.01 The Indian River County Public Works Department is hereinafter called the ENGINEER and will act as OWNER's representative, assume all duties and responsibilities, and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Days to Achieve Substantial Completion, Final Completion and Final Payment*

A. The Work will be substantially completed on or before the **180** calendar day after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions on or before the **210** calendar day after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

A. CONTRACTOR and OWNER recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. Liquidated damages will commence for this portion of work. The parties also recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty), CONTRACTOR shall pay OWNER **$2,712** for each calendar day that expires after the time specified in paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if CONTRACTOR shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER **$2,712** for each calendar day that expires after the time specified in paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 - CONTRACT PRICE

5.01 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents, an amount in current funds equal to the sum of the amounts determined pursuant to paragraph 5.01.A and summarized in paragraph 5.01.B, below:

A. For all Work, at the prices stated in CONTRACTOR's Bid, attached hereto as an exhibit.

B. THE CONTRACT SUM subject to additions and deductions provided in the Contract:

Numerical Amount: $_____

Written Amount: _____

_____

ARTICLE 6 - PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions and the Contract Documents.

6.02 *Progress Payments.*

A. The OWNER shall make progress payments to the CONTRACTOR on the basis of the approved partial payment request as recommended by ENGINEER in

accordance with the provisions of the Local Government Prompt Payment Act, Florida Statutes section 218.70 et. seq. The OWNER shall retain ten percent (10%) of the payment amounts due to the CONTRACTOR until fifty percent (50%) completion of the work. After fifty percent (50%) completion of the work is attained as certified to OWNER by ENGINEER in writing, OWNER shall retain five percent (5%) of the payment amount due to CONTRACTOR until final completion and acceptance of all work to be performed by CONTRACTOR under the Contract Documents. Pursuant to Florida Statutes section 218.735(8)(b), fifty percent (50%) completion means the point at which the County as OWNER has expended fifty percent (50%) of the total cost of the construction services work purchased under the Contract Documents, together with all costs associated with existing change orders and other additions or modifications to the construction services work provided under the Contract Documents.

6.03 *Pay Requests.*

A. Each request for a progress payment shall be submitted on the application for payment form supplied by OWNER and the application for payment shall contain the CONTRACTOR'S certification. All progress payments will be on the basis of progress of the work measured by the schedule of values established, or in the case of unit price work based on the number of units completed. After fifty percent (50%) completion, and pursuant to Florida Statutes section 218.735(8)(d), the CONTRACTOR may submit a pay request to the County as OWNER for up to one half (1/2) of the retainage held by the County as OWNER, and the County as OWNER shall promptly make payment to the CONTRACTOR unless such amounts are the subject of a good faith dispute; the subject of a claim pursuant to Florida Statutes section 255.05; or otherwise the subject of a claim or demand by the County as OWNER or the CONTRACTOR. The CONTRACTOR acknowledges that where such retainage is attributable to the labor, services, or materials supplied by one or more subcontractors or suppliers, the Contractor shall timely remit payment of such retainage to those subcontractors and suppliers. Pursuant to Florida Statutes section 218.735(8)(c), CONTRACTOR further acknowledges and agrees that: 1) the County as OWNER shall receive immediate written notice of all decisions made by CONTRACTOR to withhold retainage on any subcontractor at greater than five percent (5%) after fifty percent (50%) completion; and 2) CONTRACTOR will not seek release from the County as OWNER of the withheld retainage until the final pay request.

6.04 Paragraphs 6.02 and 6.03 do not apply to construction services work purchased by the County as OWNER which are paid for, in whole or in part, with federal funds and are subject to federal grantor laws and regulations or requirements that are contrary to any provision of the Local Government Prompt Payment Act. In such event, payment and retainage provisions shall be governed by the applicable grant requirements and guidelines.

6.05 *Acceptance of Final Payment as Release*.

A. The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER from all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with the work under this Contract and for every act and neglect of the OWNER and others relating to or arising out of the work. Any payment, however, final or otherwise,

shall not release the CONTRACTOR or its sureties from any obligations under the Contract Documents or the Public Construction Bond.

ARTICLE 7 - INDEMNIFICATION

7.01 CONTRACTOR shall indemnify OWNER, ENGINEER, and others in accordance with paragraph 6.20 (*Indemnification*) of the General Conditions to the Construction Contract.

ARTICLE 8 - CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce OWNER to enter into this Agreement CONTRACTOR makes the following representations:

A. CONTRACTOR has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. CONTRACTOR has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. CONTRACTOR is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. CONTRACTOR has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which have been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.

E. CONTRACTOR has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, including applying the specific means, methods, techniques, sequences, and procedures of construction, if any, expressly required by the Contract Documents to be employed by CONTRACTOR, and safety precautions and programs incident thereto

F. CONTRACTOR does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Contract Documents.

H. CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that CONTRACTOR has discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 00520-1 to 00520-9, inclusive);

2. Notice to Proceed (page 00550-1);

3. Public Construction Bond (pages 00610-1 to 00610-3, inclusive);

4. Sample Certificate of Liability Insurance (page 00620-1);

5. Contractor's Application for Payment (pages 00622-1 to 00622-5 inclusive);

6. General Conditions (pages 00700-1 to 00700-44 inclusive);

7. Technical Specifications as listed in Division 1;

8. Drawings consisting of a cover sheet and sheets numbered C-1 through D-1, inclusive, with each sheet bearing the following general title: Sector 5 Beach and Dune Restoration Project;

9. Addenda (numbers _____ to _____, inclusive);

10. Appendices to this Agreement (enumerated as follows):

APPENDIX A: DAILY QUALITY CONTROL REPORT

APPENDIX B: CONSTRUCTION EASEMENT DESCRIPTIONS

APPENDIX C: SEDIMENT QAQC PLAN

APPENDIX D: ENVIRONMENTAL PERMITS

11. CONTRACTOR'S BID (pages 00310-1 to 00310-6, inclusive);

12. Bid Bond (page 00430-1);

13. Sworn Statement Under Section 105.08, Indian River County Code, on Disclosure of Relationships (pages 00452-1 to 00452-2, inclusive);

14. Sworn Statement Under the Florida Trench Safety Act (pages 00454-1 to 00454-2, inclusive);

15. Qualifications Questionnaire (pages 00456-1 to 00456-4, inclusive);

16. List of Subcontractors (page 00458-1);

17. Certification Regarding Prohibition Against Contracting with Scrutinized Companies (page 00460-1);

18. Contractor Equipment Schedule (page 00462-1);

19. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

    a) Written Amendments;

    b) Work Change Directives;

    c) Change Order(s);

20. Contractor's Final Certification of the Work (pages 00632-1 to 00632-2, inclusive);

ARTICLE 10 - MISCELLANEOUS

10.01 *Terms*

A. Terms used in this Agreement will have the meanings indicated in the General Conditions.

10.02 *Assignment of Contract*

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

A. OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Venue*

A. This Contract shall be governed by the laws of the State of Florida. Venue for any lawsuit brought by either party against the other party or otherwise arising out of this Contract shall be in Indian River County, Florida, or, in the event of a federal jurisdiction, in the United States District Court for the Southern District of Florida.

10.06 *Public Records Compliance*

A. Indian River County is a public agency subject to Chapter 119, Florida Statutes. The Contractor shall comply with Florida's Public Records Law. Specifically, the Contractor shall:

(1) Keep and maintain public records required by the County to perform the service.

(2) Upon request from the County's Custodian of Public Records, provide the County with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119 or as otherwise provided by law.

(3) Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of the contract if the contractor does not transfer the records to the County.

(4) Upon completion of the contract, transfer, at no cost, to the County all public records in possession of the Contractor or keep and maintain public records required by the County to perform the service. If the Contractor transfers all public records to the County upon completion of the contract, the Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the contractor keeps and maintains public records upon completion of the contract, the Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the County, upon request from the Custodian of Public Records, in a format that is compatible with the information technology systems of the County.

B. **IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT:**

(772) 226-1424
publicrecords@ircgov.com
Indian River County Office of the County Attorney
1801 27th Street
Vero Beach, FL 32960

C. Failure of the Contractor to comply with these requirements shall be a material breach of this Agreement.

ARTICLE 11 – FEDERAL CLAUSES

11.01 OWNER and CONTRACTOR will adhere to the following, as applicable to this work.

A. Equal Employment Opportunity. During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

B. Compliance with the Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708):

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed

on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The OWNER shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1) through (4) of this section.

C. Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended.

(1) The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.

(2) The contractor agrees to report each violation to the (name of the state agency or local or Indian tribal government) and understands and agrees that the (name of the state agency or local or Indian tribal government) will, in turn, report each violation as required to assure notification to the (name of recipient), Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

(3) The contractor agrees to include these requirements in each subcontract exceeding $100,000 financed in whole or in part with Federal assistance provided by FEMA.

(4) The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.

(5) The contractor agrees to report each violation to the (name of the state agency or local or Indian tribal government) and understands and agrees that the (name of the state agency or local or Indian tribal government) will, in turn, report each violation as required to assure notification to the (name of recipient), Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

(6) The contractor agrees to include these requirements in each subcontract exceeding $100,000 financed in whole or in part with Federal assistance provided by FEMA.

D. Energy Policy and Conservation Act – The Contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

E. Suspension and Debarment

(1) This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such the contractor is required to verify that none of the contractor, its principals (defined at 2 C.F.R. § 180.995), or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

(2) The contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.

(3) This certification is a material representation of fact relied upon by Indian River County. If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to (name of state agency serving as recipient and Indian River County), the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

(4) The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

F. Byrd Anti-Lobbying Amendment (31 U.S.C. § 1352 (as amended)—Contractors who apply or bid for an award of $100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient.

G. Procurement of Recycled/Recovered Materials:

(1) In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired—

(i) Competitively within a timeframe providing for compliance with the contract performance schedule;

(ii) Meeting contract performance requirements; or

(iii) At a reasonable price.

(2) Information about this requirement is available at EPA's Comprehensive Procurement Guidelines we b site, https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program. The list of EPA-designate items is available at http://www.epa.gov/cpg/products.htm.

H. Access to Records: The following access to records requirements apply to this contract:

(1) The contractor agrees to provide (insert name of state agency or local or Indian tribal government), Indian River County, the FEMA Administrator, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.

(2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

(3) The contractor agrees to provide the FEMA Administrator or his authorized representatives access to construction or other work sites pertaining to the work being completed under the contract.

I. DHS Seal, Logo, and Flags: The contractor shall not use the DHS seal(s), logos, crests, or reproductions of flags or likenesses of DHS agency officials without specific FEMA pre-approval.

J. Compliance with Federal Law, Regulations, and Executive Orders: This is an acknowledgement that FEMA financial assistance will be used to fund the contract only. The contractor will comply will all applicable federal law, regulations, executive orders, FEMA policies, procedures, and directives.

K. No Obligation by Federal Government: The Federal Government is not a party to this contract and is not subject to any obligations or liabilities to the non-Federal entity, contractor, or any other party pertaining to any matter resulting from the contract.

L. Program Fraud and False or Fraudulent Statements or Related Acts: The contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the contractor's actions pertaining to this contract.

M. AFFIRMATIVE STEPS: CONTRACTOR shall take the following affirmative steps to ensure minority business, women's business enterprises and labor surplus area firms are used when possible:
(1) Placing qualified small and minority businesses and women's business enterprises on solicitation lists.
(2) Ensuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources.
(3) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises.
(4) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises.
(5) Using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

ARTICLE 12 - TERMINATION OF CONTRACT

A. The occurrence of any of the following shall constitute a default by CONTRACTOR and shall provide the OWNER with a right to terminate this Contract in accordance with this Article, in addition to pursuing any other remedies which the OWNER may have under this Contract or under law:

(1) if in the OWNER's opinion CONTRACTOR is improperly performing work or violating any provision(s) of the Contract Documents;

(2) if CONTRACTOR neglects or refuses to correct defective work or replace defective parts or equipment, as directed by the Engineer pursuant to an inspection;

(3) if in the OWNER's opinion CONTRACTOR's work is being unnecessarily delayed and will not be finished within the prescribed time;

(4) if CONTRACTOR assigns this Contract or any money accruing thereon or approved thereon; or

(5) if CONTRACTOR abandons the work, is adjudged bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for CONTRACTOR or for any of his property.

B. OWNER shall, before terminating the Contract for any of the foregoing reasons, notify CONTRACTOR in writing of the grounds for termination and provide CONTRACTOR with ten (10) calendar days to cure the default to the reasonable satisfaction of the OWNER.

C. If the CONTRACTOR fails to correct or cure within the time provided in the preceding Sub-Article B, OWNER may terminate this Contract by notifying CONTRACTOR in writing. Upon receiving such notification, CONTRACTOR shall immediately cease all work hereunder and shall forfeit any further right to possess or occupy the site or any materials thereon; provided, however, that the OWNER may authorize CONTRACTOR to restore any work sites.

D. The CONTRACTOR shall be liable for:

(1) any new cost incurred by the OWNER in soliciting bids or proposals for and letting a new contract; and

(2) the difference between the cost of completing the new contract and the cost of completing this Contract;

(3) any court costs and attorney's fees associated with any lawsuit undertaken by OWNER to enforce its rights herein.

E. TERMINATION FOR CONVENIENCE: OWNER may at any time and for any reason terminate CONTRACTOR's services and work for OWNER's convenience. Upon receipt of notice of such termination CONTRACTOR shall, unless the notice directs otherwise, immediately discontinue the work and immediately cease ordering of any materials, labor, equipment, facilities, or supplies in connection with the performance of this Contract. Upon such termination Contractor shall be entitled to payment only as follows:

(1) the actual cost of the work completed in conformity with this Contract and the specifications; plus,

(2) such other costs actually incurred by CONTRACTOR as are permitted by the prime contract and approved by the OWNER.

Contractor shall not be entitled to any other claim for compensation or damages against the County in the event of such termination.

F. TERMINIATION IN REGARDS TO F.S. 287.135: TERMINATION IN REGARDS TO F.S. 287.135: CONTRACTOR certifies that it and those related entities of CONTRACTOR as defined by Florida law are not on the Scrutinized Companies that Boycott Israel List, created pursuant to s. 215.4725 of the Florida Statutes, and are not engaged in a boycott of Israel. In addition, if this agreement is for goods or services of one million dollars or more, CONTRACTOR certifies that it and those related entities of CONTRACTOR as defined by Florida law are not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to Section 215.473 of the Florida Statutes and are not engaged in business operations in Cuba or Syria.

OWNER may terminate this Contract if CONTRACTOR is found to have submitted a false certification as provided under section 287.135(5), Florida Statutes, been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or been engaged in business operations in Cuba or Syria, as defined by section 287.135, Florida Statutes.

OWNER may terminate this Contract if CONTRACTOR, including all wholly owned subsidiaries, majority-owned subsidiaries, and parent companies that exist for the purpose of making profit, is found to have been placed on the Scrutinized Companies that Boycott Israel List or is engaged in a boycott of Israel as set forth in section 215.4725, Florida Statutes.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have signed this Agreement in duplicate. One counterpart each has been delivered to OWNER and CONTRACTOR. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or on their behalf.

This Agreement will be effective on _____, 20___ (the date the Contract is approved by the Indian River County Board of County Commissioners, which is the Effective Date of the Agreement).

OWNER:

INDIAN RIVER COUNTY

By: _____
Bob Solari, Chairman

By: _____
Jason E. Brown, County Administrator

APPROVED AS TO FORM AND LEGAL SUFFICIENCY:

By: _____
Dylan Reingold, County Attorney

Jeffrey R. Smith, Clerk of Court and Comptroller

Attest: _____
Deputy Clerk
(SEAL)

CONTRACTOR:

_____

By: _____
(Contractor)

(CORPORATE SEAL)

Attest _____

Address for giving notices:
_____
_____
_____

License No. _____
(Where applicable)

Agent for service of process: _____

Designated Representative:
Name: _____
Title: _____
Address:
_____
_____
Phone: _____
Facsimile: _____
(If CONTRACTOR is a corporation or a partnership, attach evidence of authority to sign.)

*** * END OF SECTION * ***

SECTION 00550 - Notice to Proceed

Dated _____

TO:

_____
(BIDDER)

ADDRESS:

_____

_____

_____

Contract For:

Sector 5 Beach and Dune Restoration Project

_____

IRC Bid No. 2019066

You are notified that the Contract Times under the above contract will commence to run on _____. By that date, you are to start performing your obligations under the Contract Documents. The contract has allocated **180** calendar days for Substantial Completion of this project and **210** calendar days for Final Completion. In accordance with Article 4 of the Agreement the date of Substantial Completion is _____ and the date of readiness for final payment is _____.

CONTRACTOR shall not commence work under this Contract until he has obtained all insurance required under Article 5 and such insurance has been delivered to the OWNER and approved by the OWNER, nor shall the CONTRACTOR allow any Subcontractor to commence work on his subcontract until all similar insurance required of the Subcontractor has been so obtained and approved. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing *defective* Work in accordance with Article 13.

Also, before you may start any Work at the Site, you must:
(add other requirements, if applicable)

_____

_____

_____

INDIAN RIVER COUNTY
(OWNER)

By:_____
(AUTHORIZED SIGNATURE)

_____
(TITLE)

00610 - PUBLIC CONSTRUCTION BOND

INSTRUCTION FOR PUBLIC CONSTRUCTION BOND

The front or cover page to the required public construction payment and performance bond shall contain the information required by Fla. Stat. 255.05(1)(a), and be substantially in the format shown on the first page following this instruction.

The Public Construction Bond shall be in the form suggested by Fla. Stat. 255.05(3) as shown on the second page following this instruction.

A Power of Attorney from a surety insurer authorized to do business in Florida, authorizing the signature of the Attorney in Fact who executes the Public Construction Bond shall accompany that Bond.

Public Work
F.S. Chapter 255.05 (1)(a)
Cover Page

THIS BOND IS GIVEN TO COMPLY WITH SECTION 255.05 OR SECTION 713.23 FLORIDA STATUTES, AND ANY ACTION INSTITUTED BY A CLAIMANT UNDER THIS BOND FOR PAYMENT MUST BE IN ACCORDANCE WITH THE NOTICE AND TIME LIMITATION PROVISIONS IN SECTION 255.05(2) OR SECTION 713.23 FLORIDA STATUTES.

BOND NO: _____

CONTRACTOR NAME: _____

CONTRACTOR ADDRESS: _____

_____

CONTRACTOR PHONE NO: _____

SURETY COMPANY NAME: _____

SURETY PRINCIPAL BUSINESS ADDRESS: _____

_____

SURETY PHONE NO: _____

OWNER NAME: _____

OWNER ADDRESS: _____

_____

OWNER PHONE NO: _____

OBLIGEE NAME: _____
(If contracting entity is different from the owner, the contracting public entity)

OBLIGEE ADDRESS: _____

_____

OBLIGEE PHONE NO: _____

BOND AMOUNT: _____

CONTRACT NO: _____
(If applicable)

DESCRIPTION OF WORK: _____

_____

PROJECT LOCATION: _____

_____

LEGAL DESCRIPTION: _____
(If applicable)

FRONT PAGE

All other bond page(s) are deemed subsequent to this page regardless of any page number(s) that may be printed thereon.

PUBLIC CONSTRUCTION BOND

Bond No._____
(enter bond number)

BY THIS BOND, We _____, as Principal and _____ _____, a corporation, as Surety, are bound to _____ _____, herein called Owner, in the sum of $_____, for payment of which we bind ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally.

THE CONDITION OF THIS BOND is that if Principal:

1. Performs the contract dated _____, _____, between Principal and Owner for construction of _____, the contract being made a part of this bond by reference, at the times and in the manner prescribed in the contract; and
2. Promptly makes payments to all claimants, as defined in Section 255.05(1), Florida Statutes, supplying Principal with labor, materials, or supplies, used directly or indirectly by Principal in the prosecution of the work provided for in the contract; and
3. Pays Owner all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that Owner sustains because of a default by Principal under the contract; and
4. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this bond is void; otherwise it remains in full force.

Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05(2), Florida Statutes.

Any changes in or under the contract documents and compliance or noncompliance with any formalities connected with the contract or the changes does not affect Surety's obligation under this bond.

DATED ON _____,

_____
(Name of Principal)

By _____
(As Attorney in Fact)

_____
(Name of Surety)

SECTION 00620 - Sample Certificate of Liability Insurance

CERTIFICATE OF LIABILITY INSURANCE

PRODUCER	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.
	COMPANIES AFFORDING COVERAGE
INSURED	COMPANY A -
	COMPANY B -
	COMPANY C -
	COMPANY D -
	COMPANY E -

COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED NOTWITHSTANDING ANY REQUIREMENT TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN THE INSURANCE ACCORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/D/YY)	LIMITS	
A	GENERAL LIABILITY ☐ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS MADE - ☐OCCUR ☐ ☐ ☐ ☐				EACH OCCURRENCE	$ 1,000,000
					FIRE DAMAGE (Any One Fire)	$ 50,000
					MED. EXP. (Any One Person)	$ 5,000
					PERSONAL & ADV INJURY	$ 1,000,000
					GENERAL AGGREGATE	$ 1,000,000
					PRODUCTS – COMP/OP AGG.	$ 1,000,000
						$
A	AUTOMOBILE LIABILITY ☐ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON-OWNED AUTOS ☐ ☐				COMBINED SINGLE LIMIT (Ea. Occurrence)	$ 1,000,000
					BODILY INJURY (Per Person)	$
					BODILY INJURY (Per Accident)	$
					PROPERTY DAMAGE	$
	GARAGE LIABILITY ☐ ☐				AUTO ONLY – EA ACCIDENT	$
					OTHER THAN EA ACC	$
					AUTO ONLY AGG	$
A	EXCESS LIABILITY ☐ ☐ CLAIMS MADE ☐ DEDUCTIBLE ☐ RETENTION $				EACH OCCURRENCE	
					AGGREGATE	$
						$
						$
A	WORKER'S COMPENSATION AND EMPLOYER'S LIABILITY THE PROPRIETOR/PARTNERS/ EXECUTIVE OFFICERS ARE: ☐ INCL ☐ EXCL				☐WC STATUTORY LIMITS	
					E.L. EACH ACCIDENT	$ 100,000
					E.L. DISEASE – EA	$ 500,000
					E.L. DISEASE-POLICY LIMIT	$ 100,000
	OTHER: BUILDER'S RISK				FULL REPLACEMENT COST OF THE WORK	

DESCRIPTION OF OPERATIONS/LOCATIONS VEHICLES/SPECIAL ITEMS

CERTIFICATE HOLDER	ADDITIONAL INSURED; INSURER LETTER:	CANCELLATION
ADDITIONAL INSURED: INDIAN RIVER COUNTY 1801 27TH STREET, VERO BEACH, FL 32960-3388		SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT. FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE

SECTION 00622 - Contractor's Application for Payment
Sector 5 Beach and Dune Restoration Project

Application for Payment No. _____.
For Work Accomplished through the period of _____ through _____.

To: Indian River County (OWNER)
From: _____ (CONTRACTOR)
Bid No.: 2019066

1) Attach detailed schedule and copies of all paid invoices.

1.	Original Contract Price:	$
2.	Net change by Change Orders and Written Amendments (+ or -):	$
3.	Current Contract Price (1 plus 2):	$
4.	Total completed and stored to date:	$
5.	Retainage (per Agreement):	
	_____% of completed Work:	
	_____% of retainage: $	
	Total Retainage:	$
6.	Total completed and stored to date less retainage (4 minus 5):	$
7.	Less previous Application for Payments:	$
8.	**DUE THIS APPLICATION (6 MINUS 7):**	$

CONTRACTOR'S CERTIFICATION:

UNDER PENALTY OF PERJURY, the undersigned CONTRACTOR certifies that (1) the labor and materials listed on this request for payment have been used in the construction of this Work; (2) payment received from the last pay request has been used to make payments to all subcontractors, laborers, materialmen and suppliers except as listed on Attachment A, below; (3) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to OWNER indemnifying OWNER against any such Lien, security interest or encumbrance); (4) all Work covered by this Application for Payment is in accordance with the Contract Documents and not defective; and (5) If this Periodic Estimate is for a Final Payment to project or improvement, I further certify that all persons doing work upon or furnishing materials or supplies for this project or improvement under this foregoing contract have been paid in full, and that all taxes imposed by Chapter 212 Florida Statutes, (Sales and Use Tax Act, as Amended) have been paid and discharged, and that I have no claims against the OWNER.

Attached to or submitted with this form are:

1. Signed release of lien forms (partial or final as applicable) from all subcontractors, laborers, materialmen and suppliers except as listed on Attachment A, together with an explanation as to why any release of lien form is not included;

2. Updated Construction Schedule per Specification Section 01310.

Dated _____ By: _____
(CONTRACTOR – must be signed by an Officer of the Corporation)

_____
Print Name and Title

STATE OF FLORIDA
COUNTY OF INDIAN RIVER

Before me, a Notary Public, duly commissioned, qualified, and acting, personally appeared _____, who being by me first duly sworn upon oath, says that he/she is the _____ of the CONTRACTOR mentioned above and that he/she has been duly authorized to act on behalf of it, and that he/she executed the above Contractor's Application for Payment and Contractor's Certification statement on behalf of said CONTRACTOR; and that all of the statements contained herein are true, correct, and complete. Subscribed and sworn to before me this _____ day of_____, 20____.

_____ is personally known to me or has produced _____ as identification.

NOTARY PUBLIC: _____

(SEAL) Printed name: _____

Commission No.:_____

Commission Expiration: _____

Please remit payment to:

Contractor's Name: _____

Address: _____

_____

****

[The remainder of this page was left blank intentionally]

SURETY'S CONSENT OF PAYMENT TO CONTRACTOR:

The Surety, _____
_____
_____, a corporation, in accordance with Public Construction Bond Number _____, hereby consents to payment by the OWNER to the CONTRACTOR, for the amounts specified in this CONTRACTOR's APPLICATION FOR PAYMENT.

TO BE EXECUTED BY CORPORATE SURETY:

Attest:

_____ _____
Secretary Corporate Surety

_____
_____
_____
Business Address

BY: _____
Print Name: _____
Title: _____

(Affix Corporate SEAL)

STATE OF FLORIDA
COUNTY OF INDIAN RIVER

Before me, a Notary Public, duly commissioned, qualified, and acting, personally appeared _____, to me well known or who produced _____ as identification, who being by me first duly sworn upon oath, says that he/she is the _____ for _____ and that he/she has been authorized by _____it to approve payment by the OWNER to the CONTRACTOR of the foregoing Contractor's Application for Payment. Subscribed and sworn to before me this _____ day of ____, 20_____.

_____
Notary Public, State of _____
My Commission Expires: _____

****

[The remainder of this page was left blank intentionally]

CERTIFICATION OF ENGINEER:

I certify that I have reviewed the above and foregoing Periodic Estimate for Partial Payment; that to the best of my knowledge and belief it appears to be a reasonably accurate statement of the work performed and/or material supplied by the Contractor. I am not certifying as to whether or not the Contractor has paid all subcontractors, laborers, materialmen and suppliers because I am not in a position to accurately determine that issue.

Dated _____ _____

SIGNATURE

CERTIFICATION OF INSPECTOR:

I have checked the estimate against the Contractor's Schedule of Amounts for Contract Payments and the notes and reports of my inspections of the project. To the best of my knowledge, this statement of work performed and/or materials supplied appears to be reasonably accurate, that the Contractor appears to be observing the requirements of the Contract with respect to construction, and that the Contractor should be paid the amount requested above, unless otherwise noted by me. I am not certifying as to whether or not the Contractor has paid all subcontractors, laborers, materialmen and suppliers because I am not in a position to accurately determine that issue.

Dated _____ _____

SIGNATURE

****

[The Remainder of This Page Was Left Blank Intentionally]

ATTACHMENT A

1. **List of all subcontractors, laborers, materialmen and suppliers who have not been paid from the payment received from the last Pay Request and the reason why they were not paid (attach additional pages as necessary):**

2. **List of all subcontractors, laborers, materialmen and suppliers for which a signed release of lien form (partial or final as applicable) is not included with this Pay Request, together with an explanation as to why the release of lien form is not included (attach additional pages as necessary):**

SECTION 00630 - Certificate of Substantial Completion

Date of Issuance: _____, 20__

OWNER: Indian River County
CONTRACTOR: _____
OWNER's Bid No. 2019066
Project Description: Sector 5 Beach and Dune Restoration Project

CONTRACT FOR: Sector 5 Beach and Dune Restoration Project

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

_____
_____
_____
_____
_____
_____
_____

To: _____
OWNER

And To: _____
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

_____
DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within **30** calendar days of the above date of Substantial Completion.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees shall be as follows:

OWNER: _____

_____

_____

CONTRACTOR: _____

_____

_____

The following documents are attached to and made a part of this Certificate:

[For items to be attached see definition of Substantial Completion as supplemented and other specifically noted conditions precedent to achieving Substantial Completion as required by Contract Documents.]

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on: _____ (Date).

ENGINEER: _____

By: _____
(Authorized Signature)

CONTRACTOR accepts this Certificate of Substantial Completion on _____ (date).

CONTRACTOR: _____

By: _____
(Authorized Signature)

OWNER accepts this Certificate of Substantial Completion on _____ (date).

OWNER: INDIAN RIVER COUNTY

By: _____
(Authorized Signature)

*** * END OF SECTION * ***

SECTION 00632 - CONTRACTOR'S FINAL CERTIFICATION OF THE WORK

(TO ACCOMPANY CONTRACTOR'S FINAL APPLICATION FOR PAYMENT)

PROJECT NAME: **SECTOR 5 BEACH AND DUNE RESTORATION PROJECT**

STATE OF _____
COUNTY OF _____

Personally before me the undersigned officer, authorized by the laws of said state to administer oaths, comes _____ , who on oath says: That he is the CONTRACTOR with whom Indian River County, Florida, a political subdivision of said state, did on the _____ day of _____ ,20____, enter into a contract for the performance of certain work, more particularly described as follows:

UNDER PENALTY OF PERJURY, affiant further says that said construction has been completed and the Contract therefore fully performed and final payment is now due and that all liens of all firms and individuals contracting directly with or directly employed by such CONTRACTOR have been paid in full EXCEPT:

Name	Description/Amount
_____	_____
_____	_____

who have not been paid and who are due the amount set forth.

Affiant further says that:

1. CONTRACTOR has reviewed the Contract Documents.
2. CONTRACTOR has reviewed the Work for compliance with the Contract Documents.
3. CONTRACTOR has completed the Work in accordance with the Contract Documents.
4. All equipment and systems have been tested in the presence of the ENGINEER or his representative and are fully operational with no defects or deficiencies except as listed below.

   _____

   _____

   _____
5. The Work is complete and ready for final acceptance by the OWNER.

6. CONTRACTOR hereby certifies that it has no claims against the OWNER.

(Corporate Seal)

_____
(Contractor)

By: _____

Subscribed and sworn to before me this ___ day of _____, 20____.

_____
Notary Public State of Florida at Large
My Commission expires: _____

+ + END OF SECTION + +

SECTION 00634 - PROFESSIONAL SURVEYOR AND MAPPER'S CERTIFICATION AS TO ELEVATIONS AND LOCATIONS OF THE WORK

(TO BE COMPLETED BY A FLORIDA PROFESSIONAL SURVEYOR AND MAPPER RETAINED BY THE CONTRACTOR AND TO ACCOMPANY CONTRACTOR'S FINAL APPLICATION FOR PAYMENT)

I CERTIFY that I am a Florida Professional Surveyor and Mapper retained by:

_____

_____

(Insert name of CONTRACTOR)

Who is the CONTRACTOR for the following Project:

PROJECT NAME: SECTOR 5 BEACH AND DUNE RESTORATION PROJECT

I FURTHER CERTIFY that I have personally performed the survey work for the preparation of Record Drawings for the CONTRACTOR for this project or that such work was performed under my direct control and supervision.

I FURTHER CERTIFY that all constructed elevations and locations of the Work are in conformance with the Contract Documents, except for discrepancies listed below.

_____

_____

_____

[Attach additional sheets as necessary]

(SURVEYOR'S SEAL)

CERTIFIED BY: _____

Printed Name: _____

Florida Professional Surveyor and Mapper Registration Number: _____

Date Signed and Sealed by Professional Surveyor and Mapper: _____

Company Name: _____

Company Address: _____

_____

Telephone Number: _____

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

———————————

AMERICAN CONSULTING ENGINEERS COUNCIL

———————————

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Construction Specifications Institute

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American Consulting Engineers Council
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American Society of Civil Engineers
345 East 47th Street, New York, NY 10017

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ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Contract Documents and printed with initial or all capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between OWNER and CONTRACTOR covering the Work.

3. *Application for Payment*--The form acceptable to ENGINEER which is to be used by CONTRACTOR during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

7. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, Bid security form, if any, and the Bid form with any supplements.

8. *Bonds*--Performance and payment bonds and other instruments of security.

9. *Change Order*--A document recommended by ENGINEER which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by OWNER or CONTRACTOR seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the OWNER and CONTRACTOR concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*--The Contract Documents establish the rights and obligations of the parties and include the Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER's written interpretations and clarifications issued on or after the Effective Date of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or hard copies of the items listed in this paragraph are Contract Documents. Files in electronic media format of text, data, graphics, and the like that may be furnished by OWNER to CONTRACTOR are not Contract Documents.

13. *Contract Price*--The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Substantial Completion; and (ii) complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment.

15. *CONTRACTOR*--The individual or entity with whom OWNER has entered into the Agreement.

16. *Cost of the Work*--See paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by ENGINEER which graphically shows the scope, extent, and character of the Work to be performed by CONTRACTOR. Shop Drawings and other CONTRACTOR submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *ENGINEER*--The individual or entity named as such in the Agreement.

~~20. *ENGINEER's Consultant*--An individual or entity having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.~~

21. *Field Order*--A written order issued by ENGINEER which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

22. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

23. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

24. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

25. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

27. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

28. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon timely compliance by the apparent successful bidder with the conditions precedent listed therein, OWNER will sign and deliver the Agreement.

29. *Notice to Proceed*--A written notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform the Work under the Contract Documents.

30. *OWNER*--The individual, entity, public body, or authority with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be performed.

31. *Partial Utilization*--Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

32. *PCBs*--Polychlorinated biphenyls.

33. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

34. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part as may be indicated elsewhere in the Contract Documents.

35. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

36. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

37. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which

establish the standards by which such portion of the Work will be judged.

39. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

40. *Site*--Lands or areas indicated in the Contract Documents as being furnished by OWNER upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by OWNER which are designated for the use of CONTRACTOR.

41. *Specifications*--That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

42. *Subcontractor*--An individual or entity having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the Site.

43. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

44. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

45. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

46. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

47. *Unit Price Work*--Work to be paid for on the basis of unit prices.

48. *Work*--The entire completed construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

49. *Work Change Directive*--A written statement to CONTRACTOR issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

50. *Written Amendment*--A written statement modifying the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

1.02 *Terminology*

A. *Intent of Certain Terms or Adjectives*

1. Whenever in the Contract Documents the terms "as allowed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of ENGINEER as to the Work, it is intended that such action or determination will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct

the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.10 or any other provision of the Contract Documents.

B. *Day*

1. The word "day" shall constitute a calendar day of 24 hours measured from midnight to the next midnight.

C. *Defective*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.04 or 14.05).

D. *Furnish, Install, Perform, Provide*

1. ~~The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.~~

~~2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.~~

~~3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.~~

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of CONTRACTOR, "provide" is implied.

E. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 *Delivery of Bonds*

A. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish.

2.02 *Copies of Documents*

A. OWNER shall furnish to CONTRACTOR up to ten copies of the Contract Documents. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the ninetieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *CONTRACTOR's Review of Contract Documents:* Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error, ambiguity, or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected

thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless CONTRACTOR knew or reasonably should have known thereof.

B. *Preliminary Schedules:* Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for its timely review:

1. a preliminary progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing, and processing such submittal; and

3. a preliminary schedule of values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

~~C. *Evidence of Insurance:* Before any Work at the Site is started, CONTRACTOR and OWNER shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which CONTRACTOR and OWNER respectively are required to purchase and maintain in accordance with Article 5.~~

2.06 *Preconstruction Conference*

~~A. Within 20 days after the Contract Times start to run, but before any Work at the Site is started, a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in paragraph 2.05.B, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.~~

2.07 *Initial Acceptance of Schedules*

A. Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER, and others as appropriate will be held to review for acceptability to ENGINEER as provided below the schedules submitted in accordance with paragraph 2.05.B. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until acceptable schedules are submitted to ENGINEER.

1. The progress schedule will be acceptable to ENGINEER if it provides an orderly progression of the Work to completion within any specified Milestones and the Contract Times. Such acceptance will not impose on ENGINEER responsibility for the progress schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefor.

2. CONTRACTOR's schedule of Shop Drawing and Sample submittals will be acceptable to ENGINEER if it provides a workable arrangement for reviewing and processing the required submittals.

3. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to OWNER.

C. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in Article 9.

3.02 *Reference Standards*

A. *Standards, Specifications, Codes, Laws, and Regulations*

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of OWNER, CONTRACTOR, or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to OWNER, ENGINEER, or any of ENGINEER's Consultants, agents, or employees any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once. CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as required by paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.04; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity, or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways: (i) a Written Amendment; (ii) a Change Order; or (iii) a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways: (i) a Field Order; (ii) ENGINEER's approval of a Shop Drawing or Sample; or (iii) ENGINEER's written interpretation or clarification.

3.05 *Reuse of Documents*

A. CONTRACTOR and any Subcontractor or Supplier or other individual or entity performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, including electronic media editions; and (ii) shall not reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of OWNER and

ENGINEER and specific written verification or adaption by ENGINEER. This prohibition will survive final payment, completion, and acceptance of the Work, or termination or completion of the Contract. Nothing herein shall preclude CONTRACTOR from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. OWNER shall furnish the Site. OWNER shall notify CONTRACTOR of any encumbrances or restrictions not of general application but specifically related to use of the Site with which CONTRACTOR must comply in performing the Work. OWNER will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If CONTRACTOR and OWNER are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in OWNER's furnishing the Site, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

B. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and OWNER's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that ENGINEER has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that ENGINEER has used in preparing the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER, or any of ENGINEER's Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by CONTRACTOR, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any

Work in connection therewith (except in an emergency as required by paragraph 6.16.A), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *ENGINEER's Review:* After receipt of written notice as required by paragraph 4.03.A, ENGINEER will promptly review the pertinent condition, determine the necessity of OWNER's obtaining additional exploration or tests with respect thereto, and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

C. *Possible Price and Times Adjustments*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in CONTRACTOR's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of paragraphs 9.08 and 11.03.

2. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR's making such final commitment; or

c. CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.03.A.

3. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in paragraph 10.05. However, OWNER, ENGINEER, and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by CONTRACTOR on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to OWNER or ENGINEER by the owners of such Underground Facilities, including OWNER, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and CONTRACTOR shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including OWNER, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the

Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, CONTRACTOR shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility.

2. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, OWNER or CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

4.05 *Reference Points*

A. OWNER shall provide engineering surveys to establish reference points for construction which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the ENGINEER in the preparation of the Contract Documents.

B. *Limited Reliance by CONTRACTOR on Technical Data Authorized:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," CONTRACTOR may not rely upon or make any Claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

1. the completeness of such reports and drawings for CONTRACTOR's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by CONTRACTOR and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. CONTRACTOR shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. CONTRACTOR shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.

D. If CONTRACTOR encounters a Hazardous Environmental Condition or if CONTRACTOR or anyone for whom CONTRACTOR is responsible creates a Hazardous Environmental Condition, CONTRACTOR shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in

connection with such condition and in any area affected thereby (except in an emergency as required by paragraph 6.16); and (iii) notify OWNER and ENGINEER (and promptly thereafter confirm such notice in writing). OWNER shall promptly consult with ENGINEER concerning the necessity for OWNER to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. CONTRACTOR shall not be required to resume Work in connection with such condition or in any affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by CONTRACTOR, either party may make a Claim therefor as provided in paragraph 10.05.

F. If after receipt of such written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in paragraph 10.05. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.06.E shall obligate OWNER to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, other consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by CONTRACTOR or by anyone for whom CONTRACTOR is responsible. Nothing in this paragraph 4.06.F shall obligate CONTRACTOR to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of paragraphs 4.02, 4.03, and 4.04 are not intended to apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

~~A. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as provided otherwise by Laws or Regulations or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Contract Documents~~.

B. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All Bonds signed by an agent must be

accompanied by a certified copy of such agent's authority to act.

C. If the surety on any Bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.01.B, CONTRACTOR shall within 20 days thereafter substitute another Bond and surety, both of which shall comply with the requirements of paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain. ~~OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain.~~

5.04 *CONTRACTOR's Liability Insurance*

A. CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed by CONTRACTOR, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance so required by this paragraph 5.04 to be purchased and maintained shall:

1. with respect to insurance required by paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.07, 6.11, and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR pursuant to paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing, or replacing defective Work in accordance with paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter).

5.05 *OWNER's Liability Insurance*

~~A. In addition to the insurance required to be provided by CONTRACTOR under paragraph 5.04, OWNER, at OWNER's option, may purchase and maintain at OWNER's expense OWNER's own liability insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.~~

5.06 *Property Insurance*

~~A. Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:~~

~~1. include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an additional insured;~~

~~2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;~~

~~3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);~~

~~4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by OWNER prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by ENGINEER;~~

~~5. allow for partial utilization of the Work by OWNER;~~

~~6. include testing and startup; and~~

~~7. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR, and ENGINEER with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.~~

~~B. OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and any other individuals or entities identified in the Supplementary Conditions, each of whom is~~

deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.07.

D. OWNER shall not be responsible for purchasing and maintaining any property insurance specified in this paragraph 5.06 to protect the interests of CONTRACTOR, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by CONTRACTOR, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under paragraph 5.06, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the Site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

5.07 *Waiver of Rights*

A. OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraph 5.06 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. OWNER and CONTRACTOR waive all rights against each other and their respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by OWNER as trustee or otherwise payable under any policy so issued.

B. OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to OWNER's property or the Work caused by, arising out of, or resulting from fire or other peril whether or not insured by OWNER; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to paragraph 14.05, after Substantial Completion pursuant to paragraph 14.04, or after final payment pursuant to paragraph 14.07.

C. Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against CONTRACTOR, Subcontractors, ENGINEER, or ENGINEER's Consultants and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

~~A. Any insured loss under the policies of insurance required by paragraph 5.06 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.08.B. OWNER shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.~~

~~B. OWNER as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, OWNER as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, OWNER as fiduciary shall give bond for the proper performance of such duties.~~

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

~~A. If either OWNER or CONTRACTOR has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by paragraph 2.05.C. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.~~

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. CONTRACTOR shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of OWNER or ENGINEER in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

B. At all times during the progress of the Work, CONTRACTOR shall assign a competent resident superintendent thereto who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR's representative at the Site and shall have authority to act on behalf of CONTRACTOR. All communications given to or received from the superintendent shall be binding on CONTRACTOR.

6.02 *Labor; Working Hours*

A. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out, and construct the Work as required by the Contract Docu-

ments. CONTRACTOR shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday, or any legal holiday without OWNER's written consent (which will not be unreasonably withheld) given after prior written notice to ENGINEER.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the General Requirements, CONTRACTOR shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.07 as it may be adjusted from time to time as provided below.

1. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.07) proposed adjustments in the progress schedule that will not result in changing the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of Article 12. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to ENGINEER for review under the circumstances described below.

1. *"Or-Equal" Items:* If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment ENGINEER determines that: (i) it is at least equal in quality, durability, appearance, strength, and design characteristics; (ii) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole, and;

b. CONTRACTOR certifies that: (i) there is no increase in cost to the OWNER; and (ii) it will conform substantially, even with deviations, to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

a. If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR.

c. The procedure for review by ENGINEER will be as set forth in paragraph 6.05.A.2.d, as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances.

d. CONTRACTOR shall first make written application to ENGINEER for review of a proposed substitute item of material or equipment that CONTRACTOR seeks to furnish or use. The application shall certify that the proposed substitute item will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified, and be suited to the same use as that specified. The application will state the extent, if any, to which the use of the proposed substitute item will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute item from that specified will be identified in the application, and available engineering, sales, maintenance, repair, and replacement services will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute item. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute item.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.05.A.2.

C. *Engineer's Evaluation:* ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.05.A and 6.05.B. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized until ENGINEER's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." ENGINEER will advise CONTRACTOR in writing of any negative determination.

D. *Special Guarantee:* OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute.

E. *ENGINEER's Cost Reimbursement:* ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in evaluating substitute proposed or submitted by CONTRACTOR pursuant to paragraphs 6.05.A.2 and 6.05.B and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER approves a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such proposed substitute.

F. *CONTRACTOR's Expense:* CONTRACTOR shall provide all data in support of any proposed substitute or "or-equal" at CONTRACTOR's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. CONTRACTOR shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to OWNER as indicated in paragraph 6.06.B), whether initially or as a replacement, against whom OWNER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to OWNER in advance for acceptance by OWNER by a specified date prior to the Effective Date of the Agreement, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. CONTRACTOR shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of OWNER or ENGINEER to reject defective Work.

C. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other individual or entity, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR.

E. CONTRACTOR shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with ENGINEER through CONTRACTOR.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.06, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER's Consultants, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

6.07 *Patent Fees and Royalties*

A. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations,

CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants, and the officers, directors, partners, employees or agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto, such as plant investment fees.

6.09 *Laws and Regulations*

A. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

B. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR of CONTRACTOR's obligations under paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work may be the subject of an adjustment in Contract Price or Contract Times. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in paragraph 10.05.

6.10 *Taxes*

A. CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

B. OWNER qualifies for state and local sales tax exemption in the purchase of all material and equipment.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant, and the officers, directors, partners, employees, agents, and other consultants of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or

arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, ENGINEER, or any other party indemnified hereunder to the extent caused by or based upon CONTRACTOR's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work CONTRACTOR shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work CONTRACTOR shall clean the Site and make it ready for utilization by OWNER. At the completion of the Work CONTRACTOR shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. CONTRACTOR shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to ENGINEER for OWNER.

6.13 *Safety and Protection*

A. CONTRACTOR shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. All damage, injury, or loss to any property referred to in paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant, or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, CONTRACTOR is obligated to act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show ENGINEER the services, materials, and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.17.E.

B. CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers, and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.17.E. The numbers of each Sample to be submitted will be as specified in the Specifications.

C. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submittals acceptable to ENGINEER as required by paragraph 2.07, any related Work performed prior to ENGINEER's review and approval of the pertinent submittal will be at the sole expense and responsibility of CONTRACTOR.

D. *Submittal Procedures*

1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto; and

d. CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

3. At the time of each submittal, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

E. *ENGINEER's Review*

1. ENGINEER will timely review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals acceptable to

ENGINEER. ENGINEER's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. ENGINEER's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of each submittal as required by paragraph 6.17.D.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.17.D.1.

F. *Resubmittal Procedures*

1. CONTRACTOR shall make corrections required by ENGINEER and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

6.18 *Continuing the Work*

A. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.04 or as OWNER and CONTRACTOR may otherwise agree in writing.

6.19 *CONTRACTOR's General Warranty and Guarantee*

A. CONTRACTOR warrants and guarantees to OWNER, ENGINEER, and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be defective. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, Suppliers, or any other individual or entity for whom CONTRACTOR is responsible; or

2. normal wear and tear under normal usage.

B. CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents:

1. observations by ENGINEER;

2. recommendation by ENGINEER or payment by OWNER of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by ENGINEER or any payment related thereto by OWNER;

4. use or occupancy of the Work or any part thereof by OWNER;

5. any acceptance by OWNER or any failure to do so;

6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by OWNER.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's

Consultants, and the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage:

1. is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom; and

2. is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of an individual or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such individual or entity.

B. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of CONTRACTOR under paragraph 6.20.A shall not extend to the liability of ENGINEER and ENGINEER's Consultants or to the officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of them arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

ARTICLE 7 - OTHER WORK

7.01 *Related Work at Site*

A. OWNER may perform other work related to the Project at the Site by OWNER's employees, or let other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to CONTRACTOR prior to starting any such other work; and

2. if OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in paragraph 10.05.

B. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the other work with OWNER's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of ENGINEER and the others whose work will be affected. The duties and responsibilities of CONTRACTOR under this paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of CONTRACTOR in said direct contracts between OWNER and such utility owners and other contractors.

C. If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and promptly report to ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure to so report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If OWNER intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility for such coordination.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.02 *Replacement of ENGINEER*

A. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer to whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.03 *Furnish Data*

A. OWNER shall promptly furnish the data required of OWNER under the Contract Documents.

8.04 *Pay Promptly When Due*

A. OWNER shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.01 and 4.05. Paragraph 4.02 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by ENGINEER in preparing the Contract Documents.

8.06 *Insurance*

A. OWNER's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. OWNER is obligated to execute Change Orders as indicated in paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. OWNER's responsibility in respect to certain inspections, tests, and approvals is set forth in paragraph 13.03.B.

8.09 *Limitations on OWNER's Responsibilities*

A. The OWNER shall not supervise, direct, or have control or authority over, nor be responsible for, CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. OWNER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. OWNER's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *OWNER'S Representative*

A. ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and will not be changed without written consent of OWNER and ENGINEER.

9.02 *Visits to Site*

A. ENGINEER will make visits to the Site at intervals appropriate to the various stages of construction as ENGINEER deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of CONTRACTOR's executed Work. Based on information obtained during such visits and observations, ENGINEER, for the benefit of OWNER, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work.

B. ENGINEER's visits and observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.10, and particularly, but without limitation, during or as a result of ENGINEER's visits or observations of CONTRACTOR's Work ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more extensive observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.10 and in the Supplementary Conditions. If OWNER designates another representative or agent to represent OWNER at the Site who is not ENGINEER's Consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Clarifications and Interpretations*

A. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from the Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a written clarification or interpretation, a Claim may be made therefor as provided in paragraph 10.05.

9.05 *Authorized Variations in Work*

A. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR, who shall perform the Work involved promptly. If OWNER and CONTRACTOR are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of a Field Order, a

Claim may be made therefor as provided in paragraph 10.05.

9.06 *Rejecting Defective Work*

A. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be defective, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Work as provided in paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.07 *Shop Drawings, Change Orders and Payments*

A. In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraph 6.17.

B. In connection with ENGINEER's authority as to Change Orders, see Articles 10, 11, and 12.

C. In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

9.08 *Determinations for Unit Price Work*

A. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decision thereon will be final and binding (except as modified by ENGINEER to reflect changed factual conditions or more accurate data) upon OWNER and CONTRACTOR, subject to the provisions of paragraph 10.05.

9.09 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work, the quantities and classifications of Unit Price Work, the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, and Claims seeking changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing, in accordance with the provisions of paragraph 10.05, with a request for a formal decision.

B. When functioning as interpreter and judge under this paragraph 9.09, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to this paragraph 9.09 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.07) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter.

9.10 *Limitations on ENGINEER's Authority and Responsibilities*

A. Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by ENGINEER shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. ENGINEER will not supervise, direct, control, or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform the Work in accordance with the Contract Documents.

C. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of

inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this paragraph 9.10 shall also apply to ENGINEER's Consultants, Resident Project Representative, and assistants.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Written Amendment, a Change Order, or a Work Change Directive. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If OWNER and CONTRACTOR are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in paragraph 3.04, except in the case of an emergency as provided in paragraph 6.16 or in the case of uncovering Work as provided in paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

1. changes in the Work which are: (i) ordered by OWNER pursuant to paragraph 10.01.A, (ii) required because of acceptance of defective Work under paragraph 13.08.A or OWNER's correction of defective Work under paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility. The amount of each applicable Bond will be adjusted to reflect the effect of any such change.

10.05 *Claims and Disputes*

A. *Notice:* Written notice stating the general nature of each Claim, dispute, or other matter shall be delivered by the claimant to ENGINEER and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. Notice of the amount or extent of the Claim, dispute, or other matter with supporting data shall be delivered to the ENGINEER and the other party to the Contract within 60 days after the start of such event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of such Claim, dispute, or other matter). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to ENGINEER and the claimant within 30 days after receipt of the claimant's last submittal (unless ENGINEER allows additional time).

B. *ENGINEER's Decision:* ENGINEER will render a formal decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any. ENGINEER's written decision on such Claim, dispute, or other matter will be final and binding upon OWNER and CONTRACTOR unless:

1. an appeal from ENGINEER's decision is taken within the time limits and in accordance with the dispute resolution procedures set forth in Article 16; or

2. if no such dispute resolution procedures have been set forth in Article 16, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within 30 days after the date of such decision, and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction within 60 days after the date of such decision or within 60 days after Substantial Completion, whichever is later (unless otherwise agreed in writing by OWNER and CONTRACTOR), to exercise such rights or remedies as the appealing party may have with respect to such Claim, dispute, or other matter in accordance with applicable Laws and Regulations.

C. If ENGINEER does not render a formal decision in writing within the time stated in paragraph 10.05.B, a decision denying the Claim in its entirety shall be deemed to have been issued 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

D. No Claim for an adjustment in Contract Price or Contract Times (or Milestones) will be valid if not submitted in accordance with this paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to CONTRACTOR will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in paragraph 11.01.B.

~~1. Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by OWNER.~~

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

3. Payments made by CONTRACTOR to Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from subcontractors acceptable to OWNER and CONTRACTOR and shall deliver such bids to OWNER, who will then determine, with the advice of ENGINEER, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as CONTRACTOR's Cost of the Work and fee as provided in this paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of CONTRACTOR.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by CONTRACTOR in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressage, and similar petty cash items in connection with the Work.

i. When the Cost of the Work is used to determine the value of a Change Order or of a Claim, the cost of premiums for additional Bonds and insurance required because of the changes in the Work or caused by the event giving rise to the Claim.

j. When all the Work is performed on the basis of cost-plus, the costs of premiums for all

Bonds and insurance CONTRACTOR is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnerships and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by CONTRACTOR, whether at the Site or in CONTRACTOR's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.01.A.1 or specifically covered by paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site.

3. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

4. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraphs 11.01.A and 11.01.B.

C. *CONTRACTOR's Fee:* When all the Work is performed on the basis of cost-plus, CONTRACTOR's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, CONTRACTOR's fee shall be determined as set forth in paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to paragraphs 11.01.A and 11.01.B, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

11.02 *Cash Allowances*

A. It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

1. the allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. CONTRACTOR's costs for unloading and handling on the Site, labor, installation costs, overhead, profit, and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

B. Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER subject to the provisions of paragraph 9.08.

B. Each unit price will be deemed to include an amount considered by CONTRACTOR to be ade-

quate to cover CONTRACTOR's overhead and profit for each separately identified item.

C. OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Price in accordance with paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. if CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense or OWNER believes that OWNER is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in paragraph 11.01) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 12.01.C).

C. *CONTRACTOR's Fee:* The CONTRACTOR's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under paragraphs 11.01.A.1 and 11.01.A.2, the CONTRACTOR's fee shall be 15 percent;

b. for costs incurred under paragraph 11.01.A.3, the CONTRACTOR's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times (or Milestones) may only be changed by a Change Order or by a Written Amendment. Any Claim for an adjustment in the Contract Times (or Milestones) shall be based on written notice submitted by the party making the claim to the ENGINEER and the other party to the Contract in accordance with the provisions of paragraph 10.05.

B. Any adjustment of the Contract Times (or Milestones) covered by a Change Order or of any Claim for an adjustment in the Contract Times (or Milestones) will be determined in accordance with the provisions of this Article 12.

12.03 *Delays Beyond CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in paragraph 12.02.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

12.04 *Delays Within CONTRACTOR's Control*

A. The Contract Times (or Milestones) will not be extended due to delays within the control of CONTRACTOR. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.05 *Delays Beyond OWNER's and CONTRACTOR's Control*

A. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay.

12.06 *Delay Damages*

A. In no event shall OWNER or ENGINEER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from:

1. delays caused by or within the control of CONTRACTOR; or

2. delays beyond the control of both OWNER and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

B. Nothing in this paragraph 12.06 bars a change in Contract Price pursuant to this Article 12 to compensate CONTRACTOR due to delay, interference, or disruption directly attributable to actions or inactions of OWNER or anyone for whom OWNER is responsible.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of OWNER, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. ~~OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:~~

~~1. for inspections, tests, or approvals covered by paragraphs 13.03.C and 13.03.D below;~~

~~2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.04.B shall be paid as provided in said paragraph 13.04.B; and~~

~~3. as otherwise specifically provided in the Contract Documents.~~

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish ENGINEER the required certificates of inspection or approval.

D. CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to OWNER and ENGINEER.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by CONTRACTOR without written concurrence of ENGINEER, it must, if requested by ENGINEER, be uncovered for observation.

F. Uncovering Work as provided in paragraph 13.03.E shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

B. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment. If it is found that such Work is defective, CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If, however, such Work is not found to be defective, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a Claim therefor as provided in paragraph 10.05.

13.05 *OWNER May Stop the Work*

~~A. If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.~~

13.06 *Correction or Removal of Defective Work*

A. CONTRACTOR shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by ENGINEER, remove it from the Project and replace it with Work that is not defective. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.07 *Correction Period*

A. ~~If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for CONTRACTOR's use by OWNER or permitted by Laws and Regulations as contemplated in paragraph 6.11.A is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.~~ If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or repaired or may have the rejected Work removed and replaced, and all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

B. ~~In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.~~

C. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

D. CONTRACTOR's obligations under this paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, OWNER (and, prior to ENGINEER's recommendation of final payment, ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to OWNER's evaluation of and determination to accept such defective Work (such costs to be approved by ENGINEER as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by CONTRACTOR pursuant to this sentence. If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and OWNER shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, OWNER may make a Claim therefor as provided in paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

13.09 *OWNER May Correct Defective Work*

A. If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct defective Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.06.A, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days written notice to CONTRACTOR, correct and remedy any such deficiency.

B. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the Site, take possession of all or part of the Work and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees, OWNER's other contractors, and ENGINEER and ENGINEER's Consultants access to the Site to enable OWNER to exercise the rights and remedies under this paragraph.

C. All Claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by OWNER in exercising the rights and remedies under this paragraph 13.09 will be charged against CONTRACTOR, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, OWNER may make a Claim therefor as provided in paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of CONTRACTOR's defective Work.

D. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies under this paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The schedule of values established as provided in paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments*

1. At least 20 days before the date established for each progress payment (but not more often than once a month), CONTRACTOR shall submit to ENGINEER for review an Application for Payment filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that OWNER has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect OWNER's interest therein, all of which must be satisfactory to OWNER.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of CONTRACTOR stating that all previous progress payments received on account of the Work have been applied on account to discharge CONTRACTOR's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. ENGINEER will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to OWNER or return the Application to CONTRACTOR indicating in writing ENGINEER's reasons for refusing to recommend payment. In the latter case, CONTRACTOR may make the necessary corrections and resubmit the Application.

2. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on

ENGINEER's observations on the Site of the executed Work as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules, that to the best of ENGINEER's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.08, and to any other qualifications stated in the recommendation); and

c. The conditions precedent to CONTRACTOR's being entitled to such payment appear to have been fulfilled in so far as it is ENGINEER's responsibility to observe the Work.

3. By recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents; or (ii) that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

4. Neither ENGINEER's review of CONTRACTOR's Work for the purposes of recommending payments nor ENGINEER's recommendation of any payment, including final payment, will impose responsibility on ENGINEER to supervise, direct, or control the Work or for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for CONTRACTOR's failure to comply with Laws and Regulations applicable to CONTRACTOR's performance of the Work. Additionally, said review or recommendation will not impose responsibility on ENGINEER to make any examination to ascertain how or for what purposes CONTRACTOR has used the moneys paid on account of the Contract Price, or to determine that title to any of the Work, materials, or equipment has passed to OWNER free and clear of any Liens.

5. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make the representations to OWNER referred to in paragraph 14.02.B.2. ENGINEER may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Written Amendment or Change Orders;

c. OWNER has been required to correct defective Work or complete Work in accordance with paragraph 13.09; or

~~d. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.02.A.~~

C. *Payment Becomes Due*

~~1. Ten days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of paragraph 14.02.D) become due, and when due will be paid by OWNER to CONTRACTOR.~~

D. *Reduction in Payment*

1. OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

a. claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where CONTRACTOR has delivered a specific

Bond satisfactory to OWNER to secure the satisfaction and discharge of such Liens;

c. there are other items entitling OWNER to a set-off against the amount recommended; or

d. OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.02.B.5.a through 14.02.B.5.c or paragraph 15.02.A.

2. If OWNER refuses to make payment of the full amount recommended by ENGINEER, OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR any amount remaining after deduction of the amount so withheld. OWNER shall promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

3. If it is subsequently determined that OWNER's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by paragraph 14.02.C.1.

14.03 *CONTRACTOR's Warranty of Title*

A. CONTRACTOR warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Promptly thereafter, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefore. ~~If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within 14 days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said 14 days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.~~

B. OWNER shall have the right to exclude CONTRACTOR from the Site after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Use by OWNER at OWNER's option of any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which OWNER, ENGINEER, and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following conditions.

1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER

believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR, and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefor. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

2. No occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will promptly make a final inspection with OWNER and CONTRACTOR and will notify CONTRACTOR in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment*

1. After CONTRACTOR has, in the opinion of ENGINEER, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in paragraph 6.12), and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.04.B.7; (ii) consent of the surety, if any, to final payment; and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in paragraph 14.07.A.2 and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full and an affidavit of CONTRACTOR that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, CONTRACTOR may furnish a Bond or other collateral satisfactory to OWNER to indemnify OWNER against any Lien.

B. *Review of Application and Acceptance*

1. If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application for Payment to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.09. Otherwise, ENGINEER will return the Application for Payment to

CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application for Payment.

C. *Payment Becomes Due*

~~1. Thirty days after the presentation to OWNER of the Application for Payment and accompanying documentation, the amount recommended by ENGINEER will become due and, when due, will be paid by OWNER to CONTRACTOR.~~

14.08 *Final Completion Delayed*

A. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed, and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by OWNER against CONTRACTOR, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by CONTRACTOR against OWNER other than those previously made in writing which are still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 OWNER May Suspend Work

A. At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. ~~CONTRACTOR shall be allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes a Claim therefor as provided in paragraph 10.05.~~

15.02 *OWNER May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. CONTRACTOR's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.07 as adjusted from time to time pursuant to paragraph 6.04);

2. CONTRACTOR's disregard of Laws or Regulations of any public body having jurisdiction;

3. CONTRACTOR's disregard of the authority of ENGINEER; or

4. CONTRACTOR's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in paragraph 15.02.A occur, OWNER may, after giving CONTRACTOR (and the surety, if any) seven days written notice, terminate the services of CONTRACTOR, exclude CONTRACTOR from the Site, and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the Site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case, CONTRACTOR

shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by OWNER arising out of or relating to completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses, and damages exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such claims, costs, losses, and damages incurred by OWNER will be reviewed by ENGINEER as to their reasonableness and, when so approved by ENGINEER, incorporated in a Change Order. When exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

C. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.03 *OWNER May Terminate For Convenience*

A. Upon seven days written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Contract. In such case, CONTRACTOR shall be paid (without duplication of any items):

1. for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. for all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. for reasonable expenses directly attributable to termination.

B. CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *CONTRACTOR May Stop Work or Terminate*

A. If, through no act or fault of CONTRACTOR, the Work is suspended for more than 90 consecutive days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within 30 days after it is submitted, ~~or OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due~~, then CONTRACTOR may, upon seven days written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Contract and recover from OWNER payment on the same terms as provided in paragraph 15.03. In lieu of terminating the Contract and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within 30 days after it is submitted, ~~or OWNER has failed for 30 days to pay CONTRACTOR any sum finally determined to be due~~, CONTRACTOR may, seven days after written notice to OWNER and ENGINEER, stop the Work until payment is made of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.04 are not intended to preclude CONTRACTOR from making a Claim under paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping the Work as permitted by this paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Dispute resolution methods and procedures, if any, shall be as set forth in the Supplementary Conditions. If no method and procedure has been set forth, and subject to the provisions of paragraphs 9.09 and 10.05, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Agreement.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

SECTION 00800 - SUPPLEMENTARY CONDITIONS TO THE GENERAL CONDITIONS

Article Title	Article Number
Introduction	SC – 1.00
Defined Terms	SC – 1.01
Terminology	SC – 1.02
Before Starting Construction	SC – 2.05
Preconstruction Conference	SC – 2.06
Coordination of Plans, Specifications, and Special Provisions	SC – 3.06
Subsurface and Physical Conditions	SC – 4.02
Performance, Payment and Other Bonds	SC – 5.01
Certificates of Insurance	SC – 5.03
CONTRACTOR's Liability Insurance	SC – 5.04
OWNER's Liability Insurance	SC – 5.05
Property Insurance	SC – 5.06
Waiver of Rights	SC – 5.07
Receipt and Application of Insurance Proceeds	SC – 5.08
Acceptance of Bonds and Insurance; Option to Replace	SC – 5.09
Labor; Working Hours	SC – 6.02
Concerning Subcontractors, Suppliers and Others	SC – 6.06
Permits	SC – 6.08
Cost of the Work	SC – 11.01
Test and Inspections	SC – 13.03
OWNER May Stop the Work	SC – 13.05
Correction Period	SC – 13.07
Progress Payments	SC – 14.02
Substantial Completion	SC – 14.04

Final Payment	SC – 14.07
OWNER May Suspend Work	SC – 15.01
OWNER May Terminate for Cause	SC – 15.02
CONTRACTOR May Stop Work or Terminate	SC – 15.04
Mediation	SC –16.02
Liens	SC – 17.06

+++ END OF THIS SUPPLEMENTARY CONDITIONS INDEX +++

SECTION 00800 - SUPPLEMENTARY CONDITIONS TO THE GENERAL CONDITIONS

SC-1.00 Introduction

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (No. 1910-8, 1996 Edition) and other provisions of the Contract Documents as indicated below. All provisions, which are not so amended or supplemented, remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions.

SC-1.01 Defined Terms

SC-1.01.A.20. *Delete paragraph GC 1.01.A.20 in its entirety.*

SC-1.02 Terminology

SC-1.02.D.1, 2, and 3 *Delete paragraphs GC-1.02.D.1, 2, and 3 in their entirety and insert the following paragraphs in their place:*

D. *Furnish, Install, Perform, Provide*

1. The word "furnish" shall mean to supply and deliver services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word "install" shall mean to put into use or place in final position services, materials, or equipment complete and ready for intended use.
3. The words "perform" or "provide" shall mean to furnish and install services, materials, or equipment complete and ready for intended use.

SC-2.05 Before Starting Construction

SC-2.05.C. *Delete paragraph GC 2.05.C in its entirety and insert the following paragraph in its place:*

C. *Evidence of Insurance:* CONTRACTOR shall not commence work under this Contract until he has obtained all insurance required under Article 5 and such insurance has been delivered to the OWNER and approved by the OWNER, nor shall the CONTRACTOR allow any Subcontractor to commence work on his subcontract until all similar insurance required of the Subcontractor has been so obtained and approved. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing *defective* Work in accordance with Article 13.

SC-2.06 Preconstruction Conference

SC-2.06 *Delete paragraph GC-2.06.A in its entirety and insert the following paragraph in its place:*

A. Immediately after awarding the contract, but before the CONTRACTOR begins work, the Project Manager will call a preconstruction conference at a place the ENGINEER designates to establish an understanding among the parties as to the work and to discuss schedules referred to in paragraph 2.05.B, procedures

for handling Shop Drawings and other submittals, and maintaining required records. Utility companies and others as appropriate will be requested to attend to discuss and coordinate work.

B. Per the FDOT Standard Specifications for Road and Bridge Construction, the Contractor will certify to the Engineer the following:

1. A listing of on-site clerical staff, supervisory personnel and their pro-rated time assigned to the contract,
2. Actual Rate for items listed in Table 4-3.2.1 (see below),
3. Existence of employee benefit plan for Holiday, Sick and Vacation benefits and a Retirement Plan, and,
4. Payment of Per Diem is a company practice for instances when compensation for Per Diem is requested.

Such certification must be made by an officer or director of the Contractor with authority to bind the Contractor. Timely certification is a condition precedent to any right of the Contractor to recover compensations for such costs, and failure to timely submit the certification will constitute a full, complete, absolute and irrevocable waiver by the Contractor of any right to recover such costs. Any subsequent changes shall be certified to the Engineer as part of the cost proposal or seven calendar days in advance of performing such extra work.

FDOT Table 4-3.2.1	
Item	Rate
FICA	Rate established by Law
FUTA/SUTA	Rate established by Law
Medical Insurance	Actual
Holidays, Sick & Vacation Benefits	Actual
Retirement Benefits	Actual
Workers Compensation	Rates based on the National Council on Compensation Insurance basic rates tables adjusted by Contractor's actual experience modification factor in effect at the time of the additional work or unforeseen work
Per Diem	Actual but not to exceed State of Florida's rate
Insurance*	Actual
*Compensation for Insurance is limited solely to General Liability Coverage and does not include any other insurance coverage (such as, but not limited to, Umbrella Coverage, Automobile Insurance, etc.).	

SC-3.06 Coordination of Plans, Specifications, and Special Provisions

SC-3.06 *Add the following new paragraphs immediately after paragraph GC-3.05:*

SC-3.06 *Coordination of Plans, Specifications, and Special Provisions*

A. In case of discrepancy, the governing order of the documents shall be as follows:

1. Written Interpretations
2. Addenda
3. Specifications
4. Supplementary Conditions to the General Conditions
5. General Conditions
6. Approved Shop Drawings
7. Drawings
8. Referenced Standards.

B. Written/computed dimensions shall govern over scaled dimensions.

SC-4.02 Subsurface and Physical Conditions

SC-4.02 *Add the following new paragraphs immediately after paragraph GC-4.02.B:*

C. In the preparation of Drawings and Specifications, ENGINEER or ENGINEER's Consultants relied upon the following reports of explorations and tests of subsurface conditions at the Site:
NONE

SC-5.01 Performance, Payment and Other Bonds

SC-5.01.A. *Delete paragraph GC-5.01.A in its entirety and insert the following paragraphs in its place:*

Within fifteen (15) days of receipt of the Contract Documents for execution, the CONTRACTOR shall furnish a Public Construction Bond in an amount equal to 100% of the Contract Price.

1. In lieu of the Public Construction Bond, the CONTRACTOR may furnish an alternative form of security in the form of cash, money order, certified check, cashier's check, irrevocable letter of credit or a security as listed in Part II of F.S. Chapter 625. Any such alternative form of security shall be for the same purpose, and be for the same amount and subject to the same conditions as those applicable to the bond otherwise required. The determination of the value of an alternative form of security shall be made by the OWNER.
2. Such Bond shall continue in effect for one (1) year after acceptance of the Work by the OWNER.
3. The OWNER shall record the Public Construction Bond with the Public Record Section of the Indian River County Courthouse located at 2000 16th Avenue, Vero Beach, Florida 32960.

SC-5.03 Certificates of Insurance

SC-5.03 *Delete the second sentence of paragraph GC-5.03 in its entirety.*

SC-5.04 CONTRACTOR's Liability Insurance

SC-5.04 *Add the following new paragraphs immediately after paragraph GC-5.04.B:*

C. The limits of liability for the insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Worker's Compensation: To meet statutory limits in compliance with the Worker's Compensation Law of Florida. This policy must include Employer Liability with a limit $100,000 for each accident, $500,000 disease (policy limit) and $100,000 disease (each employee). Such policy shall include a waiver of subrogation as against OWNER and ENGINEER on account of injury sustained by an employee(s) of the CONTRACTOR.
2. Commercial General Liability: Coverage shall provide minimum limits of liability of $1,000,000 per occurrence Combined Single Limit for Bodily Injury and Property Damage. This shall include coverage for:
   a. Premises/Operations
   b. Products/Completed Operations

c. Contractual Liability
d. Independent Contractors
e. Explosion
f. Collapse
g. Underground.

3. Business Auto Liability: Coverage shall provide minimum limits of liability of $1,000,000 per occurrence Combined Single Limit for Bodily Injury and Property Damage. This shall include coverage for:
   a. Owned Autos
   b. Hired Autos
   c. Non-Owned Autos.
4. Longshoreman's Insurance: Contractor shall secure and maintain Longshoreman Insurance to the extent required by law.
5. Special Requirements:
   a. Ten (10) days prior to the commencement of any work under this Contract, certificates of insurance and endorsement forms in the exact wording and format as presented in these Contract Documents will be provided to the OWNER's Risk Manager for review and approval.
   b. "Indian River County Florida" will be named as "Additional Insured" on both the General Liability and Auto Liability.
   c. The OWNER will be given thirty (30) days notice prior to cancellation or modification of any stipulated insurance. Such notification will be in writing by registered mail, return receipt requested and addressed to the OWNER's Risk Manager.
   d. An appropriate "Indemnification" clause shall be made a provision of the Contract (see paragraph 6.20 of the General Conditions).
   e. It is the responsibility of the CONTRACTOR to insure that all subcontractors comply with all insurance requirements.
   f. It should be remembered that these are minimum requirements, which are subject to modification in response to high hazard operation.
   g. Insured must be authorized to do business and have an agent for service of process in Florida and have Best's Rating of A-VII or better.

D. Additional Insureds:
   1. In addition to "Indian River County, Florida," the following individuals or entities shall be listed as "additional insureds" on the CONTRACTOR's liability insurance policies:
      a. <u>City of Vero Beach</u>
      b. <u>Indian River Shores</u>

SC-5.05 OWNER's Liability Insurance

SC-5.05 *Delete paragraph GC-5.05.A in its entirety.*

SC-5.06 Property Insurance

SC-5.06 *Delete paragraphs GC-5.06.A, B, and C in their entirety and insert the following paragraphs in their place:*

A. CONTRACTOR shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof. This insurance shall:

1. include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "All Risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, falsework, and materials and equipment in transit and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by OWNER prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by ENGINEER; and

5. allow for partial utilization of the Work by OWNER;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR and ENGINEER with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. CONTRACTOR shall be responsible for any deductible or self-insured retention.

C. The policies of insurance required to be purchased and maintained by CONTRACTOR in accordance with this paragraph SC-5.06 shall comply with the requirements of paragraph 5.06.C of the General Conditions.

SC-5.06.E *Delete paragraph GC-5.06.E in its entirety and insert the following in its place:*

E. Additional Insureds:
1. The following individuals or entities shall be listed as "additional insureds" on the CONTRACTOR's property insurance policies:
   a. Indian River County, Florida
   b. City of Vero Beach
   c. Indian River Shores

SC-5.07 Waiver of Rights

SC-5.07 *Delete GC-5.07 (paragraphs A, B, and C) in its entirety.*

SC-5.08 Receipt and Application of Insurance Proceeds

SC-5.08 *Delete GC-5.08 (paragraphs A and B) in its entirety.*

SC-5.09 Acceptance of Bonds and Insurance; Option to Replace

SC-5.09 *Delete GC-5.09(paragraph A)in its entirety.*

SC-6.02 Labor; Working Hours

SC-6.02.B. *Add the following paragraphs immediately after paragraph GC-6.02.B:*

1. Regular working hours are defined as Monday through Friday, excluding Indian River County Holidays, from 7 a.m. to 5 p.m.
2. Indian River County Holidays are: New Year's Day, Martin Luther King, Jr. Day, Good Friday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Friday after Thanksgiving, Christmas Eve and Christmas Day. Working on these days will not be permitted without prior written permission and approval from the Construction Coordination Manager.
3. The CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of eight hours in any one calendar day or 40 hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing.
4. All costs of inspection and testing performed during overtime work by the CONTRACTOR, which is allowed solely for the convenience of the CONTRACTOR, shall be borne by the CONTRACTOR, and a credit given to the OWNER to deduct the costs of all such inspection and testing from any payments otherwise due the CONTRACTOR.
5. All costs of OWNER's employees and costs of ENGINEER's Consultant resulting from overtime work by the CONTRACTOR, which is allowed solely for the convenience of the CONTRACTOR, shall be borne by the CONTRACTOR, and a credit given to OWNER to deduct all such costs from any payments otherwise due the CONTRACTOR.
6. No work shall commence before 7 a.m. or continue after 5 p.m. except in case of emergency upon specific permission of the ENGINEER.
7. Planting of dune vegetation is encouraged outside of marine turtle nesting season. However, planting activities may occur during the marine turtle nesting season March 1 through October 31 under the conditions as outlined under the conditions on page 16 of 36 of the Florida Department of Environmental Protection Permit Number 0363427-001-JC. Said permit is part of these contract documents in Appendix D – Environmental Permits.

SC-6.06 Concerning Subcontractors, Suppliers, and Others

SC-6.06.C. *Add the following sentence at the end of paragraph GC-6.06.C:*

OWNER or ENGINEER may furnish to any such Subcontractor, Supplier, or other individual or entity, to the extent practicable, information about amounts paid to CONTRACTOR on account of Work performed for CONTRACTOR by a particular Subcontractor, Supplier, or other individual or entity.

SC-6.08 Permits

SC-6.08 *Add the following paragraphs immediately after paragraph GC-6.08.A:*

1. The OWNER has obtained the following permits (copies of these permits are contained in Appendix "D"):
   A. Florida Department of Environmental Protection - Permit No. 0363427-001-JC
   B. Department of the Army - Permit No. SAJ-2018-01171 (SP-AWP)

2. The CONTRACTOR shall obtain and pay for all other required permits and licenses. The CONTRACTOR shall provide copies of the permits to the OWNER and ENGINEER and shall comply with all conditions contained in the permits at no extra cost to the OWNER.
3. The CONTRACTOR shall be familiar with all permit requirements during construction and shall be responsible for complying with these requirements. The cost of this effort shall be included in the pay item in which the work is most closely associated with.

SC-11.01 Cost of the Work

SC-11.01.A.1. *Delete paragraph GC-11.01.A.1 in its entirety, and insert the following sentences in its place:*

1. CONTRACTOR will receive payment for actual costs of direct labor and burden (see SC-2.06.B) for the additional or unforeseen work. Labor includes foremen actually engaged in the work; and will not include project supervisory personnel nor necessary on-site clerical staff, except when the additional or unforeseen work is a controlling work item and the performance of such controlling work item actually extends completion of the project due to no fault of the Contractor. Compensation for project supervisory personnel, but in no case higher than a Project Manager's position, shall only be for the pro-rata time such supervisory personnel spent on the contract. In no case shall an officer or director of the Company, nor those persons who own more than 1% of the Company, be considered as project supervisory personnel, direct labor or foremen hereunder. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by OWNER.

SC-13.03 Test and Inspections

SC-13.03.B. *Delete paragraph GC-13.03.B in its entirety, and insert the following sentences in its place:*

B. OWNER shall employ and pay for the services of an independent testing laboratory to perform all <u>initial</u> inspections, tests, or approvals required by the Contract Documents except those inspections, tests, or approvals listed immediately below. Subsequent inspections, tests, or approvals required after initial failing inspections, tests, or approvals shall be paid for by the CONTRACTOR by back charge to subsequent applications for payment. The CONTRACTOR shall arrange, obtain, and pay for the following inspections, tests, or approvals:

1. inspections, tests, or approvals covered by paragraphs 13.03.C and 13.03.D below;
2. costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.04.B shall be paid as provided in said paragraph 13.04.B;
3. tests otherwise specifically provided in the Contract Documents, in particular paragraph 23.4 of the technical provisions.

SC-13.05 OWNER May Stop the Work

SC-13.05.A. *Delete paragraph GC-13.05.A in its entirety and insert the following paragraph in its place:*

A. If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to comply with permit requirements, or fails to comply with the technical specifications, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

SC-13.07 Correction Period

SC-13.07 A. *Delete the first sentence of paragraph GC-13.07.A in its entirety and insert the following sentence in its place*

A. If within one year after the date of Final Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for CONTRACTOR's use by OWNER or permitted by Laws and Regulations as contemplated in paragraph 6.11.A is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) repair such defective land or areas, or (ii) correct such defective Work or, if the defective Work has been rejected by OWNER, remove it from the Project and replace it with Work that is not defective, and (iii) satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

SC-13.07 B. *Delete paragraph GC-13.07.B in its entirety and insert the following sentence in its place*

B. In special circumstances where a particular item of equipment is placed in continuous service before Final Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

SC-14.02 Progress Payments

SC-14.02.B.5. *Delete paragraph GC-14.02.B.5.d in its entirety and insert the following paragraph in its place:*

d. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraph 15.02.A; or

SC-14.02.B.5. *Add the following sentences at the end of paragraph GC-14.02.B.5:*

e. OWNER has been required to pay ENGINEER additional compensation because of CONTRACTOR delays or rejection of defective Work; or

f. OWNER has been required to pay an independent testing laboratory for subsequent inspections, tests, or approvals taken after initial failing inspections, tests, or approvals.

SC-14.02.C.1. *Delete paragraph GC-14.02.C.1 in its entirety and insert the following paragraph in its place:*

C. Payment Becomes Due

1. Payment shall be made by OWNER to CONTRACTOR according to the Local Government Prompt Payment Act. F.S. 218.70 et. seq.

SC-14.04 Substantial Completion

SC-14.04A. *After the third sentence in paragraph GC-14.04A of the General Conditions, delete the remainder of paragraph 14.04A in its entirety and replace with the following:*

"If Engineer considers the Work substantially complete, Engineer will prepare and deliver to Owner a tentative certificate of Substantial Completion that shall fix the date of Substantial Completion. In accordance with the provisions of Florida Statutes section 208.735(7)(a)(2005), upon receipt of the tentative certificate of Substantial Completion from Engineer, the Owner, the Engineer, and the Contractor shall conduct a walk-through inspection of the Project to document a list of any items required to render the Work on the Project complete, satisfactory, and acceptable under this Agreement (herein the "Statutory List"). The Statutory List shall be reduced to writing and circulated among the Owner, the Engineer, and the Contractor by the Owner or the Engineer within 30 calendar days after substantial completion. The Owner and Contractor acknowledge and agree that: 1) the failure to include any corrective work, or pending items that are not yet completed, on the Statutory List does not alter the responsibility of the Contractor to complete all of the Work under this Agreement; 2) upon completion of all items on the Statutory List, the Contractor may submit a pay request for all remaining retainage except as otherwise set forth in this Agreement; and 3) any and all items that require correction under this Agreement and that are identified after the preparation of the Statutory List remain the obligation of the Contractor to complete to the Owner's satisfaction under this Agreement. After receipt of the Statutory List by the Contractor, the Contractor acknowledges and agrees that it will diligently proceed to complete all items on the Statutory List and schedule a final walk-through in anticipation of final completion on the Project."

SC-14.04B *Add the following new paragraph immediately after paragraph GC 14.04B:*

C. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees

SC-14.07 Final Payment

SC-14.07.C.1. *Delete paragraph GC-14.07.C.1 in its entirety and insert the following paragraph in its place:*

C. Payment Becomes Due

1. Payment shall be made by OWNER to CONTRACTOR according to the " Local Government Prompt Payment Act" , Florida Statutes section 218.70, et. seq.

SC-15.01 OWNER May Suspend Work

SC-15.01.A *Delete the last sentence in paragraph GC-15.01.A and insert the following in its place:*

CONTRACTOR shall be allowed an extension of the Contract Times, directly attributable to any such suspension if CONTRACTOR makes a Claim for an extension as provided in paragraph 10.05. CONTRACTOR shall not be allowed an adjustment of the Contract Price and CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such Work suspension.

SC-15.02 OWNER May Terminate For Cause

SC-15.02.A.5 and SC-15.02.A.6 *Add the following new paragraphs immediately after paragraph GC-15.02.A.4:*

5. CONTRACTOR's violation of Section 02225 – "Erosion Control and Treatment of Dewatering Water From the Construction Site."

6. CONTRACTOR's failure to make payment to Subcontractors or Suppliers for materials or labor in accordance with the respective agreements between the CONTRACTOR and the Subcontractors or Suppliers.

7. CONTRACTOR certifies that it and its related entities as defined by Florida law are not on the Scrutinized Companies that Boycott Israel List, created pursuant to s. 215.4725 of the Florida Statutes, and are not engaged in a boycott of Israel. In addition, if this agreement is for goods or services of one million dollars or more, CONTRACTOR certifies that it and its related entities as defined above by Florida law are not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to Section 215.473 of the Florida Statutes and are not engaged in business operations in Cuba or Syria.

   OWNER may terminate this Contract if CONTRACTOR is found to have submitted a false certification as provided under section 287.135(5), Florida Statutes, been placed on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List,or been engaged in business operations in Cuba or Syria, as defined by section 287.135, Florida Statutes.

   OWNER may terminate this Contract if CONTRACTOR, including all wholly owned subsidiaries, majority-owned subsidiaries, and parent companies, that exist for the purpose of making profit, is found to have been placed on the Scrutinized Companies that Boycott Israel List or is engaged in a boycott of Israel as set forth in section 215.4725, Florida Statutes.

SC-15.04 CONTRACTOR May Stop Work or Terminate

SC-15.04 *Delete the following text from the first sentence of paragraph GC-15.04.A:*

~~or OWNER fails for 30 days to pay CONTRACTOR any sum finally determined to be due,~~

SC-15.04 *Delete the following text from the second sentence of paragraph GC-15.04.A:*

~~or OWNER has failed for 30 days to pay CONTRACTOR any sum finally determined to be due,~~

SC-16 DISPUTE RESOLUTION

SC-16.02 Mediation

SC-16 *Add the following new paragraph immediately after paragraph GC-16.01.*

SC-16.02 Mediation

A. OWNER and CONTRACTOR agree that they shall submit any and all unsettled Claims or counterclaims, disputes, or other matters in question between them arising out of or relating to the Contract Documents or the breach thereof, to mediation by a certified mediator of the 19th Judicial Circuit in Indian River County unless delay in initiating mediation would irrevocably prejudice one of the parties. The mediator of any dispute submitted to mediation under this agreement shall not serve as arbitrator of such dispute unless otherwise agreed.

SC-17 Miscellaneous

SC-17.06 Liens

Add the following new paragraphs immediately after paragraph GC17.05:

SC-17.06 Liens

A. This project is a "Public Works" under Chapter 255, Florida Statutes. No merchant's liens may be filed against the OWNER. Any claimant may apply to the OWNER for a copy of this Contract. The claimant shall have a right of action against the CONTRACTOR for the amount due him. Such action shall not involve the OWNER in any expense. Claims against the CONTRACTOR are subject to timely prior notice to the CONTRACTOR as specified in Florida Statutes Section 255.05. The CONTRACTOR shall insert the following paragraph in all subcontracts hereunder:

"Notice: Claims for labor, materials and supplies are not assessable against Indian River County and are subject to proper prior notice to (CONTRACTOR'S Name) and to (CONTRACTOR Surety Company Name), pursuant to Chapter 255 of the Florida Statutes. This paragraph shall be inserted in every sub-subcontract hereunder." The payment due under the Contract shall be paid by the OWNER to the CONTRACTOR only after the CONTRACTOR has furnished the OWNER with an affidavit stating that all persons, firms or corporations who are defined in Section 713.01, Florida Statutes, who have furnished labor or materials, employed directly or indirectly in the Work, have been paid in full. The OWNER may rely on said affidavit at face value. The CONTRACTOR does hereby release, remiss and quit-claim any and all rights he may enjoy perfecting any lien or any other type of statutory common law or equitable lien against the job.

++END OF SUPPLEMENTARY CONDITIONS++

SECTION 00942 - Change Order Form

No. _____

DATE OF ISSUANCE: _____ EFFECTIVE DATE:_____

OWNER: Indian River County
CONTRACTOR _____
Project: Sector 5 Beach and Dune Restoration Project
OWNER'S Bid No. 2019066

You are directed to make the following changes in the Contract Documents:
Description:

Reason for Change Order:

Attachments: (List documents supporting change)

CHANGE IN CONTRACT PRICE:	
Description	Amount
Original Contract Price	$_____
Net Increase (Decrease) from previous Change Orders No. _____ to _____:	$_____
Contract Price prior to this Change Order:	$_____
Net increase (decrease) of this Change Order:	$_____
Contract Price with all approved Change Orders:	$_____

CHANGE IN CONTRACT TIMES	
Description	Time
Original Contract Time: Substantial Completion: Final Completion:	(days or dates) _____ _____
Net change from previous Change Orders No. _____ to _____: Substantial Completion: Final Completion:	(days) _____ _____
Contract Time prior to this Change Order: Substantial Completion: Final Completion:	(days or dates) _____ _____
Net increase (decrease) this Change Order: Substantial Completion: Final Completion:	(days or dates) _____ _____
Contract Time with all approved Change Orders: Substantial Completion: Final Completion:	(days or dates) _____ _____

ACCEPTED:	RECOMMENDED:	APPROVED:
By:	By:	By:
CONTRACTOR (Signature)	ENGINEER (Signature)	OWNER (Signature)
Date:	Date:	Date:

SECTION 00946 - Field Order Form

Field Change No.: _____

DATE OF ISSUANCE: _____ EFFECTIVE DATE:_____

OWNER: Indian River County
CONTRACTOR _____
Project: Sector 5 Beach and Dune Restoration Project
OWNER'S Bid No. 2019066

Field Activity Description:

Reason for Change:

Recommended Disposition:

Field Operations Officer / Engineer (Signature) Date

Disposition:

Contractor's Onsite Supervisor (Signature) Date

Distribution: Field Operations Officer
On-site Supervisor
Project File

Others as Required: _____

*** * END OF SECTION * ***

SECTION 00948 - Work Change Directive

No. _____

DATE OF ISSUANCE: _____ EFFECTIVE DATE:_____

OWNER: Indian River County
CONTRACTOR _____
Project: Sector 5 Beach and Dune Restoration Project
OWNER'S Bid No. 2019066

You are directed to proceed promptly with the following changes:

Description:

Purpose of Work Change Directive:

Attachments: (List documents supporting change)

If OWNER or CONTRACTOR believe that the above change has affected Contract Price any Claim for a Change Order based thereon will involve one or more of the following methods as defined in the Contract Documents.

Method of determining change in Contract Prices	Method of determining change in Contract Times
☐ Unit Prices ☐ Lump Sum ☐ Other:_____ ☐ By Change Order:	☐ Contractor's Records ☐ Engineer's Records ☐ Other:_____ ☐ By Change Order:
Estimated increase (decrease) of this Work Change Directive $_____ If the change involves an increase, the estimated amount is not to be exceeded without further authorization.	Estimated increase (decrease) in Contract Times: Substantial Completion: _____ days; Ready for Final Completion: _____ days. If the change involves an increase, the estimated time is not to be exceeded without further authorization.

ACCEPTED:	RECOMMENDED:	APPROVED:
By:	By:	By:
CONTRACTOR (Signature)	ENGINEER (Signature)	OWNER (Signature)
Date:	Date:	Date:

*** * END OF SECTION * ***

TECHNICAL SPECIFICATIONS

SECTOR 5 - BEACH AND DUNE RESTORATION PROJECT

Prepared for:

Indian River County
Public Works Department
Coastal Engineering Division
1801 27th Street, Building A
Vero Beach, FL 32960

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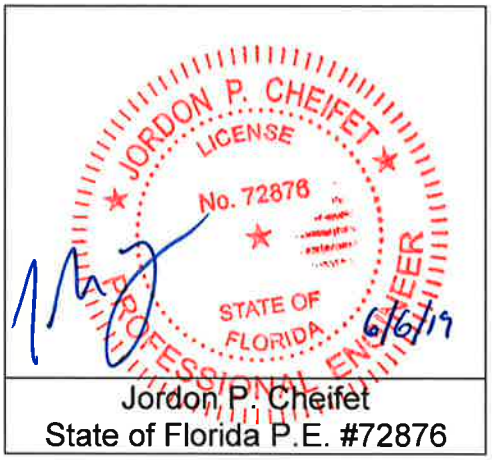

Jordon P. Cheifet
State of Florida P.E. #72876

INDIAN RIVER COUNTY

SECTOR 5 – BEACH AND DUNE RESTORATION PROJECT

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INDIAN RIVER COUNTY

SECTOR 5 – BEACH AND DUNE RESTORATION PROJECT

TECHNICAL SPECIFICATIONS

PART 1 – GENERAL PROVISIONS

1. SCOPE OF WORK

The work covered in this section consists of furnishing all plant, labor, equipment, tools, supplies, and material, and of performing all operations and surveys in connection with the construction of a beach and dune restoration in Indian River County in accordance with the Plans and Specifications.

2. PROJECT DESCRIPTION

The project is located on the east coast of Florida bordering the Atlantic Ocean within Indian River County. Indian River County is located approximately 150 miles north of Miami and 100 miles southeast of Orlando. The project area encompasses approximately 3.1 miles of coastline in the City of Vero Beach, Town of Indian River Shores, and unincorporated Indian River County. The total fill volume to be placed within the beach and dune construction templates is approximately 123,800 cubic yards (185,700 tons) of beach quality sand. Salt-tolerant dune vegetation (approximately 128,769 plantings) will be planted on the restored dunes.

The upland staging and access areas are located at Tracking Station Park, Jaycee Park and Conn Beach, and Humiston Park. The project will be constructed using beach sand from the Stewart Materials Fort Pierce mine. It is assumed that the sand will have a relationship of 1.5 tons/cy for sand delivery from the mine and volume computations.

The CONTRACTOR shall be expressly aware of the beach location and dynamic nature of this project site. This beach is a major tourist attraction and is highly utilized by tourists and residents throughout the year. Throughout the project, the CONTRACTOR shall put forth the utmost care and attention to public safety by maintaining a clean and organized site free from the accumulation of debris.

2.1. **Permits**. The COUNTY has obtained the Florida Department of Environmental Protection (FDEP) and United States Army Corps of Engineers (USACE) permits for this project. The CONTRACTOR shall comply with all conditions of the permits, which are included in the bid package. Any modifications to said permits will be addressed through an addendum by the COUNTY.

2.2. **Other Permits**. The CONTRACTOR is solely responsible for obtaining, at their cost, all other approvals required for the prosecution of the work. This includes, but is not limited to, any and all roadway permits, customs clearances, and business licenses

required to bring material to the site. The erosion control line (ECL) marks the landward limit of State lands along the project shoreline.

2.3. Construction Window. The construction window in which the work shall be completed is limited to the period of time between issuance of the CONTRACTOR's Notice to Proceed and May 1. Permits for the project restrict work conducted on the beach to the period from November 1 through April 30. The permit requires sea turtle daily nest surveys be completed if work occurs in November, March or April and that no work may be conducted on the beach between May 1 and October 31, inclusive. Planting of dune vegetation shall be outside of sea turtle nesting season; however, the permits for the project allow dune planting activities to occur during sea turtle nesting season from March 1 through October 31. The CONTRACTOR shall be responsible for coordinating construction and dune planting activities with the COUNTY's sea turtle and shorebird personnel in order to fulfill permit requirements. The cost of this coordination shall be included in the lump sum cost for Environmental Compliance.

3. DEFINITIONS

3.1. Acceptance Sections. Acceptance sections are defined as the segment of beach lying between two immediately adjacent pay profile lines, which are located a perpendicular distance approximately 100 foot apart as indicated in the Plans.

4. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK

The CONTRACTOR shall commence work under the contract within fourteen (14) days after the Notice to Proceed has been issued by the COUNTY and shall complete all works within two-hundred and ten (210) days of the issuance from the Notice to Proceed. The time stated for completion shall include all aspects of the work including grading, leveling of escarpments in the beach, tilling the beach, dune planting, final clean-up of the premises, and all repairs or restorations of facilities, structures, work areas, staging areas, vegetation, submerged marine resources, or any other items damaged by the CONTRACTOR or their subcontractors as a result of the project construction activities, and complete demobilization from the project site.

5. TECHNICAL DISPUTE RESOLUTION

The CONTRACTOR shall perform the work as specified by the contract documents. The ENGINEER will interpret the requirements of the technical portion of the work, as specified in the Plans and Specifications of the contract documents. If the CONTRACTOR objects to the ENGINEER's decision, the CONTRACTOR shall, within 48 hours of receiving the ENGINEER's decision, notify the ENGINEER in writing of the CONTRACTOR's objection thereto. The CONTRACTOR and ENGINEER will mutually attempt to resolve the issue; nevertheless, the ENGINEER's decision will be binding upon the CONTRACTOR.

6. MEETINGS

6.1. Pre-Bid Meeting. See Invitation for Bid.

6.2. Contract Pre-Construction Conference. See General Conditions 00700 – 2.06.

6.3. Permit Pre-Construction Conference. A mandatory pre-construction meeting will be held at the COUNTY's offices with the ENGINEER, COUNTY, CONTRACTOR, marine turtle license holder, shorebird monitor, appropriate State and Federal agencies, and any other individuals as required in compliance with project permit requirements, to discuss permit conditions. This meeting is separate from the contract pre-construction conference described above, which will also be held in Indian River County. These two meetings may be coordinated to occur at the same location, and/or on the same day, pending agency availability.

6.4. Weekly Progress Meetings. Mandatory weekly progress meetings will be held during construction at the COUNTY's offices with the ENGINEER, COUNTY, and CONTRACTOR to discuss the progress of the project.

7. SUBMITTALS AND NOTIFICATIONS

The CONTRACTOR shall submit the following items to the ENGINEER at the appropriate times:

7.1. Construction Schedule and Methods. A minimum of seven (7) days prior to the contract pre-construction conference, the CONTRACTOR shall prepare and submit to the ENGINEER, for approval, a practicable construction schedule and methodology statement for construction of each portion of the work. No work on site shall begin until the schedule is approved by the ENGINEER. Approval by the ENGINEER indicates an acknowledgement and not an endorsement of the CONTRACTOR's means and methods. The methodology statement shall include a description of the CONTRACTOR's truck ticket tracking system, direction of the work, and utilization plan of the construction accesses.

7.2. Material and Equipment Transport, Storage, and Access. At least seven (7) days prior to the contract pre-construction conference, the CONTRACTOR shall provide to the ENGINEER a description of the routes and areas he intends to use to transport and store material and equipment during the project. The description shall also describe how the CONTRACTOR intends to access the work area. All transport routes, work areas, storage areas, access areas, and facilities are subject to review by the ENGINEER and COUNTY for compliance with the Plans and Specifications.

7.3. Contact List. At least seven (7) days prior to the contract pre-construction conference, the CONTRACTOR shall submit a list of project personnel, including subcontractors, and their telephone, e-mail address, telefax, and other numbers by which key personnel can be reached for purposes of notification and other matters discussed in these Specifications. Nevertheless, the CONTRACTOR remains responsible for all work and shall be the point of contact and in responsible charge of the subcontractor during the duration of the work.

7.4. **Daily Quality Control Reports**. The CONTRACTOR shall submit daily reports that summarize the work completed at the end of each work day. Daily Quality Control Reports shall be submitted every contract day during the construction period (even when no work is done) between the time at which the Notice to Proceed is issued and the time of final acceptance. Reports shall be submitted by 2:00 p.m. to the ENGINEER on a daily basis in person or via e-mail. The reports shall include all work activity including, but not limited to, the location (coordinates or stationing) of work, daily and cumulative quantities of sand placed, placement surveys, weather conditions, turbidity reports, personnel, materials, and on-site equipment. A copy of the required daily report for is included in Appendix A of the Specifications.

7.5. **Unsuitable Material**. The ENGINEER or COUNTY will provide daily inspections and take samples from trucks at the mine and/or at the beach. The CONTRACTOR shall notify the ENGINEER of the discovery of any unsuitable material delivered to or within the fill area.

7.6. **Surveys.** The CONTRACTOR shall provide pay surveys (pre- and post-placement) for review by the ENGINEER.

7.7. **Maintenance of Traffic**. The CONTRACTOR shall provide a Traffic Control Plan at least seven (7) days prior to the contract pre-construction conference. The plan shall outline the signage and methods the CONTRACTOR will use to minimize disturbance to normal traffic flows in the project area as part of the plan. The CONTRACTOR shall utilize flagmen when unloading materials and mobilizing or demobilizing equipment from the construction site. The ENGINEER or COUNTY may request modifications to the plan.

7.8. **Pre-/Post-Construction Condition**. The CONTRACTOR shall provide copies of the pre- and post-construction video and/or photography at least one (1) day prior to the start construction documenting the condition of the project site including, but not limited to, construction accesses, staging areas, infrastructure, and vegetation.

7.9. **Grade Stake Recovery Plan & Log**. This plan applies if grade stakes are used. Within seven (7) days of Notice to Proceed, the CONTRACTOR shall submit a Grade Stake Recovery Plan acceptable to the ENGINEER and the COUNTY. The plan shall outline the steps that the CONTRACTOR will implement to recover all the stakes used on the project as required. This plan shall include the use of an inventory log that will be made available for review by the ENGINEER. Upon completion of the project, the CONTRACTOR shall furnish a final grade stake log to the COUNTY.

7.10. **Name and Qualifications of Turbidity Monitor**. As required by permits, the CONTRACTOR shall submit the name and qualifications of all turbidity monitors to be used on the project at least seven (7) days prior to the start of construction for FDEP approval, and as a perquisite for a FDEP Notice to Proceed. The turbidity meter calibration shall also be submitted.

7.11. General Plans and Information. The CONTRACTOR shall provide the following additional submittals at least seven (7) days prior to commencement of the work:

(a) Quality Control Plan
(b) Accident Prevention Plan
(c) Environmental Protection Plan
(d) Hurricane and Severe Storm Plan
(e) Transport, Storage, and Access Plan

7.12. General Notifications. The CONTRACTOR shall provide the following notifications at the appropriate times, if applicable:

(a) Notification of Plans/Specifications Discrepancy
(b) Notification of Cultural Resource Discovery
(c) Notification of Misplaced Material
(d) Notification of Occurrence of Delays in Work
(e) Claims and Disputes
(f) Reports of All Inspections, Surveys, and Tests and Remedial Actions

Further details on submittals and notifications, including their due dates, are provided in the contract and herein. Refer to Section 23.5 for additional material submittals required for the work.

8. ORDER OF WORK, PROJECT SCHEDULE, AND ACCEPTANCE SECTIONS

8.1. Order of Work and Project Schedule. The CONTRACTOR shall provide a construction schedule and methodology statement for construction of each portion of the work to the ENGINEER and COUNTY a minimum of seven (7) days prior to the contract pre-construction meeting. The order of work may be modified at the contract pre-construction meeting to accommodate local priorities. The project schedule shall indicate, at a minimum, start of work, construction period, fill placement completion date, beach tilling (if required), and completion of all work. The CONTRACTOR shall propose the order in which the work will be performed, including the anticipated progression of fill placement in the project area. The project schedule shall be updated weekly during construction and submitted at each progress meeting so that local property owners can plan for the CONTRACTOR's activity, if needed.

8.2. Acceptance Sections. Acceptance sections are defined as the portion of the restored beach lying between two immediately adjacent pay profile lines. Once fill placement begins in an acceptance section, it must be completed before moving to the adjacent acceptance section, unless otherwise authorized by the ENGINEER. Pay profiles will be established by the CONTRACTOR according to the Plans. The CONTRACTOR shall establish intermediate profiles in addition to those shown in the Plans to construct the project in accordance with plan view layout. The CONTRACTOR may submit the intermediate profiles for payment subject to review and approval by the ENGINEER.

9. PERFORMANCE OF WORK BY CONTRACTOR

9.1. **Contractor Participation in the Work**. There is no minimum amount of CONTRACTOR participation in the project.

9.2. **Continuous Construction**. The CONTRACTOR shall maintain at the project site and on the job, the materials, equipment, and personnel required to continuously construct all elements of the project. Under no circumstances will the CONTRACTOR remove their equipment, materials, subcontractors, and personnel from the project site without the written consent of the COUNTY, unless one or more of the following occurs: the project is complete; weather or sea state conditions require movement from the project site; a condition exists which threatens the safety and welfare of personnel or threatens equipment; repair or fueling of equipment is required; or the time frame provided for project construction in the FDEP or USACE permits has expired.

9.3. **Capacity**. The CONTRACTOR shall meet the standards for capacity, productivity, and ability to maintain it throughout the time allotted for construction.

10. SUPERINTENDENT

The CONTRACTOR shall propose, in writing to the ENGINEER and COUNTY, the name and qualifications of the superintendent to receive the ENGINEER's and COUNTY's instructions. There will only be one superintendent. The ENGINEER and/or COUNTY may reject the superintendent proposed by the CONTRACTOR. If the proposed superintendent is rejected, the CONTRACTOR will propose an alternate superintendent. Said instructions, once received by the CONTRACTOR's superintendent, will be legally binding on the CONTRACTOR pursuant of this contract. A superintendent of the CONTRACTOR must be at the beach project area at all times during project construction or otherwise make himself available to the ENGINEER at all times during project construction. Under no circumstances will any element of project construction occur without the presence of a superintendent at the project site. An assistant superintendent can be proposed by the CONTRACTOR to cover for the superintendent during their short absences, but the assistant superintendent cannot change plans and agreements made by the superintendent with the ENGINEER and COUNTY.

11. ENGINEER

11.1. **Technical Issues**. The ENGINEER, in consultation with the COUNTY, shall decide all technical issues of whatever nature may arise relative to the interpretation of the technical portions of the contract documents, Plans, surveys, beach fill volume measurement, and prosecution and fulfillment of this contract, and as to the character, quality, amount, and value of any work done and materials furnished under this contract.

11.2. **Work Site Access**. The ENGINEER and COUNTY shall have unlimited access to the project site, offsite staging area, and stockpile areas for laying out, measuring, and observing or administering the contract documents, and the CONTRACTOR shall

afford him all assistance for doing so. The presence or absence of the ENGINEER will not relieve the CONTRACTOR of responsibility for the proper execution of the work in accordance with the Specifications.

12. PHYSICAL DATA

12.1. Information and Data. Information and data furnished or referred to in the contract documents are furnished for informational purposes only and may not be representative of conditions at the time of construction and shall not be solely relied upon for estimating and/or prosecution of the work. It is expressly understood that the ENGINEER or COUNTY will not be responsible for any interpretation or conclusion drawn therefrom by the CONTRACTOR. Likewise, the ENGINEER or COUNTY will not be responsible for any information provided to the CONTRACTOR by any information agency or other party.

12.2. Weather Conditions. The project area may be affected by tropical storms and hurricanes primarily from June through November, and by stormy and/or rainy weather, including severe thunderstorms, during any time of the year. Wave activity can occur at any time. The CONTRACTOR shall be responsible for obtaining information concerning rain, wind, and wave conditions that could influence safety and construction operations prior to making a bid.

13. SURVEY STANDARDS AND SURVEYOR QUALIFICATIONS

The CONTRACTOR'S surveying personnel shall be duly qualified and experienced to perform all required surveys in a manner satisfactory to the COUNTY. A surveyor registered in the State of Florida shall be responsible for and certify all survey work under their direction. The registered surveyor is not obligated to actually perform the surveys. All surveys shall be in accordance with professional standards and practices. Hydrographic surveys shall be performed in accordance with EM 1110-2-1003 dated November 30, 2013 entitled "HYDROGRAPHIC SURVEYING" and the Florida Standards of Practice as presented in 5J-17 FAC. Survey notes shall be reduced to elevations, be neat, legible, and in accordance with accepted practices and shall include the date performed, weather conditions, bench marks or monument used, name and title of each member of the survey party, and the name of COUNTY's representative present. Survey notes lacking information, illegible, or in error, will be returned to the CONTRACTOR for correction. Surveying instruments shall be checked for adjustment at least once per week and such checks shall be recorded in survey notes and on the quality control sheet.

The commencement point for each profile shall follow the control listed within the Plans. Topographic and bathymetric surveys shall use FDEP Division of Water Resource Management "A" monuments or other National Geodetic Survey (NGS) published 2nd order or higher marks as a basis for survey control. Tabular listings of all horizontal and vertical control on all existing "A" monuments shall be obtained through either the FDEP website or directly from the FDEP office.

All GPS base station control or range/azimuth system control shall be established or recovered from FDEP control monuments (typically "A" stations) and shall meet or exceed Geospatial

Positioning Accuracy Standards, Range VIII. Designation, stamping, description, horizontal position, horizontal RMSE, elevation (in NAVD) and elevation RMSE shall be provided to the ENGINEER for all established base station control. Even if the FDEP R-monuments have been recently verified using "A" monuments, they should be re-verified by the CONTRACTOR. New or replaced FDEP and intermediate monuments shall be based on "A" monuments.

14. ACCESS, WORK AREAS, AND STORAGE AREAS

14.1. **General**. The general location and extent of the construction access areas, staging areas, and work areas are indicated in the Plans. Access points should be minimized as much as practicable. Unless otherwise directed in writing by the COUNTY, the CONTRACTOR is responsible for removing existing vegetation, fencing, and other impediments, as necessary, to allow equipment access and material deliveries to the work area. The CONTRACTOR shall landscape and restore those areas where access routes and staging areas are developed. The cost of preparing and maintaining the project area shall be included in the unit price cost for Supply/Deliver/Place Sand; the cost of restoring the project area shall be included in the lump sum cost for Site Restoration & Grading.

14.2. **Construction Access**. The CONTRACTOR shall limit construction access to the beach at the locations shown in the Plans or as approved by the COUNTY. The CONTRACTOR shall exercise caution when accessing and driving on the beach with vehicles or equipment, particularly with regard to beachgoers and private property. In the event that damage is caused by the CONTRACTOR, the CONTRACTOR shall restore all damage to sidewalks, roads, coastal structures, dune vegetation, or any other structure or natural feature to pre-construction conditions or better. The CONTRACTOR will not receive final payment until all damage is restored to the satisfaction of the COUNTY, as stated in these Specifications. All damage will be repaired at the CONTRACTOR's expense.

14.3. **Staging Area**. Upland staging areas are limited to the construction access and staging areas shown in the Plans. Beach staging areas are limited to the project fill template and alongshore limits shown in the Plans. The CONTRACTOR shall cordon off and/or fence the staging areas to keep the public away from equipment. The staging areas must be restored to the pre-construction condition upon project completion at the cost of the CONTRACTOR. If additional staging areas are needed, they shall be procured by and at the expense of the CONTRACTOR, and with the approval of the COUNTY.

14.4. **Work Area**. The work area limits available to the CONTRACTOR for accomplishing the work are shown in the Plans. Construction access to the beach is shown in the Plans, and as stated in these Specifications.

14.5. **Exclusion of Public**. The CONTRACTOR shall accomplish the work in such a manner so as to minimize disruption to road traffic and the use of the beach. It is the CONTRACTOR's responsibility to exclude the public for safety purposes from the construction access, staging area, and work areas in the immediate vicinity of the active

work, transport operations, or any other area that may be dangerous to the public using a temporary fence and/or appropriate signage. The CONTRACTOR shall minimize the areas closed to the public to what is required to safely conduct the work.

15. USE OF COMPLETED PORTIONS

The COUNTY shall have the right to take possession of, and use, any completed or partially completed portions of the work, prior to the completion of the entire work. Such taking possession and use shall not be deemed an acceptance of any work not completed in accordance with the contract documents.

16. CHANGES AND EXTRAS

16.1. Changes in the Work. The COUNTY shall have the right, within the general scope of the work and without notice to any surety or sureties of the CONTRACTOR, to make changes in the work, including but not limited to changes in the Plans and Specifications pertaining to beach width, beach elevation, beach volume, beach length, environmental protection, contract time, contract price, in or to the method or manner of performance of the work, in or to equipment, materials, service or site, in or to the mode or manner of payment for the work, or directing a change in the rate of performance of the work. All changes shall, except in the case of emergencies endangering the safety of personnel or property, be made by modification of the contract documents or by written change order duly executed by the COUNTY, ENGINEER, and CONTRACTOR. Work necessary in connection with emergency changes in the work shall be strictly limited to the minimum necessary to alleviate the immediate emergency; work beyond such minimum shall be undertaken only pursuant to a properly issued change order received from the ENGINEER. The CONTRACTOR shall promptly comply with any and all written change orders issued by the ENGINEER, notwithstanding any disputes. No such change order shall be deemed to invalidate the contract.

16.2. No Adjustment of Unit Price. The quantity of material to be placed on the beach is based on beach surveys conducted prior to the construction of the project. It is almost a certainty that the forces of wind and waves have altered the beach since development of the estimated fill volume for the project. No adjustment shall be made in any unit price of the contract for changes ordered by the COUNTY that cause an increase or decrease less than or equal to twenty-five percent (25%) in the amount of the work, or by the estimated volume provided in the contract documents of fill material that is to be placed within fill templates. It is further provided, however, that no adjustments shall be made in the contract price or time of performance for either lump sum or unit price work if the change is expressly or reasonably implied by the Plans and Specifications or is incidental thereto, or if the work becomes more difficult than the bid price and contract documents would reflect, or if CONTRACTOR failed to protest, negotiate, comment, or otherwise call to the COUNTY's attention, in writing, any omissions, ambiguities, or conflicts in the contract documents that the CONTRACTOR could have discovered prior to the submission of their bid or execution of the contract.

17. SAFETY

See General Conditions 00700 – 6.13.

18. PERMISSIBLE WORK DAYS AND HOURS

Due to the sea turtle protection requirements in the project permits, construction on the beach is prohibited from May 1 through October 31, inclusive. During the period of November 1 through April 30, construction activity shall be limited to daylight hours, as described in Supplementary Conditions 00800 - 6.02, unless otherwise authorized by the COUNTY. No trucks shall be on-site, including the staging areas, outside of daylight hours. Lighting of the work site is prohibited except as may be specifically authorized in writing by the ENGINEER.

19. PROJECT NOTIFICATION & OBSERVATION

19.1. **Notification**. The CONTRACTOR shall specifically notify the COUNTY and ENGINEER of the CONTRACTOR's intended date of commencement of the following work milestones at least seven (7) days prior or as noted:

(a) Mobilization and material delivery;
(b) Commencement of the site work;
(c) Establishment of horizontal and vertical control work;
(d) Pre-/Post-Placement Surveys (at least one (1) day prior);
(e) Expected substantial completion of the entire work;
(f) Expected completion of the entire work.

19.2. **Project Uncovering**. The presence or absence of the ENGINEER shall not relieve the CONTRACTOR of their responsibility to properly execute the work in close accordance with these Plans and Specifications. The ENGINEER may order any element of the work uncovered, at no additional expense to the COUNTY, in the event the work was not observed by the ENGINEER or surveyed prior to covering. This condition applies to any source of sand coverage, including from natural processes such as wind, waves, and tides.

19.3. **Noncompliance Notification**. The ENGINEER shall notify the CONTRACTOR of any observed non-compliance with the Plans and Specifications and/or applicable Federal, State, or local laws & regulations, promptly upon discovery. The CONTRACTOR shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the CONTRACTOR or their authorized representative, shall be deemed sufficient for the purpose. If the CONTRACTOR fails or refuses to comply promptly, the COUNTY may issue an order stopping all or part of the work until satisfactory corrective action has been taken.

20. PROTECTION OF PROPERTY FROM WORK

20.1. Protection of Property. The CONTRACTOR shall collect and provide a pre-construction video to include (1) staging and access areas to be used for the work and (2) the upland dunes, vegetation, and infrastructure along the beach within the project limits as documentation of the pre-construction conditions. The video shall be provided the ENGINEER prior to the commencement of equipment arrival in the staging areas and before any site work occurs on the beach. All damages to natural areas, and private or public property resulting from the CONTRACTOR's operations shall be repaired by the CONTRACTOR at the CONTRACTOR's expense. The COUNTY shall determine if repairs are required and the COUNTY or owner of the damaged property will determine if the property has been repaired to its previous condition before the CONTRACTOR receives approval of repairs. If the CONTRACTOR fails to repair damages, the COUNTY may conduct the repair and deduct from payment due to the CONTRACTOR the amount of money required for the repair, including all administrative and engineering costs.

20.2. Contractor Responsibility. The CONTRACTOR shall at all times guard the work site or sites and adjacent properties from any damage whatsoever in connection with this contract whether arising from direct operations under this contract, theft, vandalism, or any cause whatsoever. The CONTRACTOR shall at all times protect their own work from damage; nevertheless, the CONTRACTOR is not responsible for natural erosion of beach sections previously accepted by the ENGINEER for payment. The CONTRACTOR shall make good any and all loss, damage, or injury to the work, whether arising from direct operations under this contract, weather or sea conditions, theft, vandalism, or any cause whatsoever. The CONTRACTOR will not be responsible for maintenance of beach sections previously accepted by the ENGINEER, unless the beach is eroded or damaged due to the activities of the CONTRACTOR.

20.3. Risk of Weather Events. All loss or damage arising out of the nature of the work, or from the action of the elements, or from weather events, hurricanes, tropical storms, adverse sea state, or from any unusual obstruction or difficulty, or any other natural or existing circumstances either known or unforeseen, that may be encountered in the prosecution of the work, shall be sustained and borne by the CONTRACTOR at their own cost and expense, including all fill placement that has not been accepted by the ENGINEER for payment.

20.4. Beach Erosion. The CONTRACTOR shall be aware of the dynamic nature of the project site and account for the likelihood of changing site conditions including, but not limited to, beach erosion and accretion, sediment migration and shoaling, and changes required by the project fill template. Based on the CONTRACTOR’s pre-placement surveys, the ENGINEER will evaluate the conditions and make a determination regarding adjustments to the work as prescribed in these contact documents. The CONTRACTOR is not responsible for naturally-occurring erosion of any section of the beach fill after it has been accepted for payment by the ENGINEER; however, the CONTRACTOR is responsible for maintaining the beach fill until it is

accepted by the ENGINEER and to avoid preventable damage to sections that have been accepted by the ENGINEER. The CONTRACTOR is also responsible to grade and eliminate all beach scarps or cliffs in the project fill areas regardless of ENGINEER acceptance, prior to being considered complete and eligible for final payment.

21. SITE CLEAN-UP

21.1. **General**. It is the intent of the COUNTY that the work be accomplished with minimum disturbance to the natural resources adjacent to the work area (specifically, the adjacent upland, lawns, landscaping, trees, dunes, and nearshore areas), and that the immediate and general vicinity of the work area remain in its pre-project state subsequent to completion of the work. All materials utilized by the CONTRACTOR during construction shall be removed from the site; including survey stakes, flagging, and other temporary survey controls. All rock fragments greater than 0.75 inches in any dimension shall be removed from the beach and construction access areas. All accesses to the beach shall be restored to the topographic and vegetative conditions that existed prior to construction. All costs associated with these activities shall be included in the lump sum price for Site Restoration & Grading.

21.2. **Vegetation**. The CONTRCTOR shall submit a Dune Restoration Plan for review by the ENGINEER and COUNTY to restore any impacted vegetation at the construction access, staging area, and/or work areas not shown in the Plans. Any native salt-resistant vegetation destroyed during construction shall be replaced with plants of the same species or, by authorization of ENGINEER, with other native salt-resistant vegetation suitable for beach and dune stabilization. All plants installed in beach and coastal areas (whether to replace vegetation displaced, damaged, or destroyed during construction or otherwise) shall be of species indigenous to Florida beaches and dunes (i.e., sea oats, sea grape, saw palmetto, panic grass, salt meadow hay cord grass, seashore salt grass, and railroad vine).

21.3. **Misplaced Material**. Should the CONTRACTOR during the progress of the work, lose, dump, sink, or misplace any material, plant, machinery, equipment, or appliance, the CONTRACTOR shall recover and remove same within twenty-four (24) hours of receipt of said notice at no additional cost to the COUNTY. The CONTRACTOR shall also give immediate notice to the ENGINEER, with description and location of such material, plant, machinery, equipment, or appliance. Should the CONTRACTOR refuse, neglect, or delay compliance with the above requirements, such material, plant, machinery, equipment, or appliance may be removed by the COUNTY, and the cost of such removal may be deducted from any money due or to become due to the CONTRACTOR or may be recovered under their bond.

21.4. **Road Debris**. The CONTRACTOR shall immediately have those streets or access roadways used for transport of construction materials cleaned or swept of spilled materials (e.g. sand, vegetation, fuel, oil) which resulted from the carriage of material for this work. Collected material shall be disposed of in a legal manner and at the CONTRACTOR's own expense.

21.5. Work Area Debris. The CONTRACTOR shall continually inspect the work areas to ensure that all debris left by the CONTRACTOR's and subcontractor's workers has been removed from the work areas and properly disposed of. This includes, for example, lunch bags, soda cans, drink cups, etc. Any construction debris generated during mobilization, site preparation, excavation, material placement, and/or demobilization shall be removed on a daily basis such that no debris is left on the beach at the end of the day.

22. ELECTRICITY AND OTHER UTILITIES

All electricity, water, and other utilities required by the CONTRACTOR to complete the work shall be furnished at the CONTRACTOR's own expense.

PART 2 – TECHNICAL PROVISIONS

23. CHARACTER OF BEACH FILL MATERIAL

The beach fill material will come from the Stewart Materials Fort Pierce mine. The quality standards are specified herein. The sand quality shall not vary from these standards, and the CONTRACTOR shall report deviations to the ENGINEER and COUNTY. If the ENGINEER or COUNTY determines the sand does not meet this standard based on visual observation or physical sampling, the truck load may be rejected.

23.1. Acceptable Characteristic of Material within Upland Sand Source. Based upon recent geotechnical testing from the COUNTY's 2017 Hurricane Matthew dune repair project, the material provided by the Stewart Materials Fort Pierce mine was within the quality standards described in **Table** 1.

23.2. Potential Differing Upland Sand Source Characteristics. The material found in each of the samples previously tested is indicative only of the material at that discrete time and location within the stockpile. The CONTRACTOR should be aware that it is possible for material of differing characteristics to be present in the stockpile, including material differing from that contained in the samples.

23.3. Quality Characteristics of Fill Material. All fill material must meet the quality requirements of these Plans and Specifications and the Sediment QA/QC Plan (Appendix C). To be permit compliant, no singular sample may exceed any parameter of the sediment compliance Specifications listed in **Table** 1. The CONTRACTOR shall coordinate with on-site COUNTY representatives performing visual inspection, verification of unloading location, verification of truck tickets, collection of sand samples, and chain of custody logging.

23.4. Sediment QA/QC Plan. FDEP has developed a Sediment QA/QC Plan for the upland sand source that applies to this project. This plan must be applied to maintain the quality of the beach nourishment project and extensive testing is an integral part of the plan. The material shall be observed by the CONTRACTOR at the mine while the material is being loaded into the trucks for transport to the project site. The CONTRACTOR shall collect and a minimum of 1 representative sand sample from the mine stockpile for every 3,000 cubic yards of material delivered to the project site. The samples shall be tested at a Licensed Testing Laboratory. The CONTRACTOR shall continuously visually monitor the sediment being placed on the beach to assess grain size, silt content, gravel content, and Munsell color. Additional details relative to observations, sampling, and testing are presented in the Sediment QA/QC Plan. Post-construction sediment sampling and testing will be completed by the ENGINEER.

Table 1 – Sediment Compliance Specifications

Sediment Parameter	Parameter Definition	Compliance Value
Median Grain Size	50% larger/smaller by weight*	0.30 mm – 0.55 mm
Mean Grain Size	Calculated by moment method*	0.33 mm – 0.55 mm
Max. Silt Content	Passing #230 sieve	2%
Max Gravel Content	Retained above #4 sieve	2%
Munsell Color	Moist Hue	10 YR, 2.5Y, or 5Y
	Moist Value	≥ 7
	Moist Chroma	≤ 2
The beach fill material shall not contain construction debris, toxic material, or other foreign matter.		

*Determined using the sieves listed in the QA/QC Plan

23.5. Submittals. The CONTRACTOR shall submit the following samples and documents at the pre-construction meeting:

(a) One (1) U.S. pint (at least 200 grams) sample of the sand being proposed for the project. The submitted sample must be consistent with the laboratory results submitted by the CONTRACTOR. The submitted sand sample and documents shall be considered the CONTRACTOR's certification that he is familiar with the sand specification. The COUNTY may conduct their own laboratory analysis of the submitted sample. The sample shall be used by the COUNTY and ENGINEER as the benchmark sample referred to in the Sediment QA/QC Plan.

(b) Gradation analysis report containing the Mean Grain Size, Silt Content, and Sorting (Standard Deviation) of the submitted sample.

(c) The moist Munsell characteristics (color value, chroma, hue) of the sand.

(d) Other characteristics of the material, including the percentage of carbonate and the exclusion of clay, peat, debris, and larger stones.

(e) A recent certified quality control and laboratory report on the product or pit proposed for this project.

24. CHARACTER OF DUNE VEGETATION MATERIAL

24.1. General. The CONTRACTOR shall supply, deliver, and place approximately 128,800 plants of native salt tolerant dune vegetation as specified in the contract documents. The actual number of plants required and installed may vary depending upon the dimensions of the fill template based on the pre-construction survey and the as-built dimensions of the fill placed by the CONTRACTOR. The plants shall be installed on the dune crest of the constructed dune as depicted by the typical cross section shown in the Plans.

24.2. **Source of Plant Material**. Acceptable plants for the purpose of this contract are nursery grown plants produced vegetatively from first generation foundation material and/or plants produced vegetatively as accessional generations from foundation materials. Plants shall be originate from the Florida peninsula. The contracting nursery shall acclimate plant materials by growing plants in full sun conditions for at least thirty (30) days before planting (i.e., not inside greenhouse, under glass, under shade cloth, etc.). Plants shall be available for inspection at the nursery by the ENGINEER. The CONTRACTOR shall provide written documentation as to the source of the planting units. Certification shall be provided that all plant materials have been produced in accordance with all applicable Federal and State laws. The CONTRACTOR shall secure all permits required for the transportation, collection, and propagation of nursery stock. A copy of all permits required shall be provided to the ENGINEER. Documentation shall include collection permits or contracts from a State, the U.S. Department of Agriculture, or other comparable documents.

24.3. **Plant Size and Containers**. For commercially available plants, all plants shall be provided in four (4) inch containers. The containers shall be square, rectangle, or round in shape and shall be individual containers, not molded trays or tray liners. Containers shall be at least four (4) inches (outside dimensions) across the top length and width, or diameter if round, and a minimum of three and one-half (3½) inches deep. Containers shall be constructed of rigid plastics. Paper, Styrofoam, peats, or other biodegradable container materials are not acceptable. Each container shall have at least three (3) live and actively growing stems. Each of the stems shall have a stem height/length between eight (8) and sixteen (16) inches as measured from the stem-root interface to the stem (not leaf) tip.

24.4. **Plants**. Plants species shall include sea oats (*Uniola paniculata*), bitter panicgrass (*Panicum amarum*), railroad vine (*Ipomoea pes-caprae*), and dune sunflower (*Helianthus debilis*). Approximately 128,800 plants are required for this Project. The COUNTY may adjust the quantity of plants based on field adjustments to the landward limit of fill at the time of construction. The estimated quantities and proportion of plants for the four (4) species used shall be as summarized in **Table** 2. The COUNTY reserves the right to adjust or modify the quantities of plants by up to ±25%. The actual number of plants required and installed may vary depending upon the dimensions of the fill template based on pre-construction surveys and the as-built dimensions of the fill placed by the CONTRACTOR. The percentage distributions shall be achieved regardless of the number of plants installed and within each acceptance section.

Table 2 – Dune Vegetation Distribution

Plant Type	Distribution	Estimated Quantity
Sea Oats	80% - 85%	103,040
Bitter Panicgrass	10% - 15%	12,880
Railroad Vine	4% - 8%	6,440
Dune Sunflower	4% - 8%	6,440
Total:	**100%**	**128,800**

24.5. Plant Condition. All plants shall be "healthy and vigorous" according to horticultural standards. Their roots shall be disease free, moist, and milky white at the time of delivery and installation. The plants shall have a fully developed root ball, with white or light beige roots. Brown, black, or rotting root balls shall be rejected. The plants shall be free of defects, disfiguring, sun scalding, diseases, insects, insect eggs, borers, or other forms of infections or infestation. Plants showing signs of stress, either from drought, pest infestation, disease, or any visible mishandling shall be rejected and shall be replaced at CONTRACTOR's expense. Plants rejected under this Specification will not be considered as delivered to the site and; therefore, not eligible for payment under the unit cost schedule applying to planting units.

25. TRANSPORTATION OF MATERIALS

25.1. Method of Transport. The method of transporting construction equipment and placement of fill shall be at the discretion of the CONTRACTOR; however, methods and equipment shall comply with all permit, production, and environmental requirements. All dump trucks and associated transport equipment shall be kept in good condition. Equipment may be rejected by the ENGINEER or COUNTY based on safety or environmental issues.

25.2. Traffic Regulations. The CONTRACTOR is responsible for complying with all Department of Transportation, County, and other local regulations regarding weight limits for bridges, roads, and railways utilized for transport. The CONTRACTOR is likewise responsible for complying with all applicable traffic, safety, and speed laws. Repeated failure of the CONTRACTOR to comply with applicable load and traffic regulations will result in suspension of transport operations until the CONTRACTOR demonstrates to the satisfaction of the COUNTY that the CONTRACTOR has taken sufficient steps to ensure compliance with these regulations. The CONTRACTOR shall notify, and coordinate with, local law enforcement and highway agencies regarding transport activities that shall be undertaken for the work.

25.3. Flagmen. The CONTRACTOR shall provide and maintain barricades, warning signals, and flagmen as required by Federal, State, or local regulations and the CONTRACTOR'S Traffic Control Plan. Any costs associated with this requirement shall be included in the CONTRACTOR's bid.

26. SURVEY LAYOUT AND CONTROL

26.1. Layout of Work. The CONTRACTOR shall provide at their own expense all stakes, templates, platforms, equipment, tools, materials, and labor as may be required in laying out any part of the work. The CONTRACTOR shall utilize FDEP "A" monuments and control data shown in the Plans to establish a construction baseline and pay profile locations at the intervals shown in the Plans. The CONTRACTOR shall utilize cross-sections provided by the ENGINEER at FDEP monuments in order to establish the lines and grades at the approximate 100 foot on-center profiles, if not provided by the ENGINEER. If the CONTRACTOR elects to establish temporary

beach marks (TBMs) through the work site, they shall be established by a closed loop of levels from a permanent bench mark, a line of levels between two permanent bench marks, or using GPS-RTK. Work layout may be subject to modifications by the COUNTY to meet changed conditions or as a result of other required modifications to the work. The layout of the work shall be made from the updated cross-sections and not the plan views in the contract drawings. The CONTRACTOR may use any other control and establish any profile cross-sections deemed necessary for the layout of work. All beach surveys will be referenced to NAVD.

26.2. Contractor Acceptance of Survey Control. The FDEP "A" monument location coordinates and elevations for the work site are indicated in the Plans, but shall be independently verified by the CONTRACTOR and their surveyor. The CONTRACTOR shall immediately notify the ENGINEER if any discrepancies are discovered in any of the information presented concerning all beach monumentation, including FDEP monuments. If the CONTRACTOR does not notify the ENGINEER, it is understood that the CONTRACTOR agrees with all information presented in the Plans related to beach monumentation elevation and control information.

26.3. Disturbing Monuments. The CONTRACTOR shall not disturb permanent markers or monuments and shall be responsible for maintaining and preserving all monuments, stakes, and other markers established by the COUNTY unless and until authorized to remove them. If such markers are disturbed and/or destroyed by the CONTRACTOR, or through CONTRACTOR negligence, prior to their authorized removal, they may be replaced at the discretion of the COUNTY, and the expense of replacement will be deducted from any amounts due or to become due the CONTRACTOR.

26.4. Grade Stakes. Construction and grade stakes, and any other stakes for any purpose, shall be made of steel pipe that can and will be removed intact after filling to cross sections accepted by or as directed by the ENGINEER. Stakes consisting of wood, plastic, or other materials will not be accepted. All stakes shall be of sufficient length above grade so they may not be accidentally covered by the fill. The CONTRACTOR shall consecutively number each piece of pipe used for grade stakes, shall clearly mark that number upon the pipe, and shall record the location of each numbered pipe in a grade stake log. The removal of each numbered pipe shall be recorded in the grade stake log at the time of the pipe/stake removal. At the request of the ENGINEER, all of the grade stake pipes shall be displayed after their removal to demonstrate those pipes that have been removed. It is the CONTRACTOR's responsibility to track, locate, and completely remove all grade stakes in their entirety to the satisfaction of the ENGINEER. The CONTRACTOR shall also remove all temporary marking stakes used for the work layout upon completion of the project.

Upon completion of construction in an area, the CONTRACTOR shall conduct a search using a suitably sensitive metal detector to find each and every stake placed by the CONTRACTOR in the area. The search and removal of all stakes shall be certified by the CONTRACTOR. The CONTRACTOR will not be eligible for payment until the CONTRACTOR certifies that all grade stakes in completed sections have been

removed. Sections of beach upon which the search for, and removal of, stakes is complete shall be documented in the Daily Quality Control Reports. Any grade stakes left in the beach will be the sole responsibility and liability of the CONTRACTOR. Any injuries to the public which may occur because grade stakes were left in the beach by the CONTRACTOR will be the responsibility and the liability of the CONTRACTOR. If the CONTRACTOR fails to remove grade stakes in a timely manner, the COUNTY may have the stakes removed and deduct the cost from the CONTRACTOR's final payment.

26.4.1. Grade Stake Log. The CONTRACTOR shall prepare and maintain a log to inventory the grade stakes used on the project. The log shall include information concerning the location, installation, and recovery of all grade stakes. The CONTRACTOR shall make this log available for review by the ENGINEER upon request. Upon completion of the project, the CONTRACTOR shall furnish the log to the ENGINEER.

26.4.2. Grade Stake Recovery. After completion of the project, the CONTRACTOR shall provide a letter to the ENGINEER certifying that all grade stakes have been recovered in accordance with the CONTRACTOR's approved Grade Stake Recovery Plan.

27. PAY PROFILES

27.1. General. The surveys required to supplement construction and payment shall be taken at pay profile locations indicated in the Plans. The CONTRACTOR shall establish intermediate profiles in addition to those shown in the Plans to construct the project in accordance with plan view layout. The CONTRACTOR may submit the intermediate profiles for payment subject to review and approval by the ENGINEER. The CONTRACTOR shall survey between the +13, +14, or +15 foot NAVD contour (depending on profile location) or landward edge of fill to 100 feet beyond the seaward toe of fill shown in the Plans. The landward edge of fill is located at the edge of vegetation, seawall, or the +13, +14, or +15 foot NAVD contour intersection with the existing beach. The pay profiles shall be labeled as their distance along the project baseline. The pre-placement survey for the each acceptance section shall be completed no greater than seven (7) days prior to fill placement in each acceptance section.

Payment for beach fill placement will be based on the tonnage of sand placed within the fill template and allowable tolerances as computed from truck tickets and verified by comparison of the pre- and post-placement surveys conducted on the dressed beach and certified by the CONTRACTOR's surveyor, as described in Section 36. The ENGINEER will verify the pay quantities provided by the CONTRACTOR, based on the submitted truck tickets and comparison of pre- and post-placement surveys conducted by the CONTRACTOR's surveyor and accepted by the ENGINEER. Surveys will be performed by a surveyor employed by, or a subcontractor of, the CONTRACTOR. The CONTRACTOR shall notify the ENGINEER a minimum of one (1) day prior to when the surveys will be conducted so that the ENGINEER may

observe the survey as it is conducted. The CONTRACTOR's surveyor shall certify all surveys and the ENGINEER must agree, based on submissions provided by the CONTRACTOR's surveyor, that the survey may be used for payment purposes. All survey work conducted by the CONTRACTOR for payment is subject to acceptance by the ENGINEER. The ENGINEER, at their discretion, may conduct surveys to verify surveys performed by the CONTRACTOR for payment purposes.

27.1.1. Pre-Construction Survey. The most-recent semiannual beach survey conducted by the COUNTY as part of the county-wide monitoring program, scheduled for July 2019, will be used as the pre-construction survey for this project to update fill volumes prior to the commencement of construction and to satisfy environmental permit requirements.

27.1.2. Pre-Placement Survey. Pre-placement surveys will be conducted by the CONTRACTOR at the spacing and location of pay profile lines as identified in the Plans, which are generally 100 feet apart. Pre-placement surveys will be conducted to a minimum distance of 100 feet seaward of the construction toe of fill. The pre-placement survey will be used as the baseline for payment for the beach fill project. The CONTRACTOR shall not commence construction until the ENGINEER has received the certified (signed and sealed) pre-placement survey and has reviewed the survey for use as the pre-placement survey. The fill template and volume may be revised at the ENGINEER’s discretion using the pre-placement survey results, as the bid volume may vary since the design and pre-construction survey.

27.1.3. Post-Placement Survey. Post-placement surveys will be conducted by the CONTRACTOR at the same spacing and location specified in Section 27.1.2. Post-placement surveys shall not be conducted until the beach has been dressed to provide a level and uniform beach surface, removing all depressions, gullies, or other features in the beach which may affect the accuracy of the survey and the volume computation. The post-placement pay survey shall be conducted prior to tilling the beach.

27.1.4. Post-Construction Survey. The COUNTY’s surveyor will conduct the post-construction survey as part of the county-wide monitoring program to satisfy environmental permit requirements.

27.2. Survey Field Notes Submittal. The CONTRACTOR shall submit survey field notes to the ENGINEER upon completion of each pre-placement or post-placement survey to expedite review of each survey. All field notes, survey and volume computations, and the records used by the CONTRACTOR to compute the payment fill quantity shall be furnished to the ENGINEER with the application for progress or final payment. Failure to provide the specified information will delay recommendation and payment.

27.3. Survey Error or Volume Computation Discrepancy. If there is an error or discrepancy in the survey conducted by the CONTRACTOR which affects the payment volume, the CONTRACTOR and the ENGINEER's surveyors will attempt to resolve

the survey discrepancy or error. If the discrepancy or error cannot be resolved, the ENGINEER will compute the fill volume for payment purposes. Likewise, if there is an error or discrepancy concerning the payment volume computation, the ENGINEER and CONTRACTOR will attempt to resolve the issue. Nevertheless, the volume determined to be correct by the ENGINEER shall be the volume used for payment purposes.

27.4. Fill Section Rejection. The notification of rejection of a fill section will be based on notification to the CONTRACTOR from the ENGINEER. After the survey data has been received by the ENGINEER, the ENGINEER will have seven (7) days to review the data and prepare a written response if a section has been rejected, and the reason for rejection.

27.5. Beach Fill Pay Profile Lines. The pre- and post-placement surveys shall be conducted at the intervals and locations as indicated in the Plans and shall extend offshore a minimum distance of 100 feet seaward of the termination of the construction toe of fill. Profiles to be used for payment purposes are strictly limited to profiles specifically defined by the project baseline in the Plans. For example, FDEP R-monument profile line R-70 will be the first payment station, with payment profile lines spaced generally at 100 foot intervals to the south except at the location of the FDEP monuments where the spacing varies to include the FDEP profile location. Pay quantity verification calculations will utilize the distance between adjacent pay profile lines as shown in the Plans.

27.6. Survey Requirements. All beach profile surveys shall be conducted by either differential leveling techniques or with RTK-GPS technology to a minimum distance of 100 feet seaward of the termination of the construction toe of fill. The CONTRACTOR shall close all level loops; the closure shall be less than 0.04 feet. All onshore points shall be within ±3 feet of the established profile line.

27.7. Profile Line Azimuth and Measurements. Profile line surveys shall be conducted along the azimuth indicated in the Plans. A sufficient number of points will be taken along each line to ensure adequate measurements of the entire profile line including topographic features, major breaks in slope, beach berms, foreshore, and intersection of the fill with the bottom, with a maximum elevation difference of approximately one (1) foot between adjacent points. Data points shall be taken at a spacing of not more than ten (10) feet. The product shall be a continuous line representing the entire beach fill profile plus a minimum of 100 feet seaward of the construction toe of fill.

27.8. Beach Survey Deliverables to the Engineer. Deliverables to the ENGINEER shall include processed and tide corrected survey data of easting, northing, and elevation (XYZ) from each of the pay stations in ASCII format provided digitally (via email, FTP, flash drive, or on a compact disk (CD)) and illustrated in cross-sections on digital or hard copy plots. Cross-section plots shall show the survey, the construction template, the upper and lower tolerance, and the mean high water line. Additional information to be provided to the ENGINEER shall include any corrections and field notes.

27.9. Survey Documentation. All survey work shall be documented and copies supplied to the ENGINEER. The surveys may be conducted in the presence of the ENGINEER or their representative, at the option of the ENGINEER. The CONTRACTOR shall provide one (1) day advance notice to the ENGINEER prior to conducting surveys for payment.

28. BEACH FILL PLACEMENT

28.1. Debris Removal. Prior to placement of fill, the CONTRACTOR shall remove from the site of the work all snags, driftwood, and similar debris lying within the foundation limits of the beach fill section. All materials removed shall be taken from the beach area and disposed of in an appropriate and legal manner and at the expense of the CONTRACTOR. Grading and construction equipment will not be permitted outside the project limits as shown in the Plans except for ingress or egress to and from the site.

28.2. Fill Placement Requirements. The material shall be placed and brought to rest on the beach to the lines, grades, and cross-sections indicated in the Plans, unless otherwise provided for herein or directed by the ENGINEER. The CONTRACTOR shall maintain and protect the fill in a satisfactory condition at all times until final completion and acceptance of the work. The beach is subject to changes and the elevations on the beach at the time the work is done may vary from the elevations shown in the Plans. The pay volumes may vary dependent upon the availability of capacity within the permitted fill template at the time of construction. The CONTRACTOR is to place the fill on the beach in such a manner as to establish a uniform beach between adjacent pay profile lines. Sections of beach located between pay profiles will not be underfilled, as defined in the contract documents.

28.3. Fill Placement Restrictions. The fill shall extend landward to the existing elevation contour that matches the dune/berm crest elevation shown in the Plans unless features (e.g. dunes, vegetation, or structures) prohibit fill placement. If a feature extends to the design berm elevation or above, the fill shall terminate at the seaward face of the feature. If the top of structure is below the dune/berm crest elevation, then the fill shall taper landward using a one (1) foot vertical to five (5) feet horizontal slope to one (1) foot below the crest of the structure to prevent burial or overtopping with sediment. If a dune vegetation line is below the dune/berm crest elevation, then the fill shall taper landward using a one (1) foot vertical to five (5) feet horizontal slope to the edge of the vegetation.

28.4. Control of Fill. The CONTRACTOR shall make every attempt to retain placed fill within the beach fill template. The CONTRACTOR shall protect existing drainage and operations. Any material permitted to flow into or restrict the flow of an existing ditch, canal, or drain pipe, shall be promptly removed. Structures within the fill section shall be protected by the CONTRACTOR to prevent damage thereof by the CONTRACTOR's operations.

28.5. **Uniform Beach**. The filled beach between the pay profiles shall be graded, dressed, and uniform in dimension. Beach sections between pay profiles shall be filled to a minimum of ninety-five (95%) percent of the volume based on the fill templates shown in the fill template cross-sections in the Plans, and to the minimum tolerance everywhere. The constructed beach contour lines between pay profiles, including the beach berm break, will be approximately parallel and straight, indicating that the CONTRACTOR constructed a uniform (non-cuspate) beach between the profile lines to the appropriate elevation and width.

28.6. **Underfilling Between Pay Profile Lines**. If the ENGINEER or COUNTY observe or believe they have observed underfilling of the beach between pay profile lines, the ENGINEER or COUNTY may request an additional survey be conducted by the CONTRACTOR at the CONTRACTOR's expense. If found to be deficient, the CONTRACTOR shall place additional fill until the beach is uniform in appearance and dimensions between pay profile lines, provides a straight beach berm break between pay profile lines, provides a minimum of ninety-five (95%) percent of the design fill volume, and meets the minimum tolerance at all locations in the acceptance section in order to qualify for payment of that section. Fill will not be obtained from adjacent areas of the beach to remedy under filling.

28.7. **Dressing the Restored Beach**. Upon completion of all filling operations within an acceptance section, and prior to surveying for payment, the fill shall be graded and dressed with a dragged pipe so as to eliminate any undrained pockets, ridges, and depressions in the beach fill surfaces. The CONTRACTOR is to grade and dress the fill on the beach in such a manner as to establish a uniform berm width and slope between adjacent pay profile lines with a positive seaward slope between the seaward toe of dune and seaward berm crest within the vertical tolerance specified in Section 28.9. The bank or scarp caused by wave erosion shall be graded down to a slope not steeper than one (1) foot vertical to eight (8) feet horizontal to the water's edge. The CONTRACTOR shall grade down any and all beach scarps or sand cliffs in the entire restored beach until the CONTRACTOR has demobilized from the project site. The project site will not be considered complete, nor the CONTRACTOR eligible for final payment, until all beach scarps in the entire project area are graded.

28.8. **Right to Vary Beach Design Dimensions**. The ENGINEER reserves the right to vary the width or grade of the berm from the lines and grades shown in the Plans due to changes in beach conditions. The beach fill cross-sections shown in the Plans are for the purpose of estimating the amount of fill needed and will be used by the ENGINEER in making any change in the lines and grades.

28.9. **Tolerances**. Progress payments will be for fill placed within the construction template of accepted sections only, as shown in the Plans and updated by the ENGINEER using the pre-placement survey. Because overfilling the templates may indirectly increase impacts to nearshore hardbottom, the CONTRACTOR shall not overfill the templates by volume. The ENGINEER may require excess fill to be removed from overfilled sections at no cost to the COUNTY. Payment requests for material placed outside of

the construction template will not be considered if they exceed the template volume. The maximum vertical tolerance above and below the template is 0.5 feet. Fill placement must at least meet the 0.5 feet tolerance below the template everywhere within areas filled and for which payment has been requested. The CONTRACTOR shall refill any deficient section of beach to at least meet the below template tolerance, and to ninety-five (95%) percent of the fill volume for the acceptance segment. The COUNTY will withhold payment for those sections of beach that do not meet the minimum fill requirements until the appropriate fill placement and grading has been completed by the CONTRACTOR.

28.10. Existing Infrastructure. The CONTRACTOR shall coordinate with the ENGINEER and COUNTY prior to placement of sand at locations including Seaquay Pier, Ocean Grill, Caledon Shores Condominium, and existing outfalls. Placement of sand at these locations shall not be under, over, or inside the structure. The COUNTY may request the CONTRACTOR to place an equivalent quantity of sand adjacent to the structure or using manual methods. Field adjustment of the construction template may be required.

29. BEACH TILLING AND SCARP LEVELING

29.1. Beach Tilling. Following the completion of beach filling, dressing, and payment survey, the CONTRACTOR will till the constructed portion of the beach to loosen the compaction of the placed material. Tilling will be to a minimum depth of 36 inches throughout the newly placed beach seaward to the visible high water mark to the landward extent of fill placement. The tilling shall be by use of a tracked vehicle (bulldozer, loader, or equivalent) by pulling (rear mount) or pushing (front mount) a rake with the tines of a length appropriate to achieve a tilling depth of 36 inches. Tines will be spaced 15 to 18 inches apart. The CONTRACTOR shall conduct additional tilling as necessary to ensure all of the beach fill above the mean high water line has a compaction of less than 500 cone penetrometer units, as determined by the ENGINEER. Following tilling, the beach shall again be dressed by dragging a pipe (or similar) lengthwise over the beach. The pipe may be positioned immediately behind the tilling tines to allow for a single operation of tilling and dressing. All tilling and dressing will be conducted during daylight hours only.

29.2. Scarp Leveling. The CONTRACTOR shall inspect the entire beach project area for the formation of sand escarpments. Any escarpments exceeding 12 inches in height (on average), independent of the length, shall be leveled or smoothed to eliminate the escarpment. The ENGINEER will observe the beach after leveling of escarpments to ensure that the ENGINEER agrees that all escarpments have been leveled in compliance with permits. The CONTRACTOR shall level any escarpments found by the ENGINEER or COUNTY, at their request.

30. DUNE VEGETATION PLACEMENT

30.1. General. Following the placement and acceptance of fill within an acceptance section, dune vegetation shall be installed on the constructed dune crest as shown in the Plans.

In the event that there are surplus plants, the CONTRACTOR shall coordinate with the ENGINEER and COUNTY to install plants on the uppermost portion of the seaward dune slope, or on the landward dune slope to enhance areas of existing dune vegetation. The plants shall be installed by accessing the dune crest from the beach to avoid damaging existing vegetation.

30.2. Transportation and Delivery. All plants shall be specifically protected in such a manner as to ensure adequate protection against climatic, seasonal, mechanical, or other injury during transit, loading and unloading, holding, and planting. Special care shall be taken for prompt delivery and careful handling in loading and unloading. Plants shall be transported in an enclosed truck or trailer. Stems cannot be broken, nor physically damaged during transportation. Damaged plants will be rejected and shall be removed immediately at the CONTRACTOR's expense. The CONTRACTOR shall inform in writing for approval of the method of transporting plants from the nursery to the delivery site and from the delivery site to the planting site to the ENGINEER for approval.

Each individual shipment of plants to the delivery site shall be accompanied by a delivery slip indicating the following information: 1) source of plant material including nursery name, 2) species including scientific and common name, if applicable, 3) plant size, 4) quantity being delivered, and 5) date of delivery. Shipping slips are to be signed by the CONTRACTOR. Copies of the slips shall be provided with the daily quality control reports. The COUNTY and ENGINEER shall be notified three (3) days prior to each plant delivery to allow for plant count.

30.3. Planting Layout. The specific location of planting boundaries, rows, and baselines shall be marked on site by the CONTRACTOR. The COUNTY and ENGINEER reserve the right to alter the boundaries, rows, and plant spacing, if necessary. Planting shall occur only after the dune within an acceptance section has been constructed and accepted by the ENGINEER.

30.4. Planting Installation

30.4.1. The specific location of planting boundaries, rows, and baselines shall be marked on-site by the CONTRACTOR. The plants shall be installed 18" on-center in staggered shore-parallel rows 18" apart.

30.4.2. Plants shall be planted on the same day they are delivered to the site if possible. Plants shall not become stressed prior to planting. Plants shall retain their stem and leaf rigidity at all times indicating adequate moisture is being received. Plants shall be watered within the salinity ranges they were grown. The CONTRACTOR shall take the necessary precautions to ensure that plant materials received adequate water during all phases of the work prior to actual planting. Plants appearing discolored, shriveled, dehydrated, or otherwise stressed shall be rejected.

30.4.3. All containerized plants shall be planted in a dug hole. The plant shall be removed from the container immediately prior to planting and placed into the hole. The depth of the hole shall be at least six (6) inches below normal ground. A minimum of 8 ounces of pre-hydrated gel shall be added prior to plant installation so that the root ball, not the stems, is in contact with the gel. A pre-hydrating water gel, such as Stockosorb®, or approved equal, shall be used for all planting units per gel manufacturer specifications. Once the gel is added and the plant is installed, the distance from the top of the root ball to the sand surface shall be no less than four (4) inches.

For each planting unit, slow release fertilizer shall be added to the gel prior to planting unit installation. A minimum of 2 grams of slow release fertilizer shall be included with each plant. The slow release (90-day) pelletized Osmocote®, or approved equal, shall have an N.P.K. ratio of 18.6.12 with trace elements.

30.4.4. All debris, trays, buckets, etc. shall be removed from the working areas at the end of each work day

30.4.5. The CONTRACTOR's daily quality control report shall document the number of plants delivered and installed, watering methods, and other pertinent information.

30.5. Planting Irrigation and Fertilization

30.5.1. A minimum of seven (7) days prior to the first dune planting, the CONTRACTOR shall submit, for approval, a Planting Irrigation and Fertilization Plan to the ENGINEER. Approval by the ENGINEER indicates an acknowledgement and not an endorsement of the CONTRACTOR's means and methods.

30.5.2. The CONTRACTOR shall water-in (initially irrigate) all newly installed planting units according to a CONTRACTOR-prepared and ENGINEER-approved Planting Irrigation and Fertilization Plan. The CONTRACTOR will be responsible for all aspects of the initial irrigation including compliance with all environmental permitting regulations, requirements, and conditions stated in the permits which address maintenance irrigation and installation activities.

30.5.3. The CONTRACTOR will be responsible for the provision of all irrigation water required under this bid. Freshwater (potable only) shall be provided by the CONTRACTOR and applied to the planting zones using a non-scouring spray applicator. The CONTRACTOR shall make all necessary arrangements with the appropriate local agencies if the use of local hydrants in the area is desired.

30.5.4. The CONTRACTOR shall maintenance irrigate the installed planting units according to the CONTRACTOR-prepared and ENGINEER approved irrigation schedule. The CONTRACTOR will be responsible for all aspects of the maintenance irrigation including compliance with all environmental permitting

regulations, requirements, and conditions stated in the permits which address maintenance irrigation and installation activities.

30.5.5. The application of maintenance fertilization during the 90-day warranty period may be undertaken by the CONTRACTOR at the CONTRACTOR's discretion. The cost of any and all fertilization shall be included in the unit cost for Supply/Transport/Place Dune Vegetation. Maintenance fertilization, if employed, shall be undertaken in a manner compliant with all environmental permits applicable to the work. The CONTRACTOR shall maintenance fertilize the installed planting units according to the CONTRACTOR-prepared and ENGINEER-approved Planting Irrigation and Fertilization Plan. Whether the CONTRACTOR chooses to maintenance fertilize or not, compliance with all provisions of the Specifications including, but not limited to, the survival guarantee and replanting sections of the Specifications shall be met.

30.5.6. The cost of maintenance irrigation and fertilization events anticipated by the CONTRACTOR shall be included in the unit cost for Supply/Transport/Place Dune Vegetation.

30.6. Planting Survivability

30.6.1. The CONTRACTOR shall maintain 100% survival for an establishment period of fourteen (14) days after planting during the maintenance period. Plants that do not survive this period will not be eligible for payment. If replanting is necessary due to death, stress, etc., with the exception of those plants lost due to conditions beyond the control of the CONTRACTOR, the CONTRACTOR is responsible for the replacement of the affected plants within five (5) days following notice of delinquency. Replanting shall be performed by the CONTRACTOR at no cost to the COUNTY. The replacement planting units will be considered eligible for payment as original planting units only after they have survived the fourteen (14) day maintenance period.

30.6.2. The CONTRACTOR shall also be responsible for controlling weeds and prevention of invasive exotic and/or nuisance species encroachment within the planting area for the duration of the contract. At the end of the contract, the CONTRACTOR shall provide the ENGINEER with written instructions for the continued watering, if necessary, and care of the plants.

30.6.3. The planting survivability criterion may be waived, at the discretion of the ENGINEER, in areas where it can be documented that plant survival has been adversely affected by unexpected pedestrian traffic, wind erosion, or overwash.

30.7. Planting Warranty Period

30.7.1. The CONTRACTOR shall warranty all dune plants for 90 days. During this warranty period, for each of the planting areas a minimum survival rate of 80% of

all planting units installed for all species shall be met. Within planting areas of questionable growth/success results, the ENGINEER or COUNTY reserves the right to inspect root penetration for possible replant by the CONTRACTOR. Thirty (30) plants within each questionable planting area may be randomly selected to be dug up for root growth inspection. Eighty (80) percent of selected plants shall have achieved root penetration of 9" or greater for both grass species. The planting survival shall be deemed a success if both individual planting unit survival and root penetration are met.

30.7.2. If any of the above success criteria are not met, as determined by the ENGINEER, the CONTRACTOR shall replant non-confirming units with viable (and within Specifications) planting units of the same type in all areas considered to be deficient according to the planting unit success criteria. The replanting of planting units shall be the sole responsibility of the CONTRACTOR and will be completed at no additional cost to the COUNTY. All original maintenance, warranty, and survival requirements shall apply to replanted planting units.

30.7.3. The success criterion during the warranty period may be waived, at the discretion of the ENGINEER, in areas where it can be documented that plant survival has been adversely affected by unexpected pedestrian traffic, wind erosion or overwash.

31. CONSTRUCTION PLANS AND CONTRACT DOCUMENTS

A minimum of one (1) complete set of Plans and contract documents (with permits) shall be kept in the construction site field office. In addition, the surveyor shall have at least one set. Permit notices shall be predominantly displayed at the active work site in accordance with regulatory requirements.

32. NIGHTTIME OPERATIONS

Nighttime is defined as the period of time from sunset to sunrise. Truck haul operation can only occur from sunrise to sunset Monday through Friday. No nighttime or weekend construction activities are permitted. The CONTRACTOR shall minimize noise, so as not to disturb residents living along the beach in the project area. Beach dressing, final grading, tilling, and re-dressing will be limited to daylight hours only. The CONTRACTOR shall design their schedule to avoid nighttime work. If requested by the CONTRACTOR, the COUNTY may consider weekend operations.

33. RETAINAGE

Payments are subject to a retainage per the COUNTY's Standard Terms and Conditions. Upon final acceptance and satisfaction of all requirements of the contract documents, the withheld retainage shall be included in the final payment.

34. PAYMENT FOR MOBILIZATION AND DEMOBILIZATION

34.1. **General**. The work specified in this section consists of the preparatory work and operations in mobilizing for beginning work on the project, including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site, and for the establishment of temporary offices, buildings, utilities, traffic control, safety equipment, first aid supplies, sanitary, and other facilities, as required by these Specifications, the special provisions, and applicable laws and regulations. The costs of bonds and any required insurance, and any other pre-construction expense necessary for the start of the work, excluding the cost of construction materials, shall also be included in this section.

34.2. **Mobilization**. All costs connected with the mobilization and demobilization of all the CONTRACTOR's equipment and personnel will be paid for at the contract lump sum price for this item. Sixty percent (60%) of the lump sum price will be paid to the CONTRACTOR after the placement of a quantity of, at minimum five-thousand (7,500) tons of material on the beach and placed within the beach fill template for a minimum of four (4) days. The remaining forty percent (40%) will be included in the final payment for work under this contract. Payments for mobilization and all payment except for the final payment will be subject to a retainage until final acceptance of the project by the COUNTY per the COUNTY's Standard Terms and Conditions.

34.3. **Cost Review**. In the event that the cost for the mobilization and demobilization does not bear a reasonable relation to the cost of the entire work in this contract, then the ENGINEER may require the CONTRACTOR to produce cost data to justify this portion of the bid. The ENGINEER will utilize previously bid projects of a similar nature as a guideline to evaluate the mobilization and demobilization costs. Failure to justify such price to the satisfaction of the ENGINEER will result in payment of mobilization costs, as estimated by the ENGINEER at the completion of mobilization, and payment of the remainder of this item in the final payment under this contract.

35. PAYMENT FOR ENVIRONMENTAL COMPLIANCE

Payment for labor, materials, equipment, fuel, oil, and all other appropriate costs in connection with environmental compliance at the beach fill site will be paid for at the lump sum price on the Bid Schedule for "Environmental Compliance." Progress payments will be made based upon the percent of beach fill work completed and accepted during each month. All costs associated with environmental compliance of the work shall be included in the lump sum price for Environmental Compliance. Acceptance of the work will be determined from review by the ENGINEER of monthly activities and CONTRACTOR reporting.

36. PAYMENT FOR SUPPLY/DELIVER/PLACE SAND

36.1. **General**. Other than costs for mobilization, demobilization, environmental compliance, dune vegetation, site restoration and grading, and pre-construction and as-built surveying, all other costs associated with the beach nourishment project including

but not limited to, debris removal, site cleanup and preparation, laboratory testing, site repairs, maintenance of traffic, sand transport, staging, and placement shall be included in the contract unit price per ton on the bid form. The unit price shall also include all other items of overhead, profit, labor, material, and any other costs incidental to performing the work.

36.2. **Basis of Payment**. The basis of the payment will be the weight of sand delivered and placed on the beach within the design template, and the location and volume of placement will be verified by the pre- and post-placement surveys. Reconciliation of truck tickets created at the mine and collected at the beach stockpile is essential for accurate payments. The CONTRACTOR shall collect, log, and furnish copies of all truck tickets at the project site prior to placement on the beach in accordance with the approved methodology statement described in Section 7.1. COUNTY inspectors will collect a copy of truck tickets at the beach delivery site. Sand removed from the beach and placed in the berm will not count towards the pay volume (tonnage). The CONTRACTOR shall not place or manipulate the sand to change its unit weight or volume prior to placement surveys.

36.3. **Requests for Payment**. The CONTRACTOR may request payment for fill placement on a monthly basis, and at completion of the project, upon final acceptance by the ENGINEER of the completed beach nourishment sections. The CONTRACTOR will be eligible for progress payments when fill sections have been filled to a minimum of 95% of the total beach fill section volume. The beach fill volume for a section is the volume to completely fill the approximate 100-foot section along the project baseline to the construction template requirements shown in the Plans. The CONTRACTOR may conduct surveys for payment purposes after completion and dressing of five (5) adjacent fill sections; however, after the initial payment, future payment will be based on the filled and dressed adjacent acceptance sections completed during the previous pay period, which have been approved for payment by the ENGINEER. The CONTRACTOR shall submit to the ENGINEER and COUNTY for review on a monthly basis, an application for progress payment filled out and signed by CONTRACTOR covering the work completed as is required by the contract documents and accompanied by such supporting documentation as is required by the contract documents and also as the ENGINEER may reasonably require. All payments will be subject to retainage per the COUNTY's Standard Terms and Conditions until final acceptance of the project.

36.4. **Fill Tolerances**. Payment shall be for fill placed within the construction template only, as shown in the Plans and updated by the ENGINEER using the pre-placement survey. The minimum vertical tolerance below the template is 0.5 feet and shall be achieved everywhere within areas filled and for which payment has been requested. Notwithstanding these fill placement tolerances, fill placement must at least meet the 0.5 foot tolerance below the construction template everywhere on the constructed beach berm within the project limit shown in the Plans, and the minimum requirement of 95% of the fill volume for each acceptance section must be met. The CONTRACTOR shall fill any deficient section of beach to, at minimum, meet the template tolerance

everywhere on the constructed beach berm, and to a minimum of 95% of the fill volume for the acceptance section. The COUNTY will withhold payment for acceptance sections that do not meet the minimum required fill requirements until the required fill placement and dressing has been completed by the CONTRACTOR.

36.5. Computation of Payment Quantities. Computation of pay tonnage will be based on truck tickets collected for sand placed within the acceptance sections. Computations of volumes shall be made by the CONTRACTOR and ENGINEER using survey data provided by the CONTRACTOR to verify tonnage placed and to support regulatory requirements. Quantities of beach fill satisfactorily placed and meeting beach fill design template requirements and volumes will be computed for payment by use of the average end-area method. The distance between each profile line to be used for fill computation is the perpendicular distance between each profile line along the project baseline shown in the Plans. The CONTRACTOR shall account for this method of fill volume calculation when estimating the bid prices. Payment will be provided for fill contained within the payment profile construction templates, as shown in the Plans. No payment will be provided for fill placed above the tolerance, or outside of the template, except as indicated below. The CONTRACTOR's bid shall account for any costs associated with the payment profile requirements, the azimuth of profile lines, the profile measurement technique, survey requirements, potential loss of sand before section survey and acceptance, and the payment volume calculation methodology.

36.6. Compensatory Slope Adjustment. During placement of fill, wave conditions may adjust the slope of the placed fill beyond the fill template. In recognition of this natural phenomena, fill located seaward of the fill template slope may qualify for payment where such placed fill is (a) within the limits of the fill project area shown in the Plans, (b) below the mean high water line, (c) contiguous to the fill template, (d) above the pre-placement profile survey, and (e) measured within the post-placement profile survey. Compensatory slope volumes will be applied only to compensate for lost volume from the template slope below the mean high water line. This volume will not be used to compensate for volume deficiencies within the fill template on the beach berm located landward of the mean high water elevation on the template slope, or along other fill profiles identified in the Plans. This clause does not relieve the CONTRACTOR from grading the beach berm and slope as shown in the Plans. Compensatory fill volume shall not quality for payment other than that portion of the volume which was relocated by natural forces seaward beyond the template slope shown in the Plans.

37. PAYMENT FOR SUPPLY/DELIVER/PLACE DUNE VEGETATION

37.1. General. Payment for mobilization, demobilization, labor, materials, equipment, fuel, oil, and all other appropriate costs in connection with dune vegetation, including but not limited supplying, transporting, and installation of plants, and monitoring of planting success during the maintenance and warranty periods, shall be included in the lump sum price for Supply/Deliver/Place Dune Vegetation. The cost shall also include

overhead, profit, labor, material and any other costs incident to installing dune vegetation.

37.2. Basis for Payment of Dune Vegetation. Payment for dune vegetation will be based upon the number of plants installed within the required limits of the layout area. To be eligible for payment, the CONTRACTOR shall document planting dates, quantities supplied, quantities installed, species type, and survival rates. The planting shall achieve a 100% survival rate after the fourteen (14) day maintenance period and 80% planting survival rate after the 90-day warranty period from the date of initial planting. 75% of the unit price for Supply/Deliver/Place Dune Vegetation shall be paid upon successful demonstration of the survival rate after the maintenance period. The remaining 25% shall be paid with the successful demonstration of the survival rate after the warranty period.

37.3. Progress Payments. Monthly progress payments shall be based on the number of plants installed within a completed acceptance sections, which have been approved by the ENGINEER. The CONTRACTOR will be eligible for the initial progress payment when a minimum of five (5) acceptance sections have been completed and approved by the ENGINEER. Progress payments will not be made for partially completed acceptance sections. It should be noted that due to the dune fill placement areas and dimensions not all acceptance sections will require dune vegetation.

38. PAYMENT FOR SITE RESTORATION & GRADING

Payment for mobilization, demobilization, labor, materials, equipment, fuel, oil, and all other appropriate costs in connection with site restoration, including tilling and scarp leveling of the restored beach, shall be included in the lump sum price for Site Restoration & Grading. No partial payments will be made for this work. Acceptance of the work shall be determined by visual inspection performed by the ENGINEER or COUNTY.

39. PAYMENT FOR PRE-PLACEMENT & POST-PLACEMENT SURVEYS

Payment for mobilization, demobilization, labor, materials, equipment, fuel, oil, and all other appropriate costs in connection with the pre- and post-placement surveys shall be included in the lump sum price for Pre-Placement & Post-Placement Surveys. Progress payments will be made based upon the percent of beach fill work completed and accepted during each month. All costs associated with the pre- and post-placement surveys shall be included in the lump sum price for Pre-Placement & Post-Placement Surveys. Acceptance of the work will be determined from review by the ENGINEER of monthly activities and CONTRACTOR reporting.

40. RIGHT TO REFUSE RECOMMENDATION FOR PAYMENT

The ENGINEER may refuse to recommend the whole or any part of any payment if, in their opinion, such representations to the COUNTY would be inaccurate. The ENGINEER may also refuse to recommend any payment because of subsequently discovered evidence or the results of subsequent observations, measurements, or tests, nullify any such payment previously

recommended to such extent as may be necessary in the ENGINEER's opinion to protect the COUNTY from loss because:

(a) The work is defective, inconsistent with the Plans and Specifications, or completed work not accepted by the ENGINEER has been damaged requiring correction or replacement;

(b) Written claims have been made against the COUNTY or liens have been filed in connection with the work;

(c) The contract price has been reduced because of modifications;

(d) The COUNTY has been required to correct defective work or complete the work;

(e) The CONTRACTOR has not performed the work in accordance with the contract documents;

(f) The CONTRACTOR has failed to make payment to subcontractors, for labor, materials, or equipment;

(g) The CONTRACTOR is claiming additional placement of fill volume for payment beyond that measured and calculated using the procedure established in the contract documents for computation of fill quantities for payment purposes;

(h) The CONTRACTOR is claiming additional payment for any reason not previously agreed to by the COUNTY; or

(i) The CONTRACTOR has not repaired damages caused by the CONTRACTOR's operation to the satisfaction of the COUNTY and/or affected private property owner.

41. FINAL ACCEPTANCE AND PAYMENT

41.1. Beach Escarpment Elimination before Final Payment. At the completion of the entire fill placement and beach tilling, and prior to final payment, the CONTRACTOR will inspect the entire beach project area for the formation of sand escarpments. Any escarpments in the project area, independent of the escarpment height or the length, will be leveled or smoothed to eliminate the escarpment by the CONTRACTOR. The ENGINEER, upon request by the CONTRACTOR, will observe the beach after leveling of escarpments.

41.2. Road and Infrastructure Repair before Final Payment. Roads, beach access, and infrastructure impacted by the CONTRACTOR's operation shall be repaired to a level acceptable to the COUNTY prior to final payment. Truck haul sand operations will cause impacts needing repairs, unless infrastructure is protected during construction.

41.3. Engineer's Recommendation for Final Payment. The ENGINEER's recommendation of final payment for the project will constitute a representation by the ENGINEER to the COUNTY that, in the ENGINEER's opinion, the conditions precedent to the CONTRACTOR's being entitled to final payment as set forth in the contract documents have been fulfilled.

41.4. Completion of Work. Upon written notice from the CONTRACTOR that the work is substantially complete, the ENGINEER or COUNTY will observe the work within seven (7) days of the receipt of the written notice from the CONTRACTOR and, if required, will notify the CONTRACTOR in writing of all particulars in which this inspection reveals that the work is incomplete or defective. The CONTRACTOR shall immediately take such measures as are necessary to remedy such deficiencies.

41.5. Application for Final Payment. After the CONTRACTOR has completed all such corrections identified per Section 41.4 to the satisfaction of the ENGINEER and COUNTY, and delivered any required quality control reports, water quality reports, data requested by the ENGINEER, guarantees, bonds, certificates of inspection, marked-up record documents, and all other documents as required by the contract documents or ENGINEER, and after the ENGINEER has indicated that the work is acceptable to the ENGINEER and COUNTY, the CONTRACTOR may make application for final payment. The final application for payment shall be accompanied by all documentation called for in the contract documents and such other data and schedules as the ENGINEER may reasonably require, together with complete and legally effective releases or waivers (satisfactory to COUNTY) of all liens arising out of, or filed in connection with the work. In lieu thereof and as approved by the COUNTY, the CONTRACTOR may furnish the following set of documents: 1) receipts or releases in full; 2) an affidavit of the CONTRACTOR providing warranties, covenants, and representations that the releases and receipts include all labor, services, material and equipment bills, and other indebtedness connected with the work for which the COUNTY or the COUNTY's property might in any way be responsible; 3) proof that all charges have been paid or otherwise satisfied. If any subcontractor, manufacturer, fabricator, supplier, or distributor fails to furnish a release or receipt in full, the CONTRACTOR may furnish a bond or other collateral satisfactory to the COUNTY to indemnify the COUNTY against any lien.

41.6. Recommendation for Final Payment. If, on the basis of the ENGINEER's observation of the work during construction and post-construction, and the ENGINEER's review of the final application for payment and accompanying documentation the ENGINEER is satisfied that the work has been completed and the CONTRACTOR has fulfilled all of their obligations under the contract documents, the ENGINEER will, within seven (7) days after receipt of the final application for payment, indicate in writing their recommendation of payment and present the application to the COUNTY. If the application and accompanying documentation are acceptable as to form and substance, the COUNTY shall, within thirty (30) days after receipt of the ENGINEER's recommendation for final payment, pay the CONTRACTOR the amount recommended by the ENGINEER or other such amounts

deemed appropriate by the COUNTY in consultation with the ENGINEER. If the ENGINEER is not satisfied that the work is completed, the ENGINEER will return the application to the CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case the CONTRACTOR shall make the necessary corrections and resubmit the application.

41.7. Access to the Work. The COUNTY shall have the right to exclude the CONTRACTOR from the work after the date of completion, but the COUNTY shall allow the CONTRACTOR reasonable access to complete or correct items as allowed by project permits.

41.8. Contractor's Obligation to Complete Work. The CONTRACTOR's obligation to perform and complete the work in accordance with the contract documents shall be absolute. Neither recommendation of any payment by the ENGINEER, nor the issuance of any statement of certificate of completion or substantial completion, nor any payment by the COUNTY to the CONTRACTOR under the contract documents, nor any use of or occupancy of the work of any part thereof by the COUNTY, nor any act of acceptance by the ENGINEER nor any failure to do so, nor the issuance of a notice of acceptability by the ENGINEER, nor any correction of defective work by the COUNTY shall constitute an acceptance of work not in accordance with the contract documents or a release of the CONTRACTOR's obligation to perform the work in accordance with the contract documents.

41.9. Making and Acceptance of Final Payment. The making and acceptance of final payment shall constitute:

(a) A waiver of all claims by the COUNTY against the CONTRACTOR, except claims arising from unsettled liens, from defective work appearing after project completion, or from failure to comply with the contract documents or the terms of any guarantees specified therein; however, final payment shall not constitute a waiver by the COUNTY of any rights in respect to the CONTRACTOR's continuing obligations under the contract documents.

(b) A waiver of all claims by the CONTRACTOR against the COUNTY other than those previously made in writing and still unsettled.

41.10. Defective Work

41.10.1. One Year Correction Period. If within one (1) year after the date of completion or such longer period of time as may be prescribed by law or by the terms of any applicable guarantee required by the contract documents or by any specific provision of the contract documents, any work is found to be defective, the CONTRACTOR shall promptly, without cost to the COUNTY and in accordance with the COUNTY's written instructions, either correct such defective work or, if it has been rejected by the COUNTY, remove it from the site and replace it with non-defective work. If the CONTRACTOR does not promptly comply with the

terms of such instructions, or in an emergency where delay would cause serious risk or loss or damage, the COUNTY may have the defective work corrected or the rejected work removed and replaced. All costs associated with correction of defective work including compensation for additional professional services, shall be paid by the CONTRACTOR. The CONTRACTOR will not be held responsible for erosion of the beach fill after acceptance of completed fill segments by the ENGINEER. However, if unsuitable material including but not limited to rocks, debris, or construction materials placed as a result of the CONTRACTOR's operations are found within one (1) year of the project completion, the CONTRACTOR will be held responsible to correct this at no further cost to the COUNTY.

41.10.2. Beach Erosion. The CONTRACTOR will not be responsible for erosion of the accepted beach fill sections after final acceptance of fill sections by the ENGINEER. The CONTRACTOR shall remain responsible for beach fill sections until they are accepted for payment by the ENGINEER. The CONTRACTOR shall be responsible for the placement of material that is not beach compatible or does not meet State of Florida standards for beach material.

PART 3 - ENVIRONMENTAL PROVISIONS

42. SCOPE

The Environmental Provisions section of the contract documents addresses CONTRACTOR responsibilities for the prevention of pollution and other environmental damage as the result of construction operations under the contract documents, including those measures set forth in the Specifications. For the purpose of this specification, pollution and other environmental damage are defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural, and/or historical purposes, or damage/destroy hardbottom habitats. The control of pollution and damage requires consideration of air, water, land, and the marine environment, and includes management of construction activities, visual aesthetics, noise, solid waste, radiant energy, and radioactive materials, as well as other pollutants. The CONTRACTOR shall fulfill these Specifications at the CONTRACTOR's expense. All costs associated with these sections shall be included in the unit cost for Environmental Compliance.

43. QUALITY CONTROL

The CONTRACTOR shall establish and maintain quality control for environmental protection for all items set forth herein. The CONTRACTOR shall record on the Daily Quality Control Reports any problems in complying with laws, regulations, and ordinances, as well as project permits, and corrective action taken.

44. PERMITS

The CONTRACTOR shall comply with all requirements under the Terms and Conditions set out in all permits applicable to the work. Project permit copies are provided in the contract documents. Specifically, the CONTRACTOR will familiarize himself with general and specific conditions contained in the FDEP permit (Permit No. 0363427-001-JC), USACE permit (Permit No. SAJ-2018-01171 (SP-AWP)), and other State and Federal approvals for the project, including Biological Opinions. Any other licenses or approvals required, including, but not limited to those that may be required by the COUNTY or local municipalities, shall be secured and paid for by the CONTRACTOR. A copy of each permit is a part of the contract documents.

The CONTRACTOR shall follow the applicable Terms and Conditions in the following Biological Opinions (BO) that are incorporated by reference in the USACE Permit: USFWS Statewide Programmatic Biological Opinion (SPBO) dated August 22, 2011; and Programmatic Piping Plover Biological Opinion (P3BO) dated May 22 2013. The Terms and Conditions from each BO are provided as appendices to the Specifications of the contract documents. Complete copies of BOs are available upon request.

The CONTRACTOR shall follow the applicable Terms and Conditions in the following Biological Assessment (BA) that is incorporated by reference in the USACE Permit: South Atlantic Regional Biological Assessment (SARBA). The Terms and Conditions for the SARBA are provided as an

appendix to the Specifications of the contract documents. A complete copy of the Biological Assessment is available upon request.

The CONTRACTOR shall follow the applicable Terms and Conditions of the Standard Manatee Conditions for In-Water Work – 2009 and Sea Turtle and Smalltooth Sawfish Construction Conditions dated March 23, 2006, which are incorporated by reference in the USACE permit and provided as an appendix to the Specification of the contract documents.

Any other licenses, easements, or approvals required, including, but not limited to those which may be required by the COUNTY, City of Vero Beach, or Town of Indian River Shores, shall be secured and paid for by the CONTRACTOR.

45. SUBCONTRACTORS

Assurance of compliance with all sections of the contract by subcontractors shall be the responsibility of the CONTRACTOR, including compliance with all environmental permit requirements.

46. NOTIFICATION

The ENGINEER will notify the CONTRACTOR and the COUNTY of any known noncompliance with the aforementioned Federal, State, or local laws or regulations, permits, and other elements of the CONTRACTOR's Environmental Protection Plan. Nevertheless, it remains the sole responsibility of the CONTRACTOR to comply with all applicable Federal, State, or local laws or regulations, permits, and all elements of the Environmental Protection Plan. If there is known non-compliance, the COUNTY will determine what action will be taken and such response will be transmitted to the CONTRACTOR by the ENGINEER, which may include stopping construction of the project until the CONTRACTOR complies with the Environmental Protection Plan. It will also be the CONTRACTOR's responsibility that all subcontractors shall comply with all applicable laws, regulations, permit requirements, and all elements of the Environmental Protection Plan.

47. TURBIDITY CONTROL AND WATER QUALITY MONITORING

47.1. Water Quality Monitoring by the Contractor. The CONTRACTOR shall be bound and obligated to maintain the quality of the State's waters as stipulated in project permits and in the Florida Administrative Code Rules 62-312 and 62-302 as they pertain to Class III waters and this Contract. The CONTRACTOR will be required to make inspections, measurements, and observations required by those regulations and the FDEP permit at the spoil site (beach). This includes, but is not limited to, turbidity sampling with reports to the ENGINEER, following procedures stated in FDEP Permit No. 0363427-001-JC. If it is determined that the quality of the State's waters is not being maintained, the CONTRACTOR will, without delay, follow the procedures provided in the FDEP permit. The water quality monitoring and reporting costs will be incorporated into the Lump Sum cost for Environmental Compliance in the constract documents.

47.2. Water Quality Monitoring Procedures. The FDEP permit for the project requires water quality monitoring to occur during project construction using an independent contractor, hired by the CONTRACTOR. Water quality samples are to be analyzed soon after collection by the CONTRACTOR. Under no circumstances will more than two (2) hours lapse between collection and analysis of the samples. Water samples shall be tested using a calibrated turbidity meter. The turbidity meter shall be calibrated by the manufacturer within one year prior to the beginning of the project, and written documentation of such shall be submitted to the ENGINEER. The meter shall be calibrated with standards prior to each use. Reports, including all information required by the FDEP permit, shall be provided directly to FDEP, with copies to the ENGINEER on a daily basis. If a water quality violation is recorded, the CONTRACTOR is required to immediately cease construction activities and contact the ENGINEER with the results of the water quality analysis.

47.3. Water Quality Violations. The CONTRACTOR is to follow all requirements concerning water quality as provided by the permits for the project. In the event of a turbidity violation, the CONTRACTOR will take immediate corrective action indicated in project permits which could include stopping work, changing construction or environmental protection methods, or other action. Construction activities may not resume until water quality has returned to within standards (as provided by the FDEP permit).

47.4. Reporting. The CONTRACTOR's water quality monitoring data, will be provided to the FDEP on a weekly basis. The CONTRACTOR will provide the names and qualifications of their monitoring team seven (7) days before the permit pre-construction meeting to the ENGINEER. This notification is a pre-requisite for receiving a permit Notice to Proceed from FDEP. Monitors shall meet qualifications described in the State permits including prior experience with similar work.

48. PROTECTION OF ENVIRONMENTAL RESOURCES

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The CONTRACTOR shall confine their activities to areas defined by the Plans and Specifications. Environmental protection shall be as stated in the following subparagraphs.

48.1. Protection of Land Resources

48.1.1. General. Prior to the beginning of any construction, and at the request of the CONTRACTOR, the ENGINEER shall identify land resources to be preserved within the CONTRACTOR's work area, which is defined as the beach seaward of the vegetation line. The CONTRACTOR shall not remove, cut, deface, injure, or destroy land resources including sand dune or berm vegetation, trees, shrubs, vines, grasses, top soil, and land forms without direct written permission from COUNTY. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage

unless specifically authorized. Where such special emergency use is allowed, the CONTRACTOR shall provide effective protection for land and vegetation resources at all times as defined in the following paragraphs. The CONTRACTOR will be responsible for the replacement of any damaged or destroyed vegetation, to the satisfaction of the ENGINEER or COUNTY. Failure to replace damaged or destroyed vegetation by the CONTRACTOR will result in replacement by the COUNTY; cost of replacement will be deducted from monies due to the CONTRACTOR, or from monies which will be due to the CONTRACTOR by the COUNTY.

48.1.2. Work Area Limits. In addition to features listed under Section 48.1.1, isolated areas (if any) within the work area, which are to be saved and protected, shall also be identified by the ENGINEER or COUNTY and marked or fenced by the CONTRACTOR. All monuments and markers shall be protected before construction operations commence. The CONTRACTOR shall convey to all subcontractors and personnel the purpose of the marking and/or protection for all necessary objects.

48.1.3. Protection of Landscape. Trees, shrubs, vines, grasses, land forms, and other landscape features within the work area are to be preserved. Unless otherwise approved by the ENGINEER or COUNTY, no trees, shrubs, vines, grasses or other vegetation will be harmed or destroyed by the CONTRACTOR for any purpose.

48.1.4. Retardation and Control of Runoff. Runoff from the construction site shall be controlled by the CONTRACTOR by the construction of diversion ditches, benches, and berms to retard and divert runoff to protected drainage courses, and any measures required by area wide plans approved under paragraph 208 of the Clean Water Act.

48.1.5. Temporary Excavation. Embankments for plant and/or work areas shall be controlled to protect adjacent areas from despoilment.

48.1.6. Disposal of Solid Waste. Solid wastes (including clearing debris) shall be placed in containers, which are removed from the beach area and emptied on a regular schedule. The CONTRACTOR will empty containers when three-quarters full and will avoid overflow conditions. All handling and disposal shall be conducted to prevent contamination. No steel, cables, wire, pipe, drums, or any other debris will be permitted to be disposed into the waters of the Atlantic Ocean or any other water body. Disposal of solid wastes or debris in the Atlantic Ocean is a violation of State and Federal laws. If such debris is found, the debris shall be removed by the CONTRACTOR at their own cost, or the cost of removal deducted from the CONTRACTOR's final payment.

48.1.7. Disposal of Chemical Waste. Chemical waste shall be stored in corrosion resistant containers, removed from the work area, and disposed of in accordance with Federal, State, and local regulations. The CONTRACTOR shall perform all

maintenance of equipment, including, but not limited to refueling, filter changes, and replacement of hydraulic lines in a manner so as not to contaminate soils, ground or surface waters, or any other natural resources.

48.1.8. Disposal of Discarded Materials. Discarded materials other than those which can be included in the solid waste category, will be handled by the CONTRACTOR as directed by the ENGINEER or COUNTY.

48.2. Protection of Fish and Wildlife Resources. The CONTRACTOR shall keep construction activities under continued surveillance, management, and control to minimize interference with, disturbance to, and damage of fish and wildlife. Species that require specific consideration, as well as measures for their protection, will be addressed in the CONTRACTOR's Environmental Protection Plan prior to the beginning of project construction.

48.2.1. Sea Turtles. In order to ensure that sea turtles are not adversely affected by construction activities, the CONTRACTOR shall comply with all sea turtle protection measures outlined in the permits, BOs, BAs, and "Sea Turtle and Smalltooth Sawfish Construction Conditions." These documents are provided in the appendices of the Specifications. All temporary storage of equipment shall be off the beach whenever possible, or as far landward as possible without impacting the dune system, structures, or access points.

48.2.2. Manatee Protection. In order to ensure that manatees are not adversely affected by construction activities, the CONTRACTOR shall comply with all manatee protection measures outlined in the permits, BOs, BAs, and "Standard Manatee Conditions for In-Water Work." These documents are provided in the appendices of the Specifications.

48.2.3. Smalltooth Sawfish. In order to ensure that smalltooth sawfish are not adversely affected by construction activities, the CONTRACTOR shall comply with all smalltooth sawfish protection measures outlined in the permits, BOs, BAs, and "Sea Turtle and Smalltooth Sawfish Construction Conditions." These documents are provided in the appendices of the Specifications.

48.2.4. Shorebirds. Shorebirds are protected by State and Federal laws; required protection measures are provided in the State permit and USFWS BOs, which are provided as appendices of the Specifications. Breeding season varies by species. Most species have completed the breeding cycle by September 1, but flightless young may be present through September. Shorebird nesting/breeding season for this site is March 1 – September 1, based on the best available information regarding ranges and habitat use by species for this site.

48.2.5. Hardbottom Resource Protection. The CONTRACTOR shall protect all hardbottom resources (nearshore) during all phases of the project except as noted

in the Plans and as allowed by the State and Federal Permits. The location of nearshore hardbottom resources are shown in the Plans.

48.2.6. Hardbottom Locations. Hardbottom communities exist offshore of Indian River County, within the project area, offshore of the beach fill area, and further offshore in deeper water. The CONTRACTOR shall avoid contact with any and all hardbottom communities that do not fall within the beach fill placement template, both during mobilization and demobilization as well as project construction.

48.2.7. Hardbottom Investigations. The hardbottom regions have been investigated within 1,000 feet from the shoreline. These investigations have identified the landward edge of the hardbottom, but not the offshore extent. The offshore edge of the nearshore hardbottom may extend more than 2,000 feet offshore, as indicated in the Plans. Patches and bands of hardbottom may exist further offshore.

48.2.8. Hardbottom Impacts. The location of nearshore hardbottom areas fronting the beach fill areas is provided in the Plans for the convenience of the CONTRACTOR, however, the CONTRACTOR shall not depend solely on the hardbottom mapping provided. It will be solely the responsibility of the CONTRACTOR to avoid all hardbottom formation and hardbottom biological communities other than those that may be located within the beach fill construction template. The CONTRACTOR shall take note that the State of Florida has levied significant fines to contractors who have damaged protected hardbottom communities. The CONTRACTOR will be responsible for any and all costs, legal expenses, hardbottom repairs or mitigation requirements, or any other related expenses including fines, levied by the Federal, State, or local governments with jurisdictional or regulatory authority for damage to hardbottom communities, other than those hardbottom communities which are, by permit, acknowledged to be covered with fill as part of project construction.

48.2.9. Monitoring by Others. The CONTRACTOR should be aware that all mobilization, demobilization, and construction activities may be monitored by Federal, State, and local agencies for the duration of the project.

48.3. Protection of Air Resources. The CONTRACTOR shall keep construction activities under surveillance, management, and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the CONTRACTOR in accomplishing the specified construction shall be in strict accordance with the applicable air pollution standards of the State of Florida (Florida Statute, Chapter 403 and others) and all Federal emission and performance laws and standards.

48.4. Protection of Sound Intrusions. The CONTRACTOR shall keep construction activities under surveillance, and control to minimize damage to the environment by noise. If booster pumps or generators are used on the beach, the CONTRACTOR shall provide adequate muffler systems and erect a sound barrier to deflect noise in the

waterward direction and away from buildings. The location of the booster pumps and generators shall be selected to avoid placement adjacent to residences, and shall be approved by the ENGINEER.

48.5. Dispensing of Fuel. For each fuel storage tank, the CONTRACTOR will provide secondary containment, which is capable of holding at minimum 110% of the tank contents. Fuel dispensers shall have a 4-foot square, 16-gauge metal pan with borders banded up and welded at corners right below the bibb. Edges of the pans shall be 8-inch minimum in depth to ascertain that no contamination of the ground takes place. Pans shall be cleaned by an approved method immediately after every dispensing of fuel and wastes disposed of offsite in an approved area. Should any spilling of fuel occur, the CONTRACTOR shall immediately contain the spill and contact the appropriate local authorities. The CONTRACTOR will be solely responsible for any fines, penalties, or other legal activities related to fuel spills.

48.6. Temporary Sanitary Facility. The CONTRACTOR shall supply and maintain, at minimum, one (1) temporary sanitary facility for the use of land based employees and subcontractors at each unloading site. The facility shall be conveniently located in the vicinity of the beach disposal operation, but away from residential buildings along the coastline. The facility shall be removed at the end of the project. Location and aesthetic of the temporary facility shall be in accordance with any COUNTY or local requirements and/or ordinances.

48.7. Storage of Lubricants. All lubricants and other potential liquid pollutants shall be stored in sealed, non-corrosive containers. Individual containers shall be stored in metal pans with borders banded up and welded at the corners right below the bibb. Pans shall be deep enough to prevent contamination of the ground. Pans shall be kept clean of all spillage or leakage.

49. ENVIRONMENTAL PROTECTION TRAINING

The CONTRACTOR shall train all subcontractors and personnel in all phases of environmental protection. All personnel and subcontractors will be familiar with permit requirements, and with the necessity of protection of all habitats. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities to ensure adequate and continuous environmental pollution control. Quality Control and supervisory personnel shall be thoroughly trained in the proper use of monitoring devices and abatement equipment, and shall be thoroughly knowledgeable of Federal, State, and local laws, regulations, and permits as listed in the Environmental Protection Plan submitted by the CONTRACTOR. Quality Control personnel will be identified in the plan.

50. OIL AND HAZARDOUS MATERIAL SPILLS AND CONTAINMENT

The CONTRACTOR shall ensure that all hazardous material spills are immediately reported to the proper authorities and the COUNTY. All hazardous material spills shall be immediately cleaned up in accordance with the most recent version of the USACE's Safety and Health

Requirements Manual, EM 385-1-1, or latest version, and any other applicable laws or regulations, and the plan developed for spill containment.

51. MAINTENANCE OF POLLUTION CONTROL FACILITIES

The CONTRACTOR shall maintain constructed facilities and portable pollution control devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

52. POST CONSTRUCTION CLEAN-UP

The CONTRACTOR shall clean-up any areas used for construction as stated in Section 21.

53. RESTORATION OF LANDSCAPE DAMAGE

The CONTRACTOR shall restore all landscape features damaged or destroyed during construction operations outside the limits of the approved work areas. Such restoration shall be in accordance with a plan submitted for approval by the ENGINEER. This work will be accomplished at the CONTRACTOR's expense. Final payment to the CONTRACTOR shall not occur until the ENGINEER and COUNTY are satisfied with the CONTRACTOR's effort to restore landscape or any other damage caused by the CONTRACTOR or their subcontractors.

54. MAINTENANCE OF POLLUTION CONTROL FACILITIES

The CONTRACTOR shall maintain constructed facilities and portable pollution control devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

55. PERMIT TIME EXTENSIONS

Permits for the project require construction activities to be completed before the start of peak sea turtle nesting season, including time for demobilization and tilling. If construction is not completed within the time frame allotted, the COUNTY has no plans to grant or seek an extension of the construction deadline, since it is not the COUNTY's policy to work on the beach during peak sea turtle nesting season. If the CONTRACTOR cannot complete construction in the time specified, then the COUNTY will take one of the following actions:

(a) Require the CONTRACTOR to remobilize, at the CONTRACTOR's own expense, to complete the project as permit conditions and time frames allow if it is determined by the ENGINEER and COUNTY that the CONTRACTOR failed to complete the project by the end of the construction period as identified in the contract or the permits, due to the negligence of the CONTRACTOR in avoiding delay or lack of competence or capability of the CONTRACTOR in completing the project in a timely manner. The CONTRACTOR will be charged liquidated damages for all delays after the completion date, even if they are caused by permit condition and local policy to avoid sea turtle nesting season.

(b) Terminate the contract and compensate the CONTRACTOR for fill placed within the construction template(s) and for demobilization from the project site in accordance with contract documents, if the delay is determined not to be the CONTRACTOR's fault.

(c) Negotiate with the CONTRACTOR to seek an acceptable agreement allowing for project completion when (if) permits and regulatory agencies allow for the resumption of project construction activities.

56. NOISE CONTROL

The CONTRACTOR, at times, will be working in close proximately to private residences. As a result, noise control is of paramount importance. The CONTRACTOR shall minimize noise so as not to disturb residents living along or near the beach. All hauling and excavating equipment used on this work shall be equipped with satisfactory mufflers or other noise abatement devices. The CONTRACTOR shall conduct their operations so as to comply with all Federal, State, and local laws pertaining to noise. The use of horns, whistles, and signals shall be held to the minimum necessary in order to ensure as quiet an operation as possible on the job site, while maintaining safety on the job site. Operations at or near the beach will be restricted to daylight hours.

57. ENVIRONMENTAL PROTECTION PLAN

At least seven (7) days prior to the contract pre-construction meeting, the CONTRACTOR shall submit in writing an Environmental Protection Plan to the ENGINEER. Approval of the CONTRACTOR'S plan will not relieve the CONTRACTOR of their responsibility for adequate and continuing control of pollutants and other environmental protection measures. The Environmental Protection Plan shall include, but not be limited to the following:

(a) Methods for protection of features and habitats to be preserved within authorized work areas. The CONTRACTOR shall prepare a listing of methods to protect resources needing protection, i.e. all vegetation, trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archeological and cultural resources, manatees, and the marine hardbottom habitat.

(b) Procedures to be implemented to provide the required environmental protection and to comply with the applicable permits, laws, and regulations. The CONTRACTOR shall provide written assurance that immediate corrective action will be taken to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures set out in accordance with the Environmental Protection Plan.

(c) A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, and abatement that are applicable to the CONTRACTOR'S proposed operations and the requirements imposed by those laws, regulations, and permits.

(d) Drawings showing locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

(e) Environmental monitoring plans for the jobsite, including land, water, air, and noise monitoring.

(f) Oil spill prevention.

(g) Oil spill contingency plan.

(h) A hardbottom protection and avoidance plan.

(i) A marine (sea) turtle protection plan.

(j) Shorebird management plan

(k) Work area plan showing the proposed activity in each portion of the work area and identifying the areas of limited use or nonuse. The plan shall include measures for marking the limits of use areas.

(l) The location of the solid waste disposal area.

(m) A statement as to the person who will be responsible for implementation of the Environmental Protection Plan. The CONTRACTOR personnel responsible shall report directly to the CONTRACTOR'S top management and shall have the authority to act for the CONTRACTOR in all environmental protection matters.

(n) A statement acknowledging that the CONTRACTOR is responsible for environmental protection, including all of the CONTRACTOR's personnel and subcontractors.

(o) The Environmental Protection Plan will be dated and endorsed by the individual of top management in charge of the construction.

APPENDIX A

DAILY QUALITY CONTROL REPORT

INDIAN RIVER COUNTY

SECTOR 5 – BEACH AND DUNE RESTORATION PROJECT

DAILY QUALITY CONTROL REPORT

Date: _____ Contract Day: _____
(Report is due by 2:00 p.m. of the following day)

Beach Access Utilized: _____

WEATHER: (Clear) (P. Cloudy) (Cloudy) (Rain) TEMP. Min. Max.

Wind Speed: _____ mph Wind Direction: _____
Wave Height: _____feet Wave Direction: _____

GRADING/DRESSING OPERATIONS:

COMPLETE FROM: _____ feet (north/south) of profile line no. _____
COMPLETE TO: _____ feet (north/south) of profile line no. _____

FILL PLACEMENT OPERATIONS:

COMPLETE FROM: _____ feet (north/south) of profile line no. _____
COMPLETE TO: _____ feet (north/south) of profile line no. _____

DUNE VEGETATION INSTALLATION:

COMPLETE FROM: _____ feet (north/south) of profile line no. _____
COMPLETE TO: _____ feet (north/south) of profile line no. _____

1. Work Performed Today: (Indicate location and description of work performed. Provide beach fill advance over last 24 hours.

2. Results of Surveillance: (Include satisfactory work completed or deficiencies with action to be taken.)

3. Sand Quality Monitoring Did all sand placed today meet the requirements of the contract?

   Yes/No? _____.

4. Water Quality Monitoring: Was water quality monitoring conducted today in compliance with project permit requirements of the Florida Department of Environmental Protection Permit No. 0363427-001-JC and water quality protection laws, and the results provided to the ENGINEER and COUNTY?

   (Yes/No)?_____.

   Beach sampling occurred at the following times:

   _____

5. Verbal Instructions Received: (List any instructions given by the DESIGN PROFESSIONAL or PROJECT MANAGER, construction deficiencies, retesting required, etc., with action to be taken.)

5. Remarks: (Cover delays and any conflicts in Plans, Specifications or instructions.)

6. Safety Inspection: (Report violations noted; corrective instructions given; and corrective actions taken.)

7. Equipment Data: (Indicate items of construction equipment other than hand tools at job site and whether or not used and if operable.)

8. Progress Summary:

Description	This Day	To Date
Worked Hours		
Downtime Hours (Explain Below)		
Length of Fill Placement Advance on Beach (ft)		
Number of Truck Deliveries		
Sand Volume Placed (estimated c.y.)		
Volume Pay (cy in accepted sections only)		
Linear % Completed		

Explanation of Downtime:

CONTRACTOR's Verification: The above report is complete and correct, equipment used, and works performed during this reporting period are in compliance with the contract drawings and Specifications except as noted above.

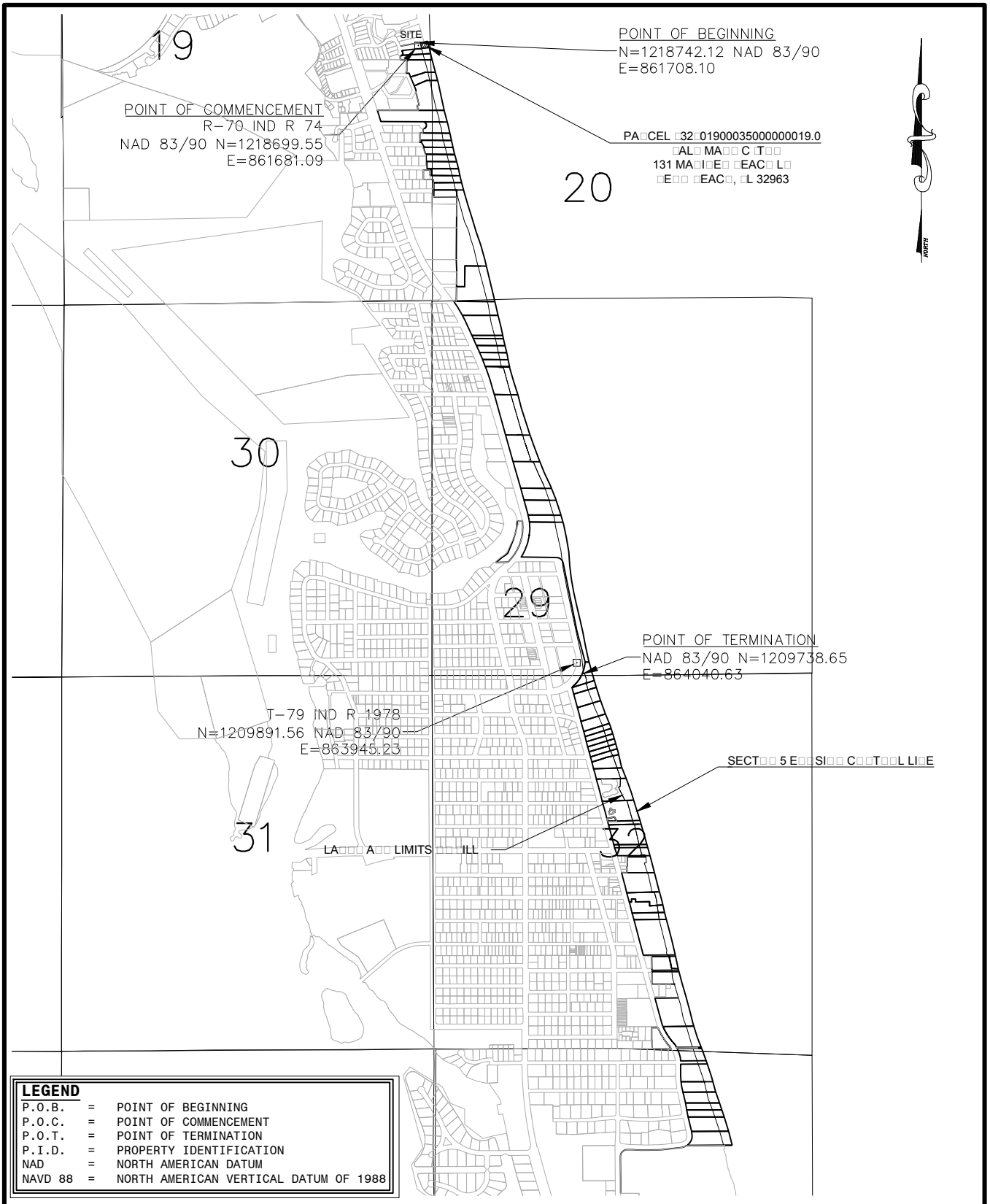
_____

Contractor's Approved Authorized Representative

APPENDIX B

CONSTRUCTION EASEMENT DESCRIPTIONS

SCHEDULE A



LEGEND

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LB #4298

SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900035000000019.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

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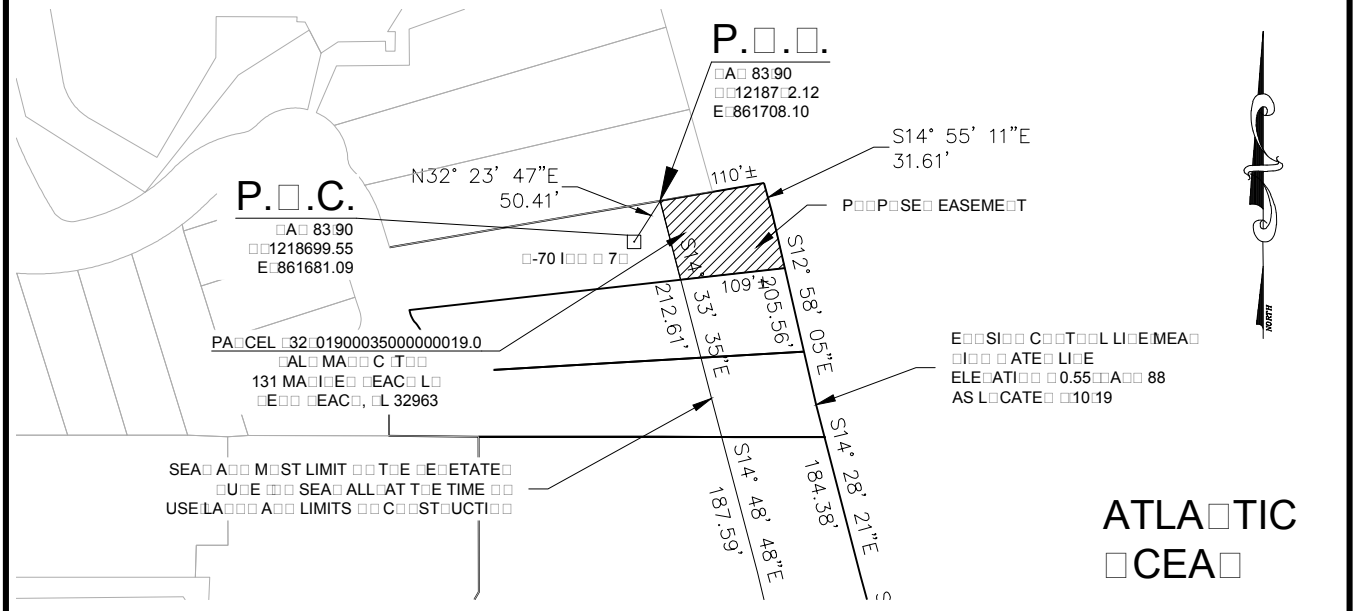
SCHEDULE A



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C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T □- 70 I□□ □ 7□ □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83⁄90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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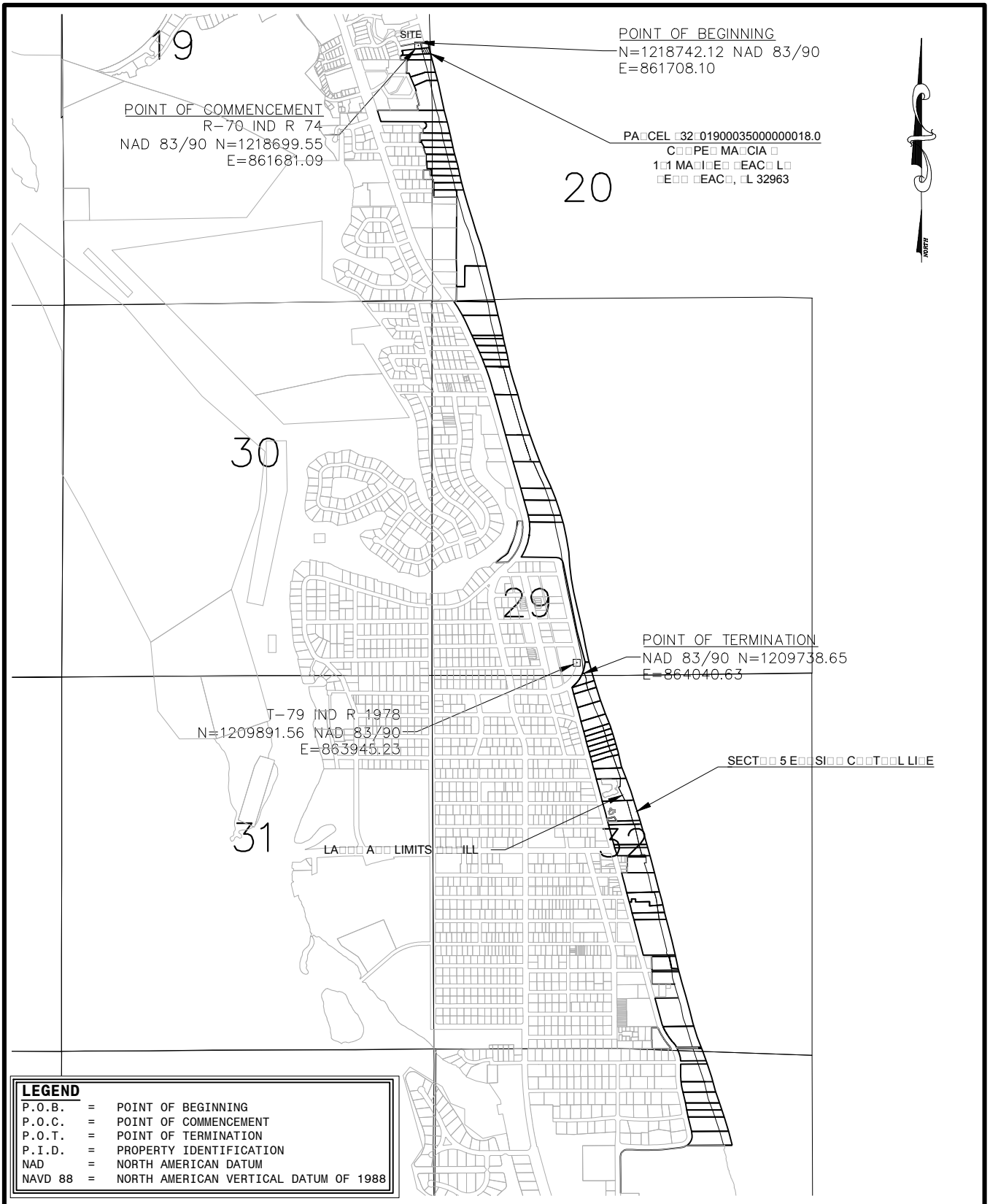

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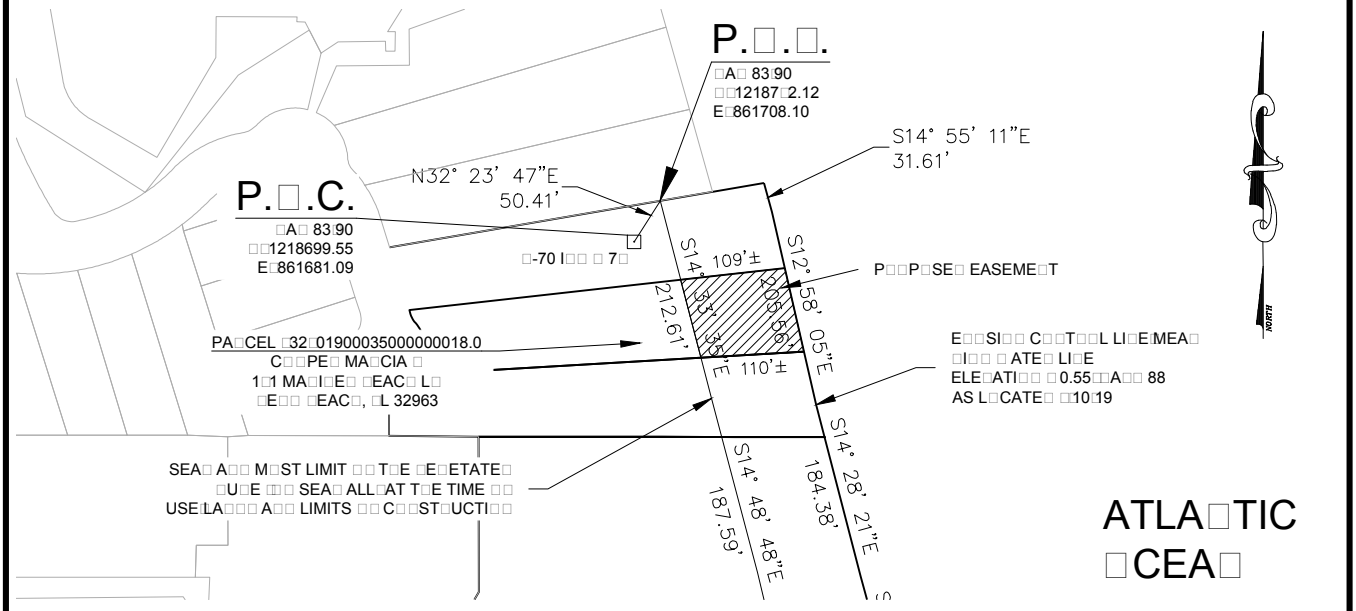

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C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83⁄90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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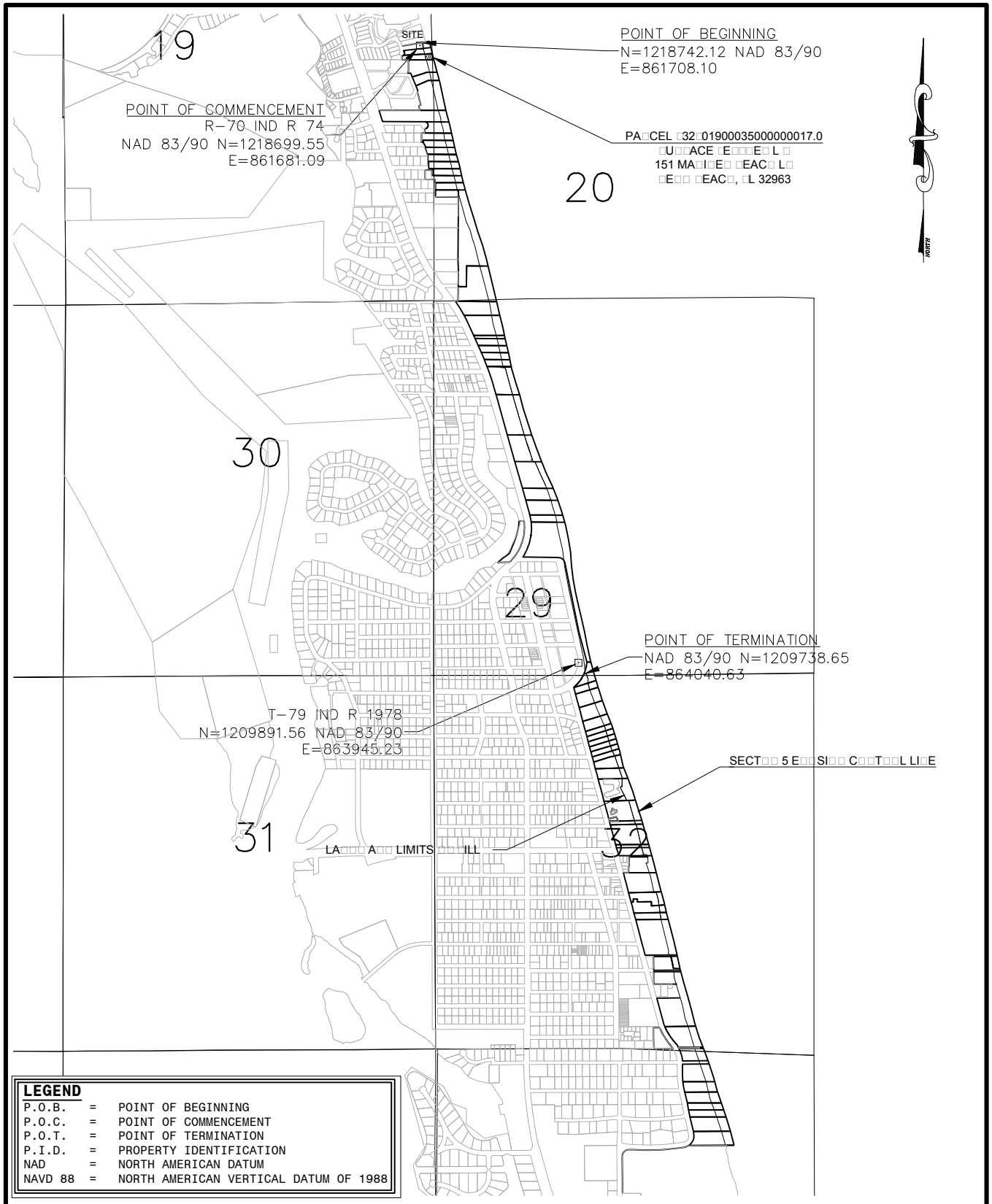
SCHEDULE A



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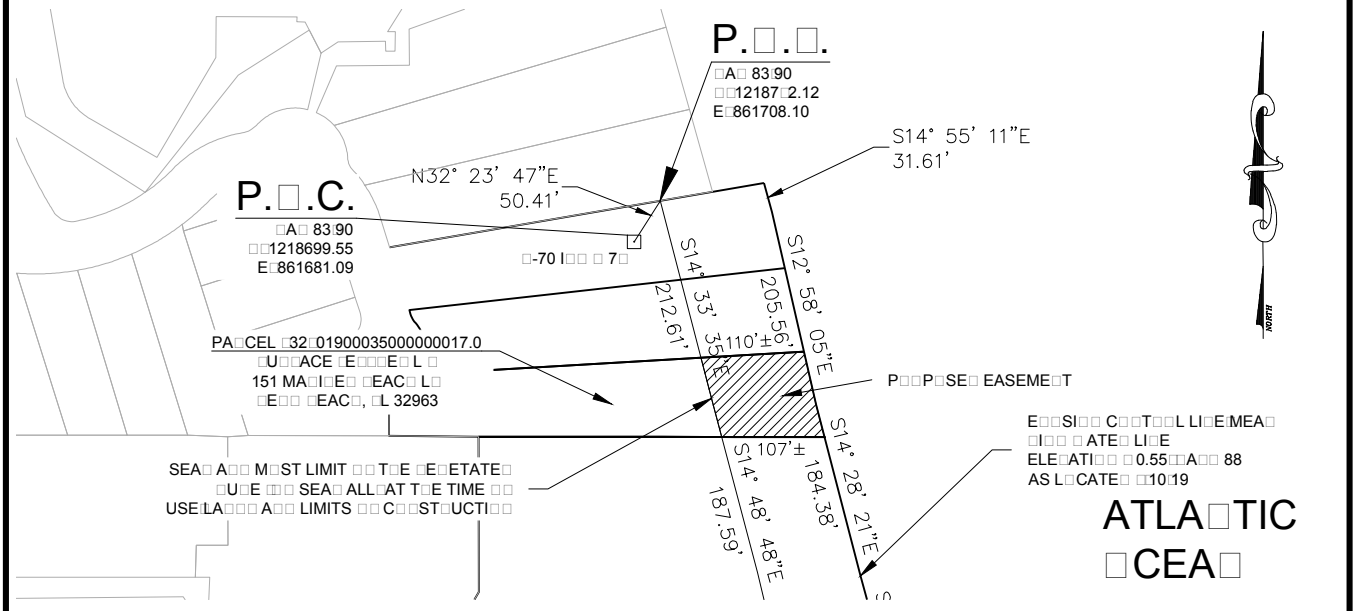
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□S □□□□ 2769, PA□E 8□□ □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

Morgan & Eklund Inc.
PROFESSIONAL SURVEY CONSULTANTS
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1612 NW 2ND AVENUE
SUITE 3
BOCA RATON, FL 33432
PHONE: (954) 421-6882
FAX: (954) 421-0425
LB #4298

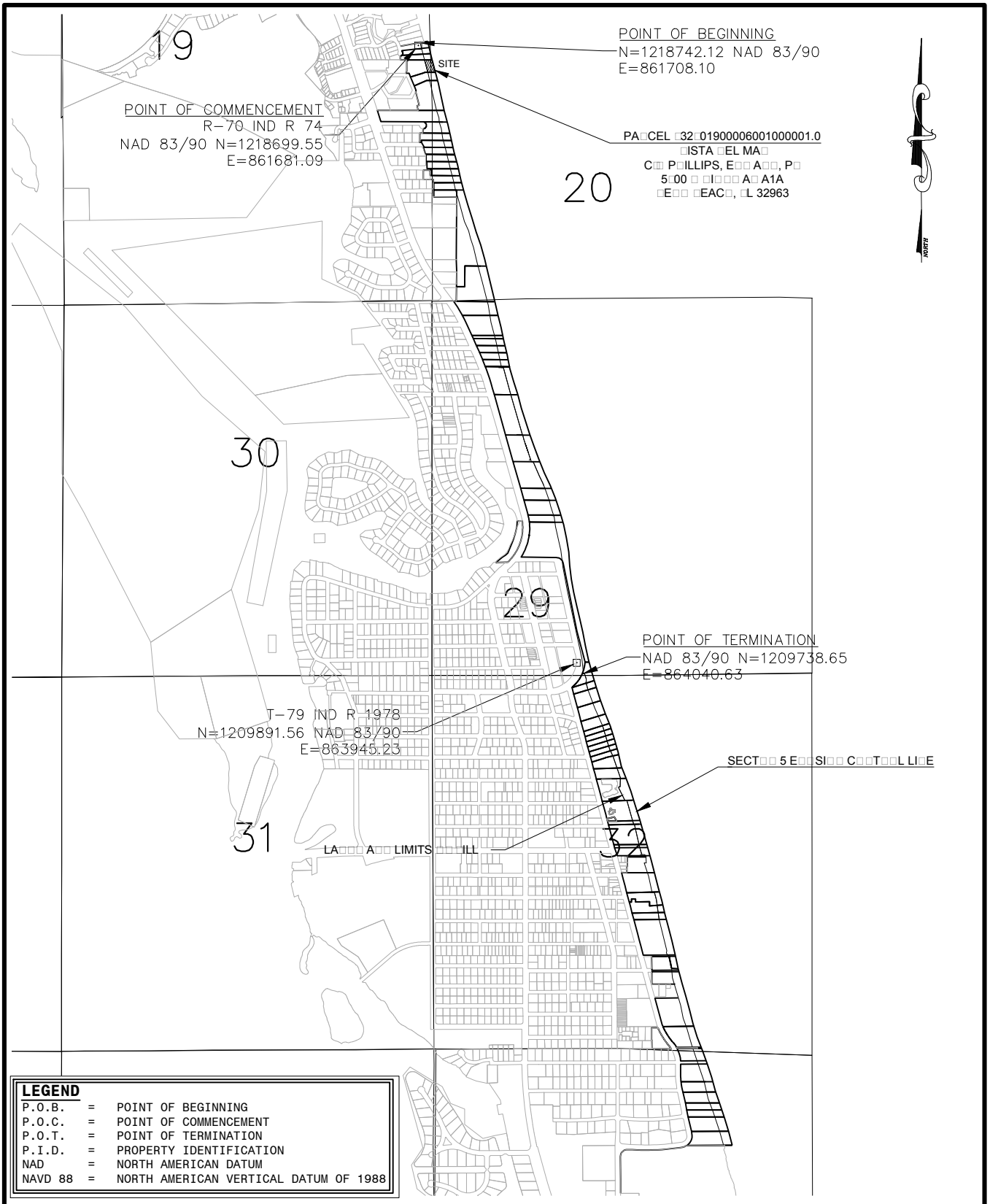
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900035000000017.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2769-P844, lou Thu, 16 May 2019 - 11:03am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.I.D.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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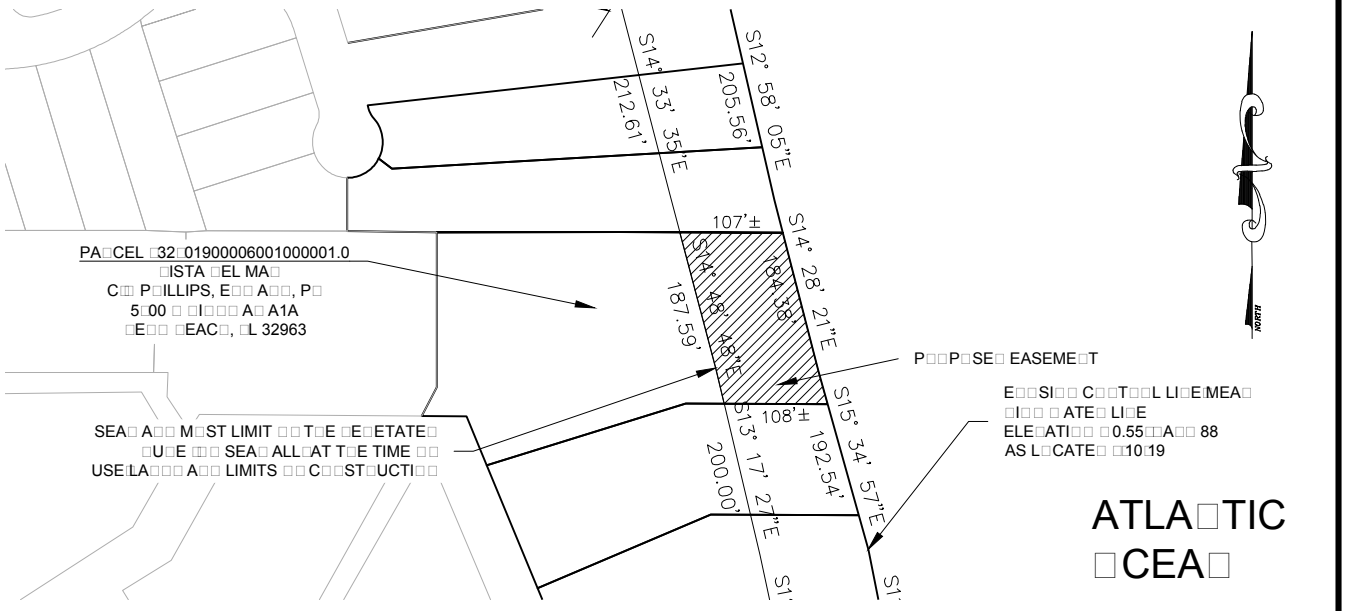
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900006001000001.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB3002-P1289-CRV, Chris Wed, 22 May 2019 - 2:48pm

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□S □□□□ 3002, PA□E 1289 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□ TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900006001000001.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

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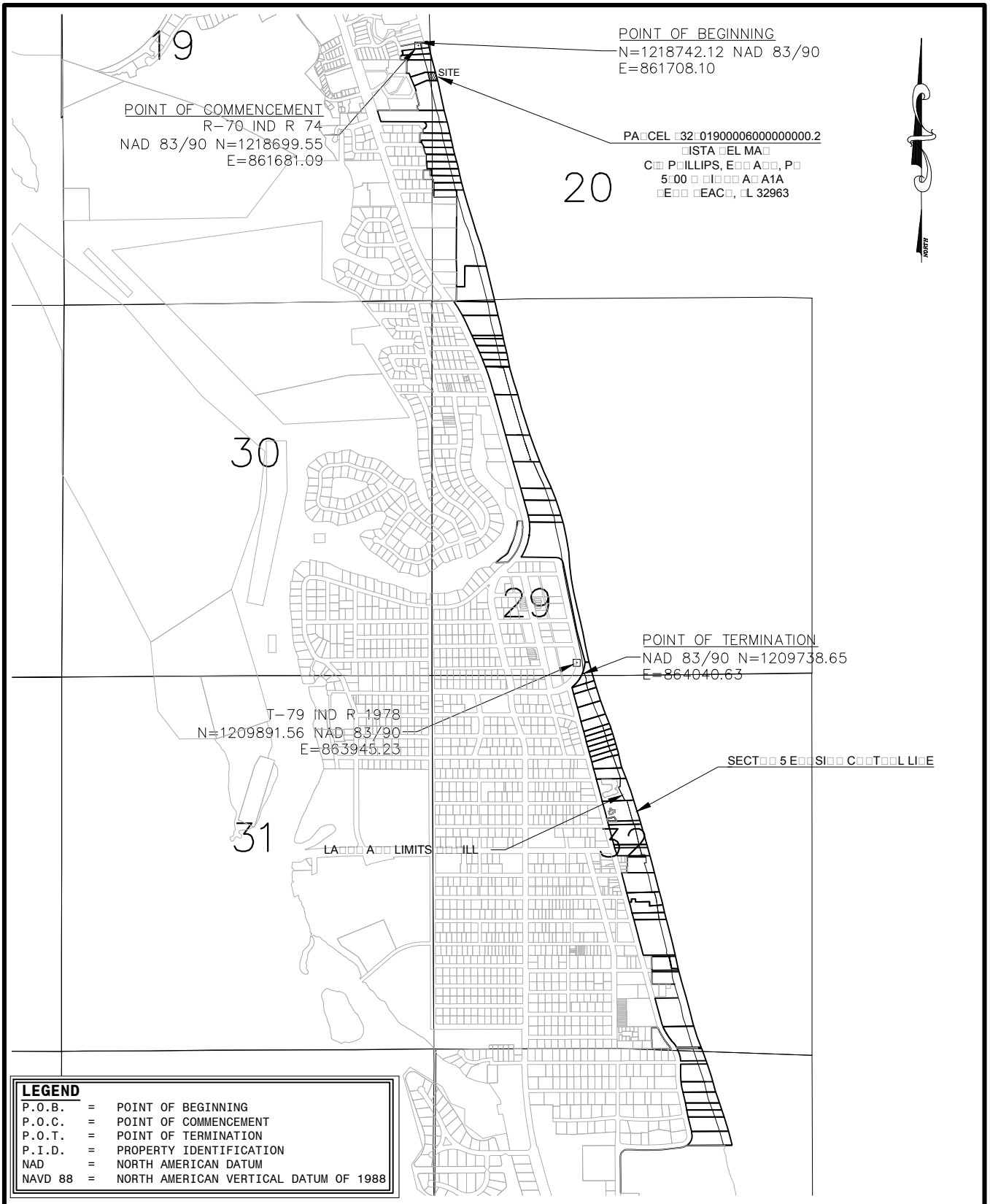
SCHEDULE A



LEGEND

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P.O.T.	=	POINT OF TERMINATION
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SKETCH OF LEGAL DESCRIPTION
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INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900006000000000.2

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK	PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A	N/A	N/A	1 OF 2

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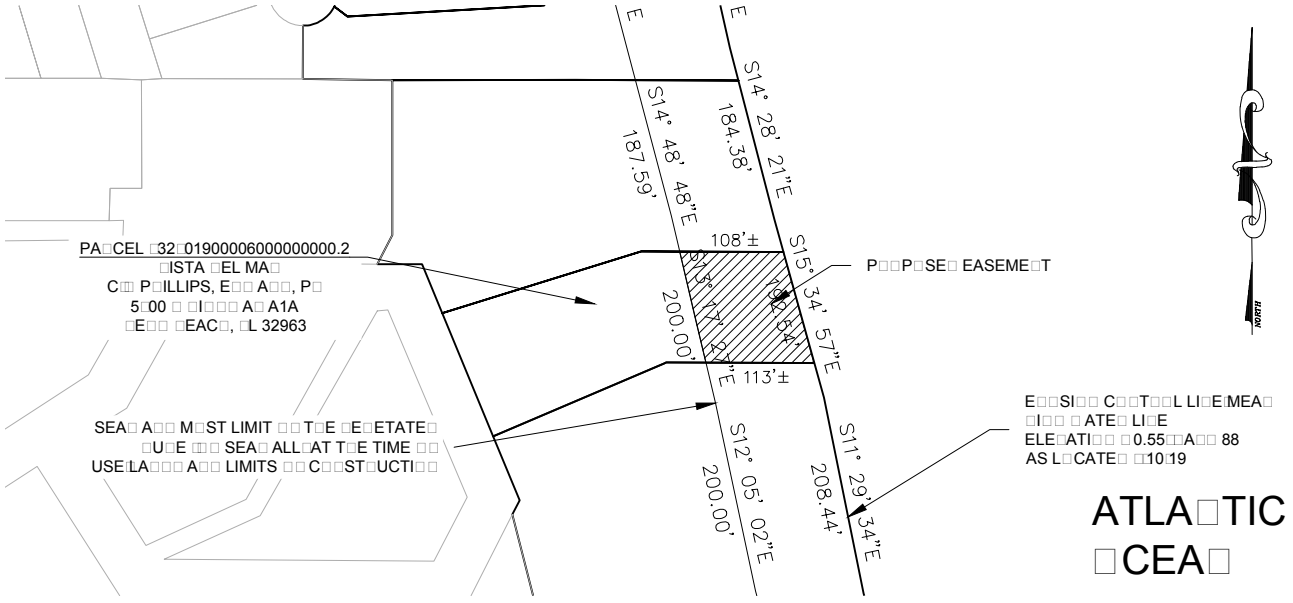

SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ OF LA□□S □ESC□I□E□ AND R ECORD ED I□ □□□ICIAL □EC□□□S BOOK 563, PA□E 1968 OF T□E PU□LIC □EC□□□S OF I□□IA□ RIVER C□U□T□, □L□□I□A, LYING EASTE□L□ OF T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E □OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T R- 70 IND □ 74 HAVING C□□□□I□ATES □□ NOR THING 1,218,699.55 □EET AND EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T□E FO LLOW ING □ESC□I□E□ LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,218,7□2.12 □EET AND EASTI□□ 861,708.10 □EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T OF TE□MI□ATI□□, HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,0□0.63 □EET NAD 83/90, SAI□ P□I□T BEING 180.23 □EET □ISTA□T FRO M □□EP M□□UME□T T-79 IND R 1978 HAVING C□□□□I□ATES OF NOR THING 1,209,891.56 □EET AND EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

Morgan & Eklund Inc.

PROFESSIONAL SURVEY CONSULTANTS

4909 US HIGHWAY #1
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PHONE: (954) 421-6882
FAX: (954) 421-0425

LB #4298

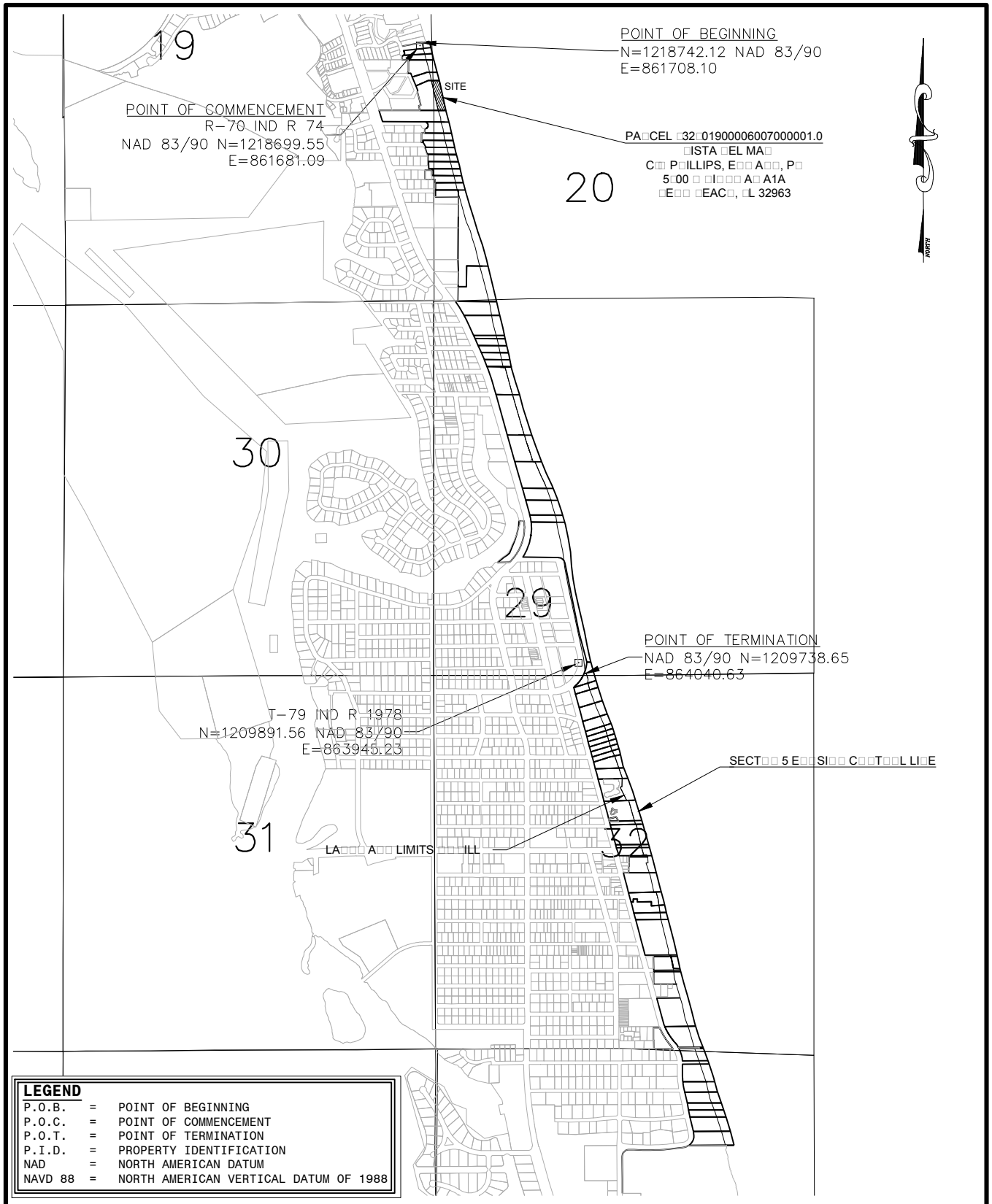
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900006000000000.2

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB563-P1968, Chris Wed, 22 May 2019 - 2:51pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.I.D.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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P.I.D. NO. 32401900006007000001.0

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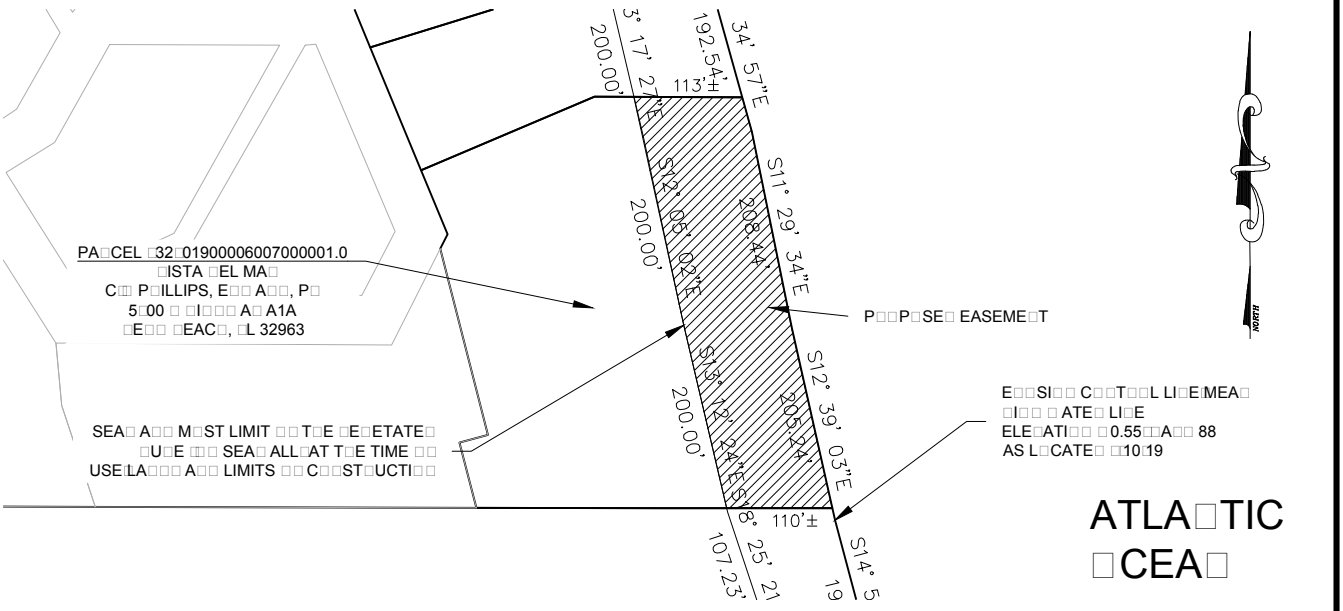
DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB3112-P1676-CRV, Chris Wed, 22 May 2019 - 2:52pm



SCHEDULE A

ATLA□TIC
□CEA□

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ OF LA□□S □ESC□I□E□ AND R ECORD ED I□ □□□ICIAL □EC□□□S BOOK 3112, PA□E 1676 OF T□E PU□LIC □EC□□□S OF I□□IA□ RIVER C□U□T□, □L□□I□A, LYING EASTE□L□ OF T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E □OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ (□EP) M□□UME□T R- 70 IND □ 74 HAVING C□□□□I□ATES □□ NOR THING 1,218,699.55 □EET AND EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T□E FO LLOW ING □ESC□I□E□ LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,218,7□2.12 □EET AND EASTI□□ 861,708.10 □EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T OF TE□MI□ATI□□, HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,0□0.63 □EET NAD 83/90, SAI□ P□I□T BEING 180.23 □EET □ISTA□T FRO M □□EP M□□UME□T T-79 IND R 1978 HAVING C□□□□I□ATES OF NOR THING 1,209,891.56 □EET AND EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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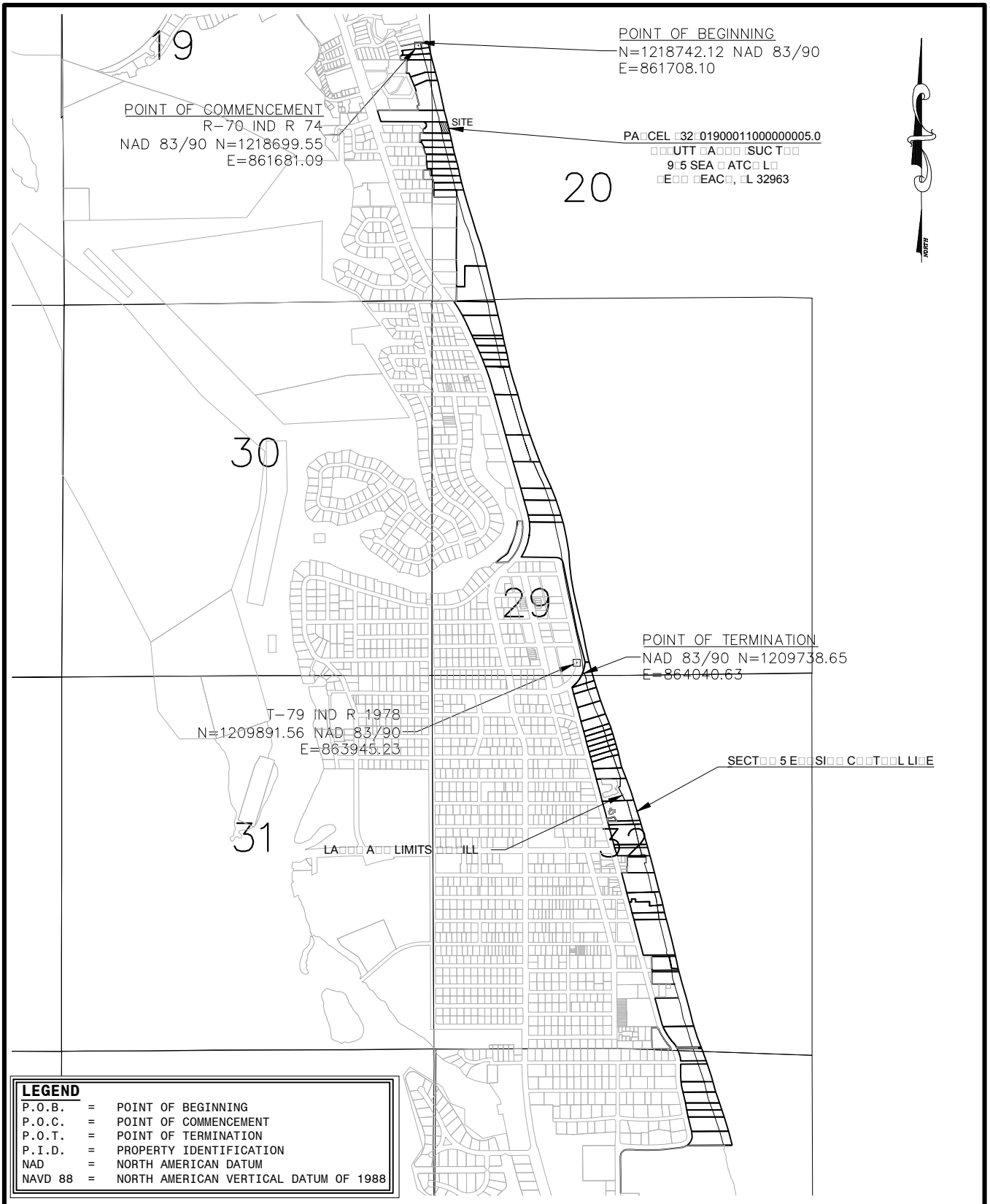
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900006007000001.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB3112-P1676, Chris Wed, 22 May 2019 - 2:53pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
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NAD	=	NORTH AMERICAN DATUM
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SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900011000000005.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

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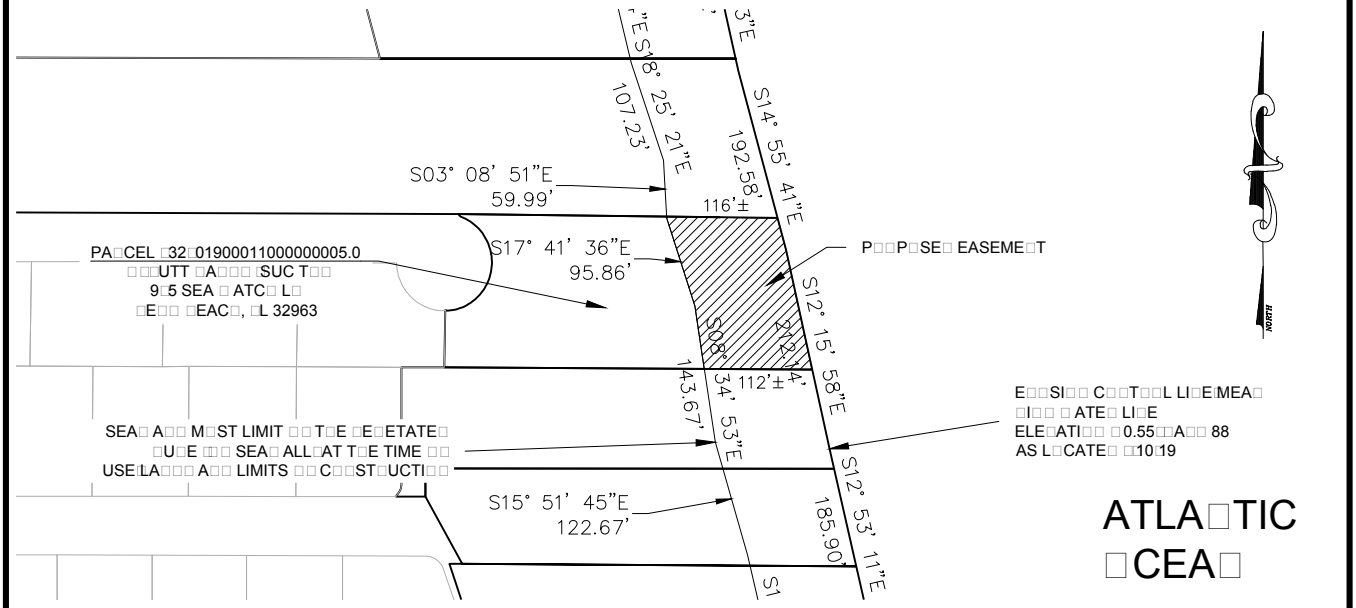
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□S □□□□ 2□27, PA□E 1328 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

Morgan & Eklund Inc.
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PHONE: (954) 421-6882
FAX: (954) 421-0425
LB #4298

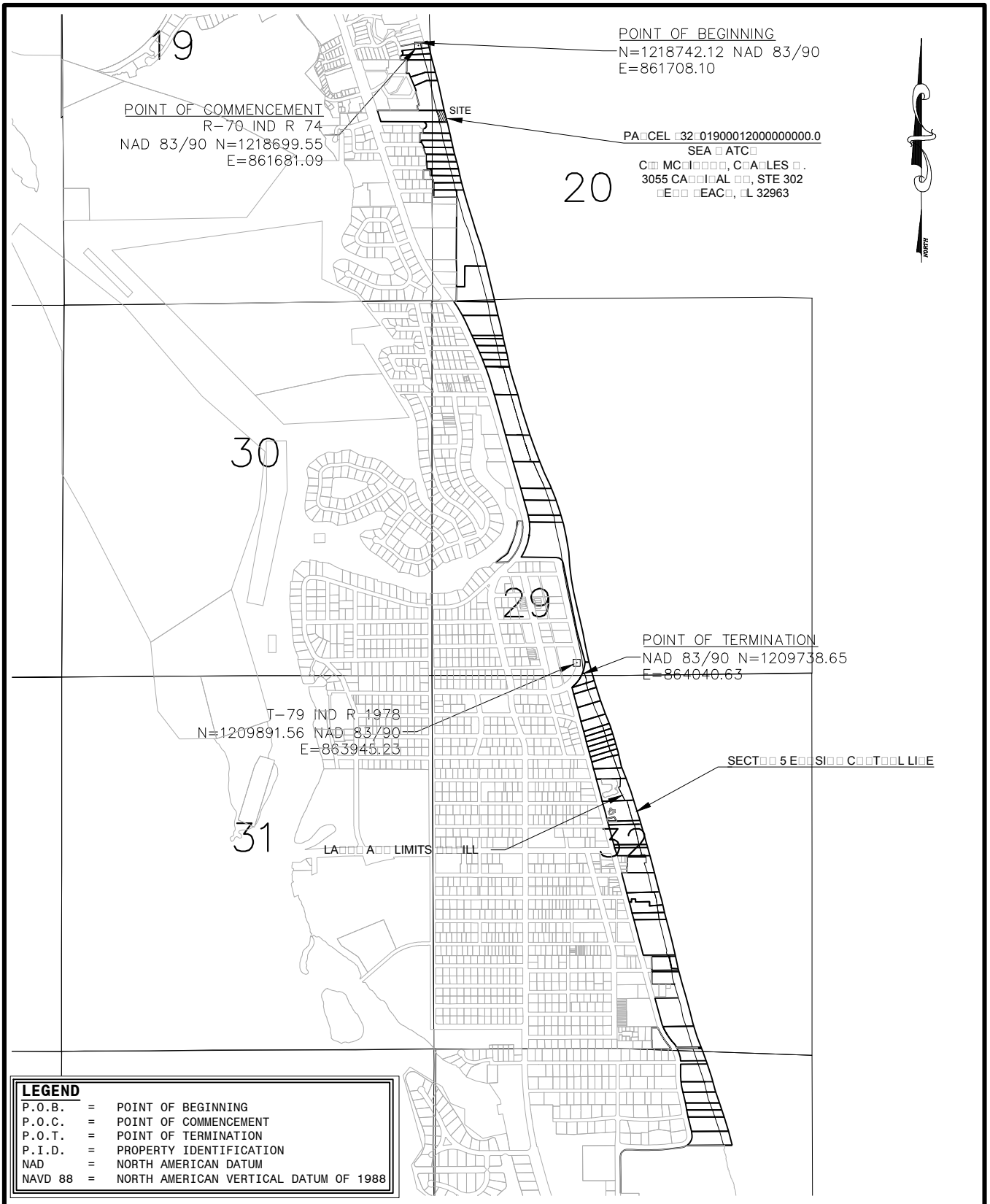
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900011000000005.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2427-P1328, lou Thu, 16 May 2019 - 11:04am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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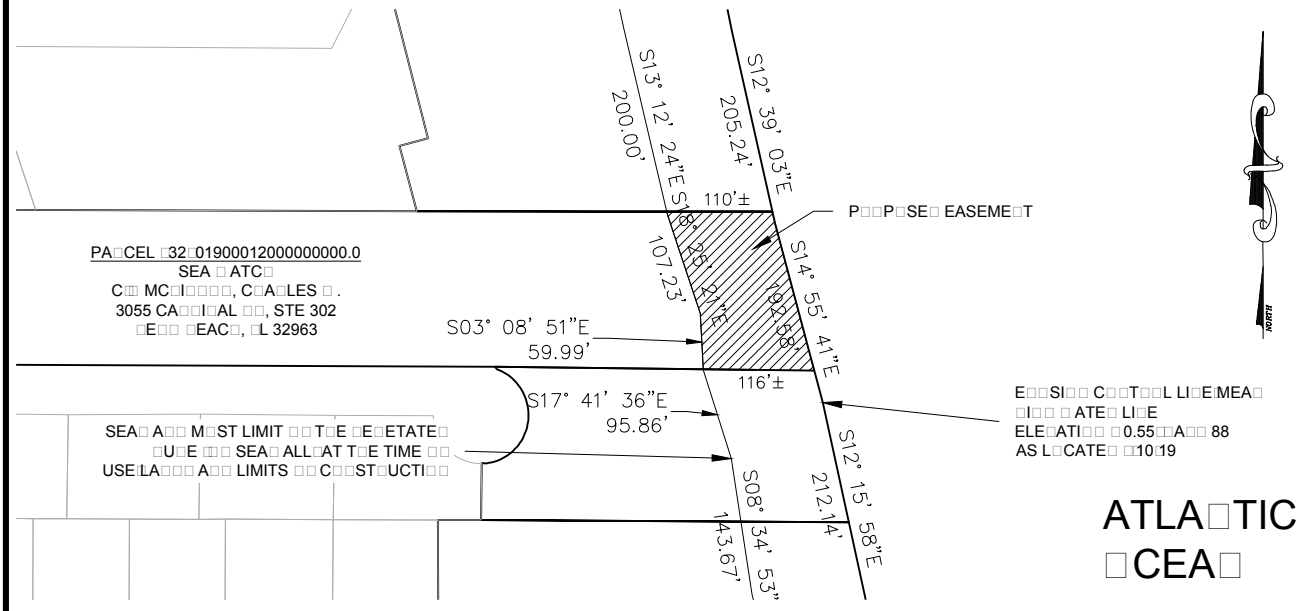
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900012000000000.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB1844-P874-CRV, Chris Wed, 22 May 2019 - 2:56pm

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□S □□□□ 18□□, PA□E 87□ □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□EP□M□□UME□T □- 70 I□□ □ 7□ □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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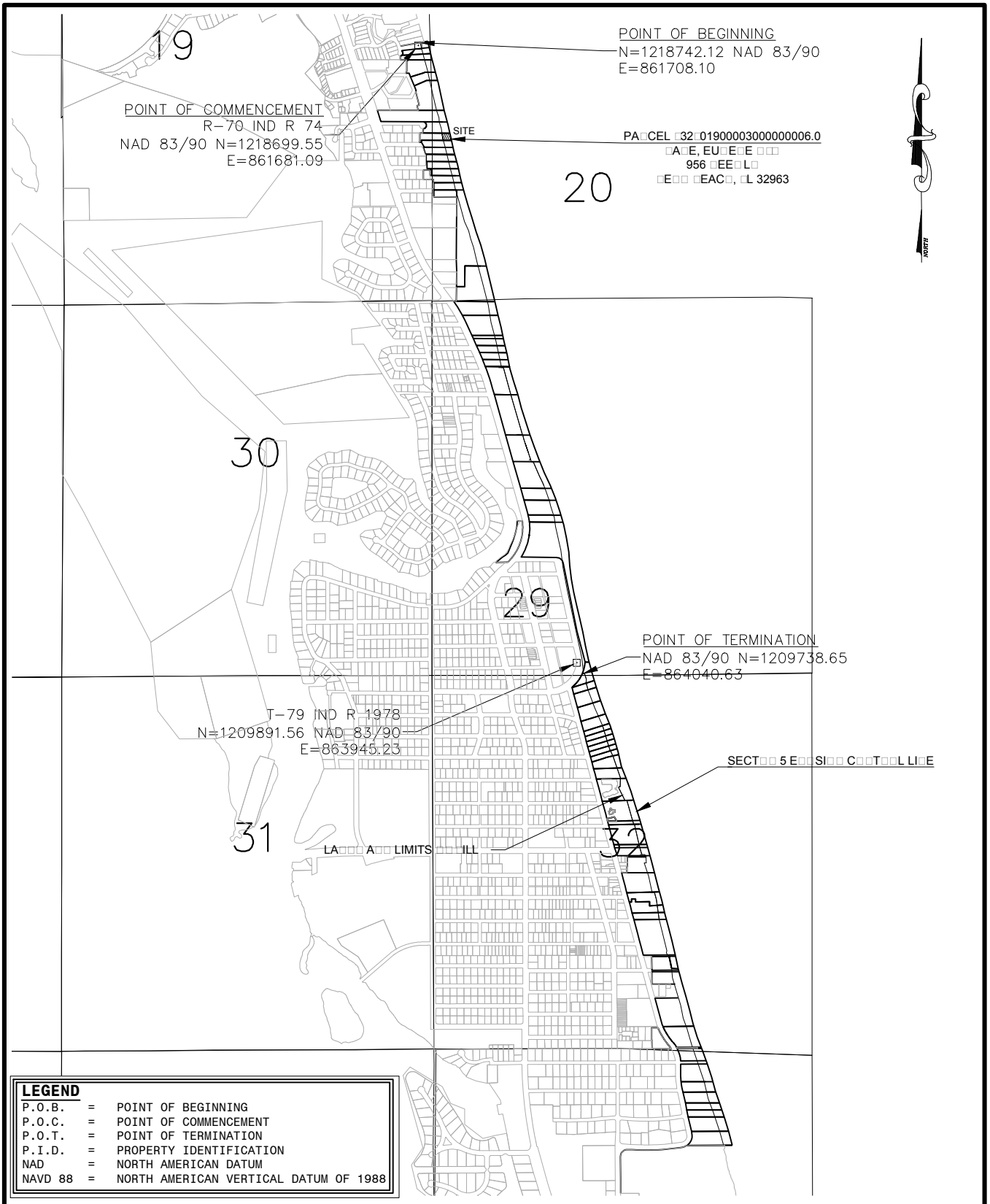
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900012000000000.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB18444-PB74, Chris Wed, 22 May 2019 - 2:56pm

SCHEDULE A



LEGEND

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LFP	JRM	N/A / N/A	N/A	1 OF 2

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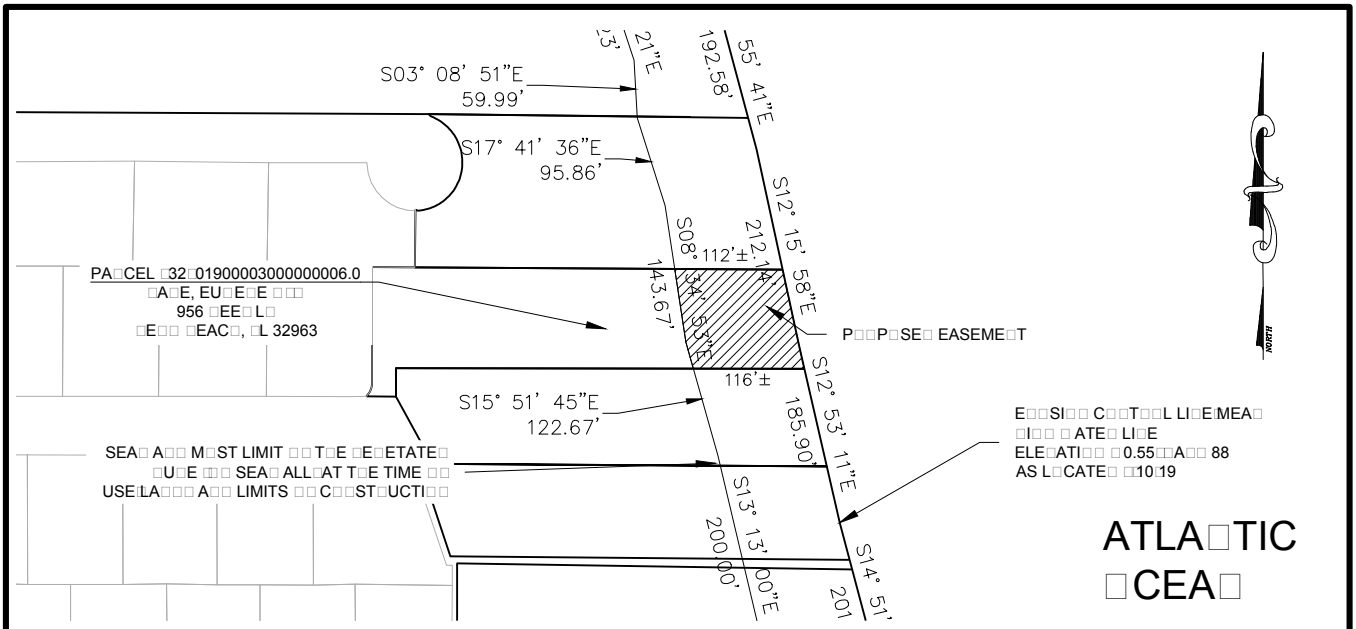
SCHEDULE A



ATLA□TIC
□CEA□

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□S □□□□ 3062, PA□E 2316 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□ TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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4909 US HIGHWAY #1
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PHONE: (954) 421-6882
FAX: (954) 421-0425
LB #4298

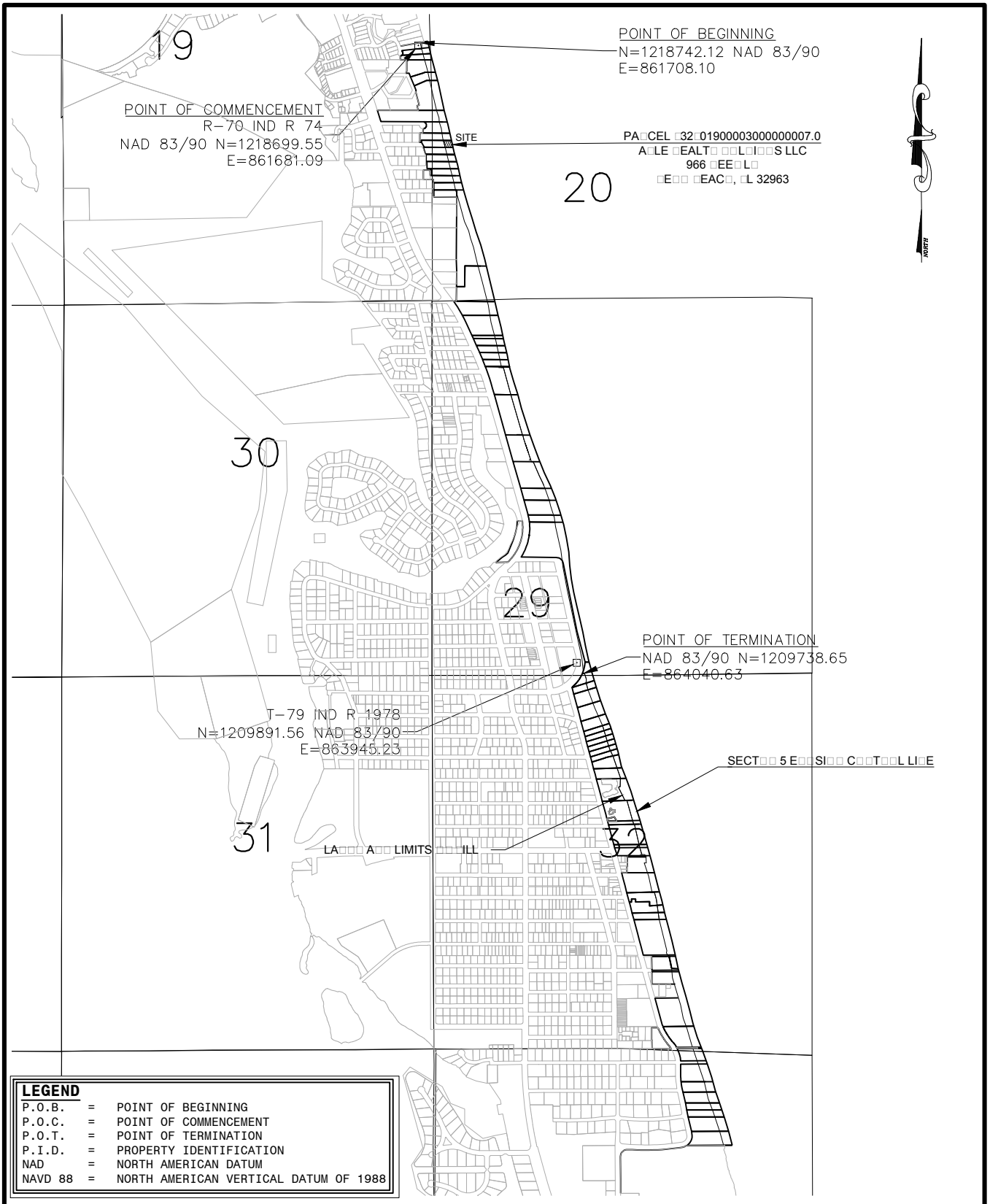
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900003000000006.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB3062-P2316, lou Thu, 16 May 2019 - 11:04am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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P.I.D. NO. 32401900003000000007.0

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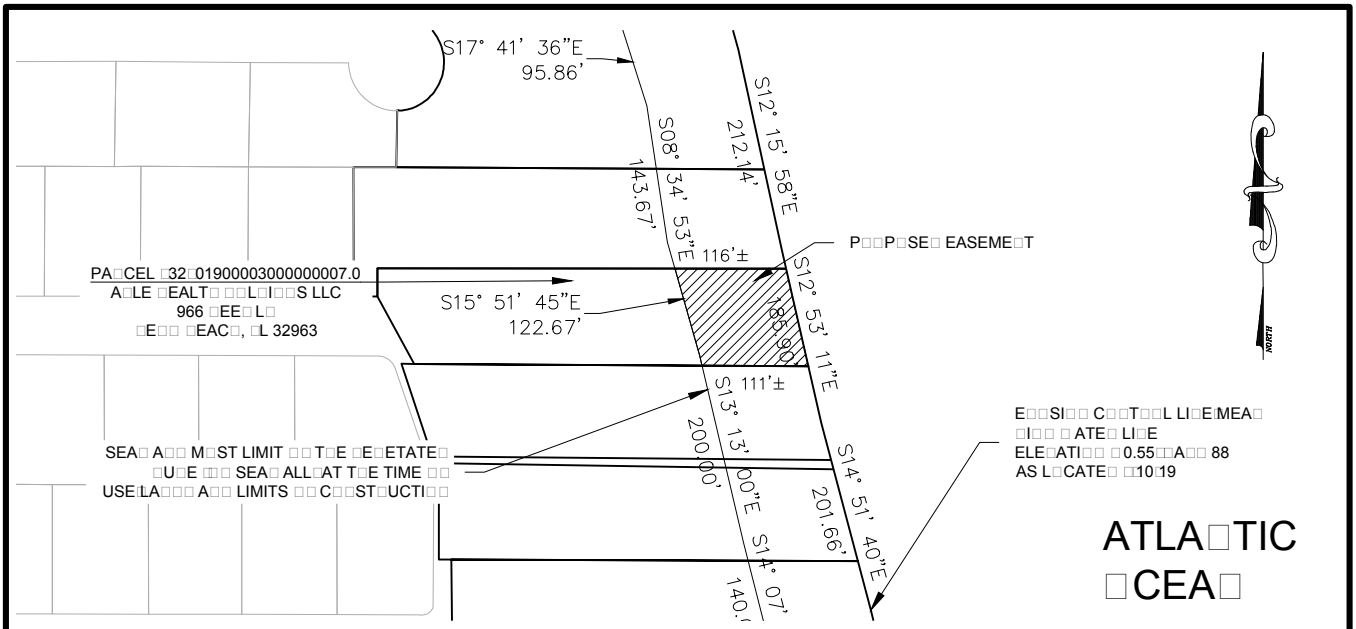
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2816-P1219-CRV, lou Thu, 16 May 2019 - 11:04am

SCHEDULE A



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T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□S □□□□ 2816, PA□E 1219 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□ TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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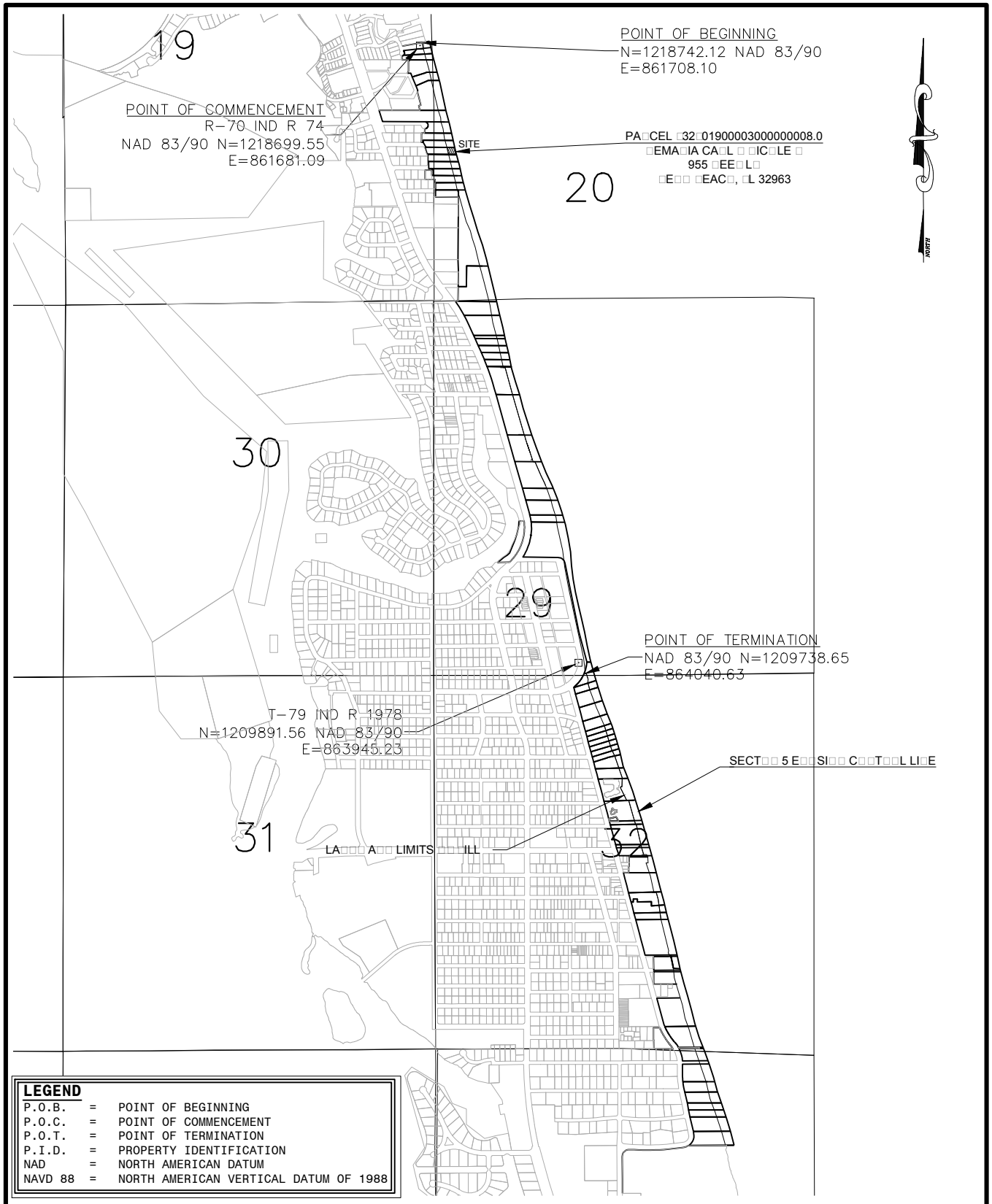
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900003000000007.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2816-P1219, Iou Thu, 16 May 2019 - 11:04am

SCHEDULE A



LEGEND

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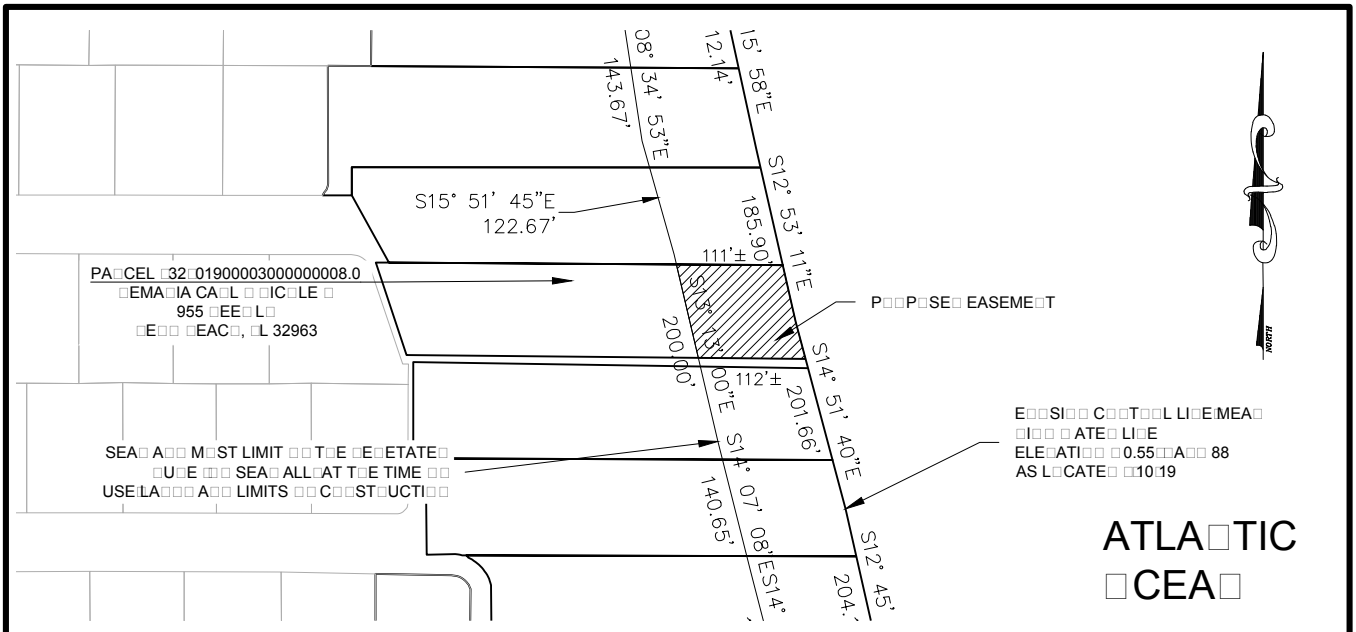
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□S □□□□ 2707, PA□E 567 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

Morgan & Eklund Inc.
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FAX: (954) 421-0425
LB #4298

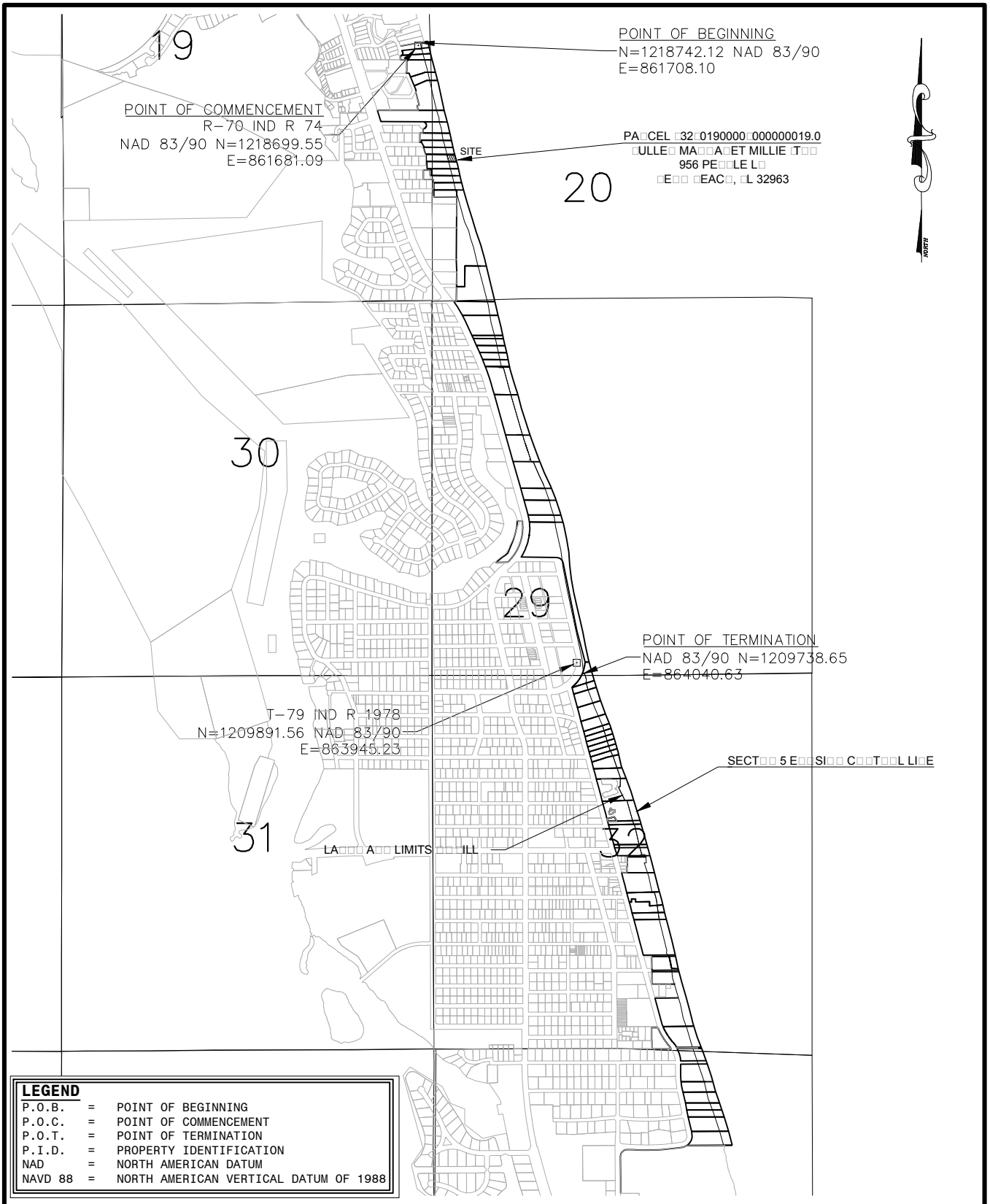
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900003000000008.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2707-P567, lou Thu, 16 May 2019 - 11:04am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

Morgan & Eklund Inc.

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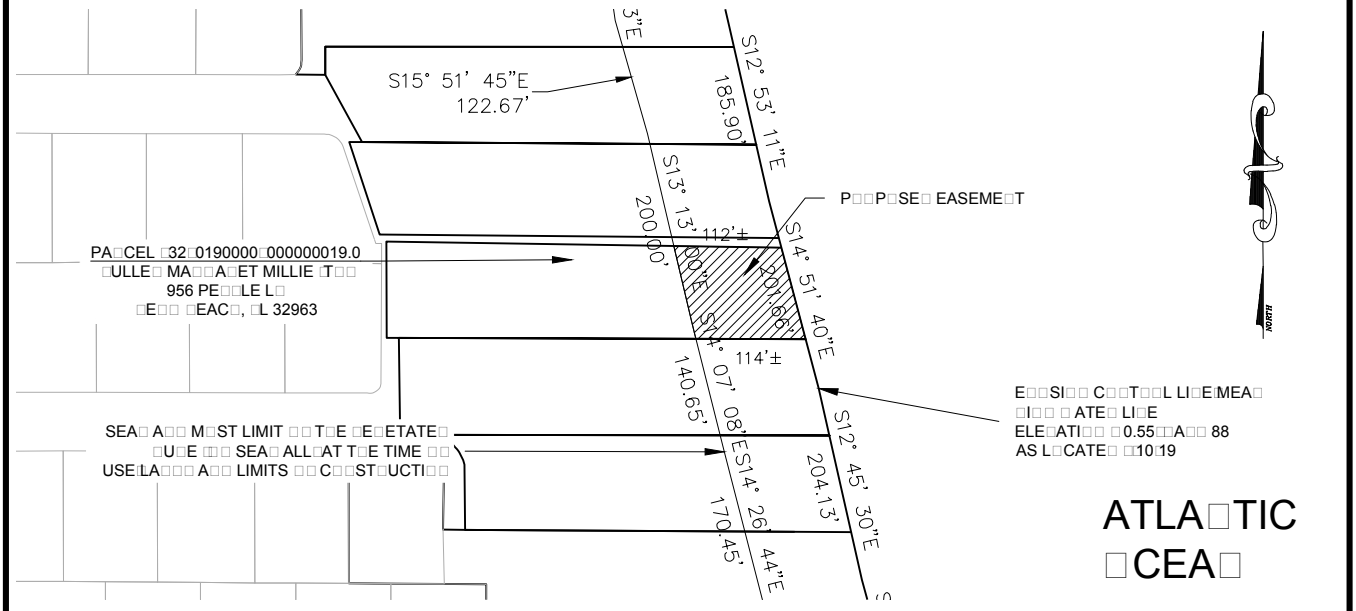
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900004000000019.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2744-P222-CRV, lou Thu, 16 May 2019 - 11:04am



SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ OF LA□□S □ESC□I□E□ AND R ECORD ED I□ □□□ICIAL □EC□□□S BOOK 2744, PA□E 222 OF T□E PU□LIC □EC□□□S OF I□□IA□ RIVER C□U□T□, □L□□I□A, LYING EASTE□L□ OF T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E □OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T R-70 IND □ 74 HAVING C□□□□I□ATES □□ NOR THING 1,218,699.55 □EET AND EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T□E FO LLOW ING □ESC□I□E□ LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,218,7□2.12 □EET AND EASTI□□ 861,708.10 □EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T OF TE□MI□ATI□□, HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,0□0.63 □EET NAD 83/90, SAI□ P□I□T BEING 180.23 □EET □ISTA□T FRO M □□EP M□□UME□T T-79 IND R 1978 HAVING C□□□□I□ATES OF NOR THING 1,209,891.56 □EET AND EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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LB #4298

SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900004000000019.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

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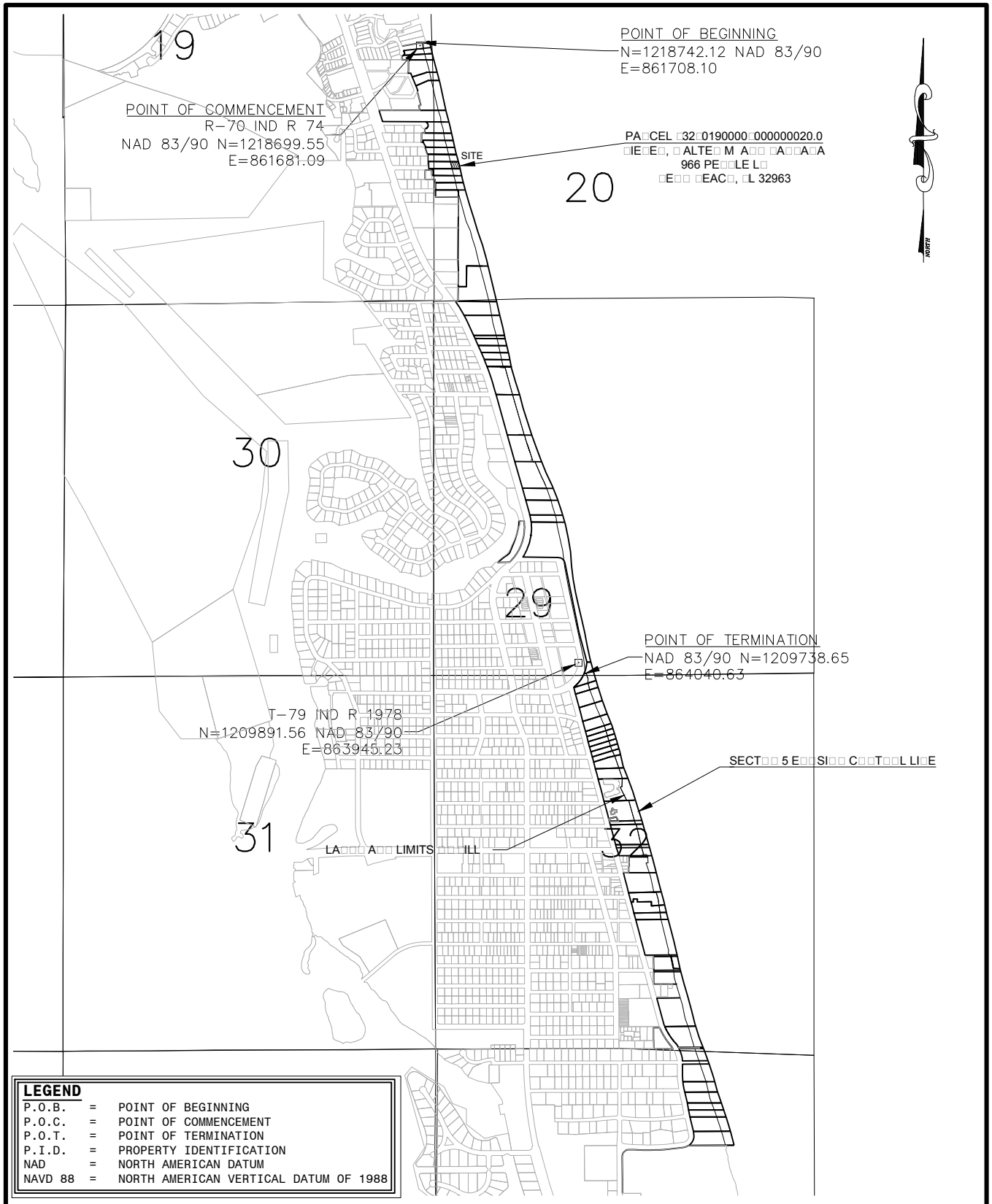
SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900004000000020.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

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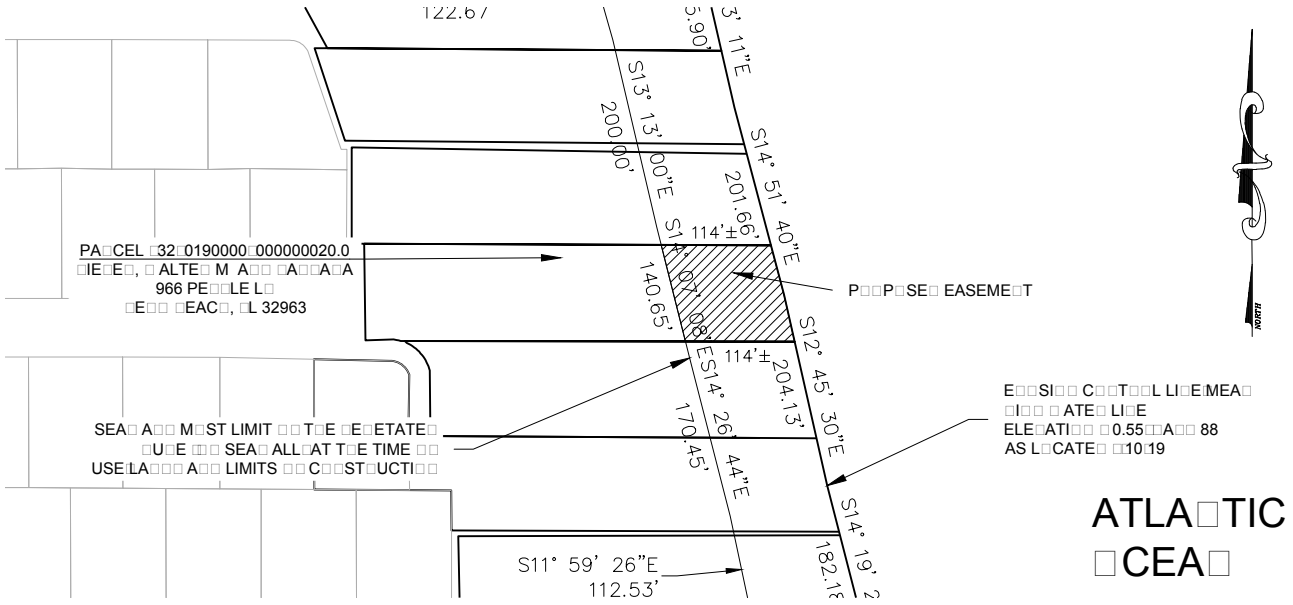
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

THAT PORTION OF LANDS DESCRIBED AS PARCEL I IN OFFICIAL RECORDS BOOK 2653, PAGE 669 OF THE PUBLIC RECORDS OF INDIAN RIVER COUNTY, FLORIDA, LYING EASTERLY OF THE SEAWARD LIMIT OF THE ESTATE OF THE PUBLIC BEACH AT THE TIME OF USE AS LIMITS OF CONSTRUCTION, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE EPA-TMENT OF ENVIRONMENTAL PROTECTION MONUMENT R- 70 IN 7-DAY COORDINATES OF 1,218,699.55 FEET AND EASTING 861,681.09 AS REFERENCED TO THE STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF THE SOUTH LINE OF INDIAN RIVER COUNTY, FLORIDA, SAID POINT ALSO HAVING COORDINATES OF 1,218,742.12 FEET AND EASTING 861,708.10 FEET ON NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO THE POINT OF INTERMEDIATE, ALSO HAVING COORDINATES OF 1,209,738.65 FEET AND EASTING 86,0-0.63 FEET AND 83-90, SAID POINT BEING 180.23 FEET DISTANT FROM MONUMENT R-79 IN 1978 ALSO HAVING COORDINATES OF 1,209,891.56 FEET AND EASTING 863,9-5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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LB #4298

SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900004000000020.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

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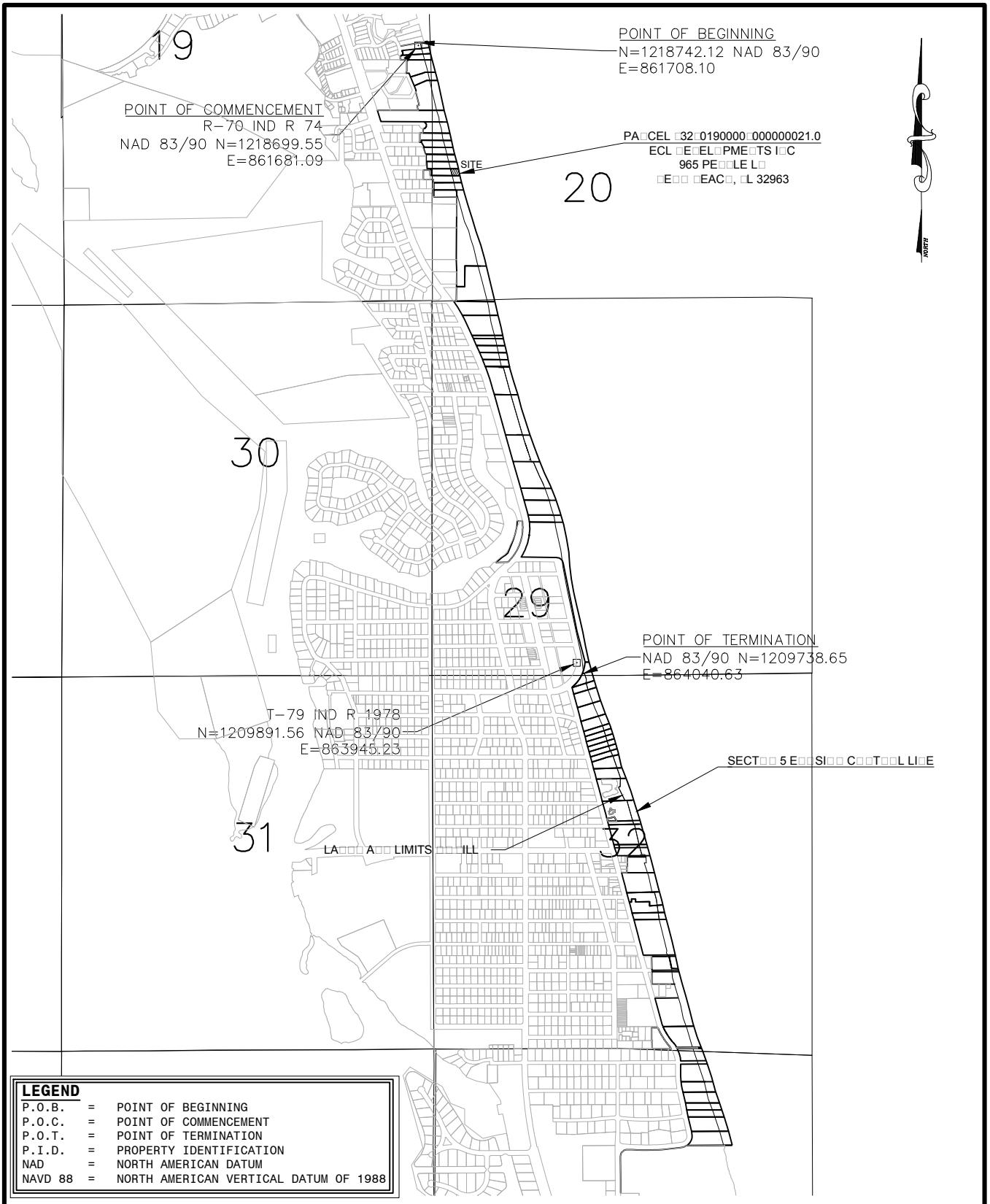
SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
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P.I.D. NO. 32401900004000000021.0

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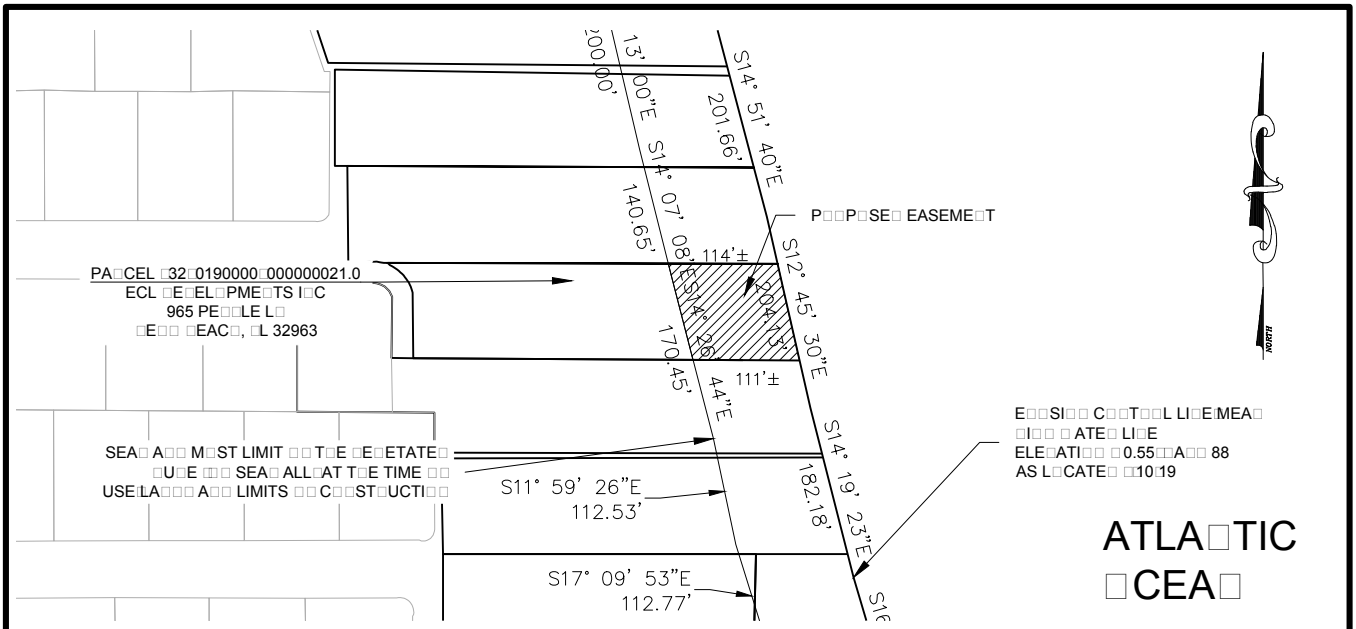

SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ OF LA□□S □ESC□I□E□ AND R ECORD ED I□ □□□ICIAL □EC□□□S BOOK 2276, PA□E 1009 OF T□E PU□LIC □EC□□□S OF I□□IA□ RIVER C□U□T□, □L□□I□A, LYING EASTE□L□ OF T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E □OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□S:

C□MME□CI□□ AT T□E □EPA□TME□T □□E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T R-70 IND □ 74 HAVING C□□□□I□ATES □□ NOR THING 1,218,699.55 □EET AND EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T□E FO LLOW ING □ESC□I□E□ LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,218,7□2.12 □EET AND EASTI□□ 861,708.10 □EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T OF TE□MI□ATI□□, HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,0□0.63 □EET NAD 83□90, SAI□ P□I□T BEING 180.23 □EET □ISTA□T FRO M □□EP M□□UME□T T-79 IND R 1978 HAVING C□□□□I□ATES OF NOR THING 1,209,891.56 □EET AND EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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LB #4298

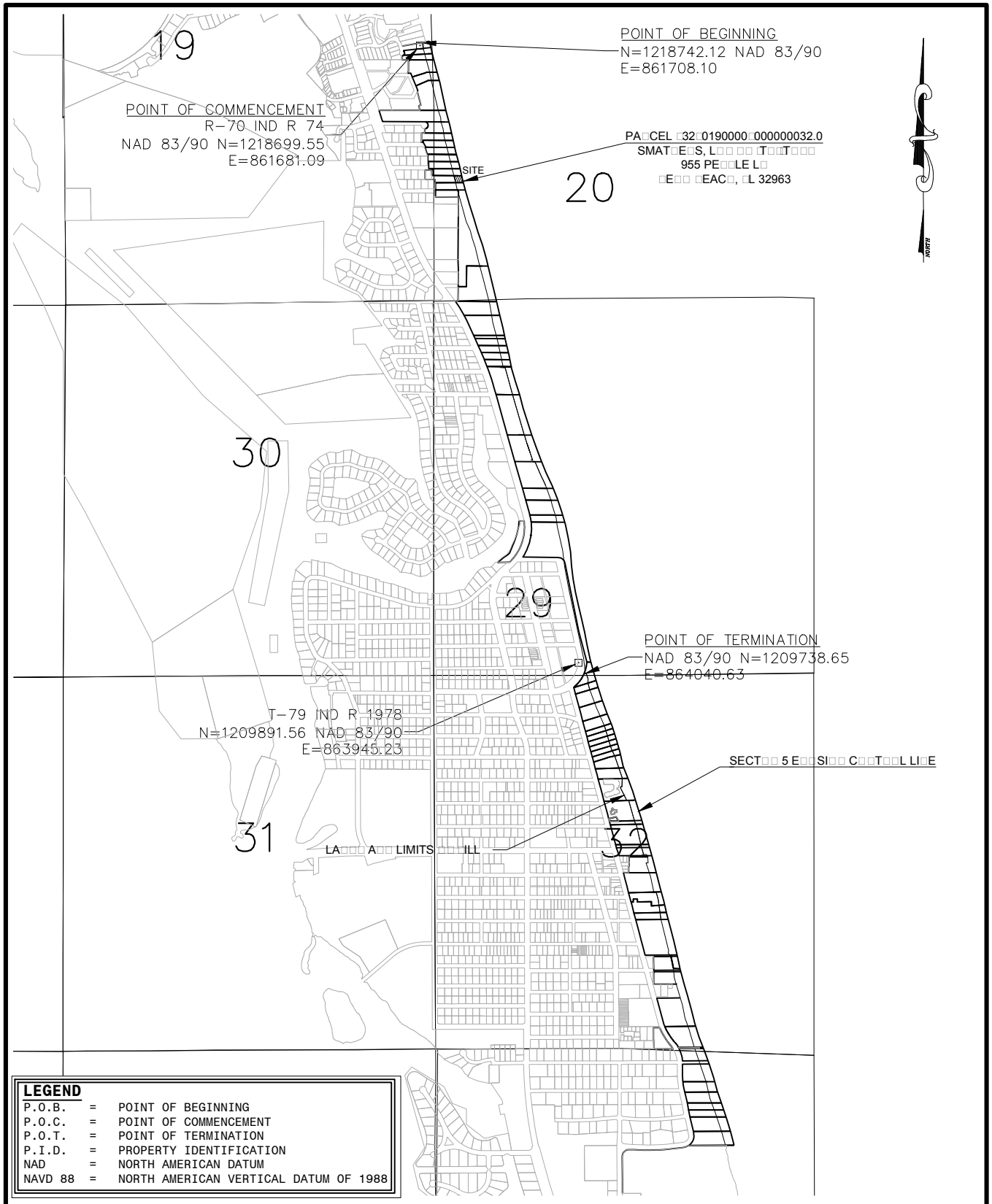
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900004000000021.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2276-P1009, lou Thu, 16 May 2019 - 11:05am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
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COMMISSION NO.	SCALE	DATE
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LFP	JRM	N/A / N/A	N/A	1 OF 2

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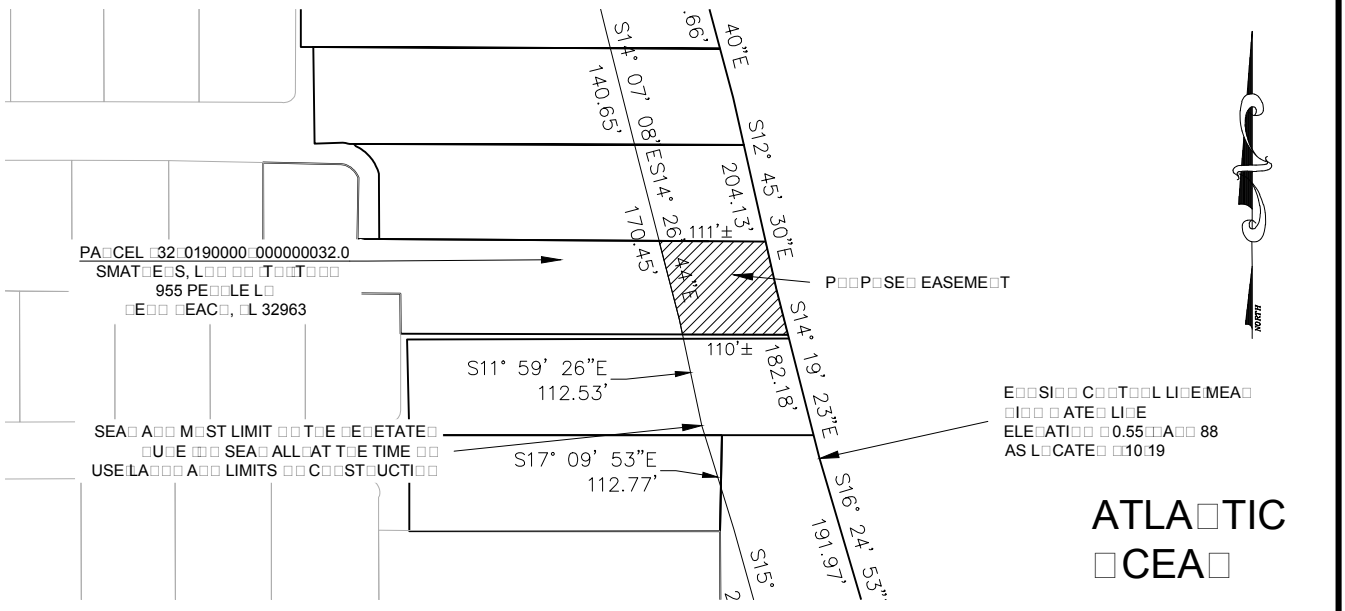

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

THAT PORTION OF LANDS DESCRIBED AS PARCEL 2 IN OFFICIAL RECORDS BOOK 157, PAGE 203 OF THE PUBLIC RECORDS OF INDIAN RIVER COUNTY, FLORIDA, LYING EASTERLY OF THE SEAWARD MOST LIMIT OF THE SEAWARD ALL AT THE TIME OF USE LAWFUL LIMITS OF CONSTRUCTION, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE EPATME NAD 83/90 (2011) COORDINATES OF N 1,218,699.55 FEET AND EAST 861,681.09 AS REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF THE HEREIN DESCRIBED LINE, SAID POINT HAVING NAD 83/90 COORDINATES OF N 1,218,742.12 FEET AND EAST 861,708.10 FEET AND BEING ON THE SEAWARD MOST LIMIT OF THE SEAWARD ALL AT THE TIME OF USE LAWFUL LIMITS OF CONSTRUCTION; THENCE S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO THE POINT OF TERMINATION, SAID POINT HAVING NAD 83/90 COORDINATES OF N 1,209,738.65 FEET AND EAST 86,0-0.63 FEET AND BEING 83/90, SAID POINT BEING 180.23 FEET DISTANT FROM MEAN HIGH WATER LINE OF THE ATLANTIC OCEAN AS LOCATED IN 1978 AND HAVING NAD 83/90 COORDINATES OF N 1,209,891.56 FEET AND EAST 863,9-5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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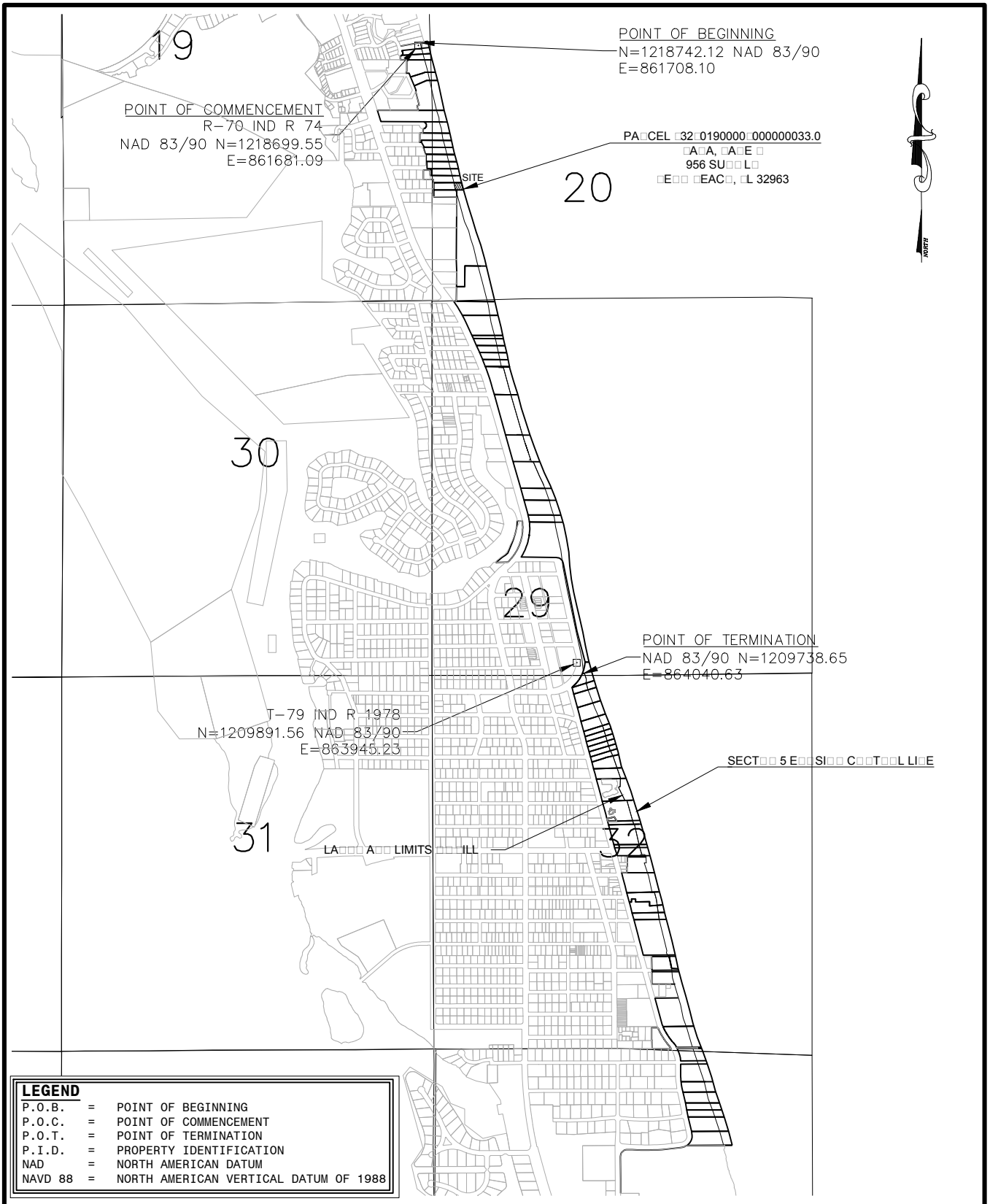
SCHEDULE A



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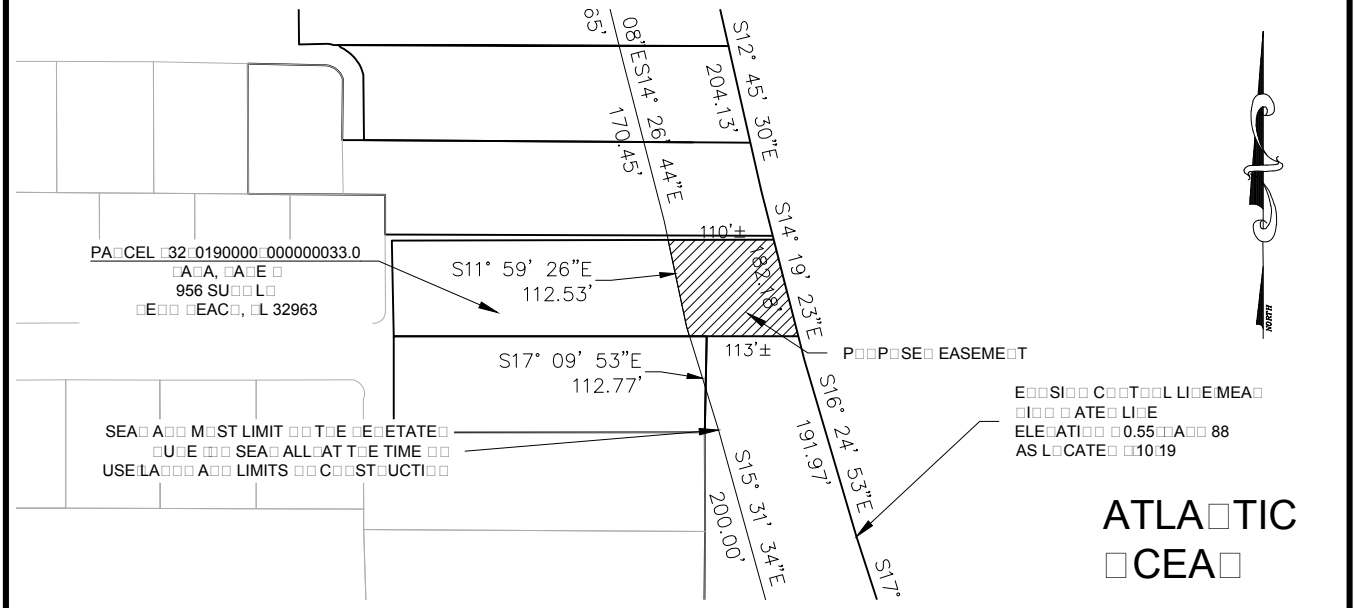
LB #4298

SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32401900004000000033.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB1967-P1798-CRV, lou Thu, 16 May 2019 - 11:05am



SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ OF LA□□S □ESC□I□E□ AND R ECORD ED I□ □□□ICIAL □EC□□□S BOOK 1967, PA□E 1798 OF T□E PU□LIC □EC□□□S OF I□□IA□ RIVER C□U□T□, □L□□I□A, LYING EASTE□L□ OF T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E □OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T R- 70 IND □ 74 HAVING C□□□□I□ATES □□ NOR THING 1,218,699.55 □EET AND EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T□E FO LLOW ING □ESC□I□E□ LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,218,7□2.12 □EET AND EASTI□□ 861,708.10 □EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T OF TE□MI□ATI□□, HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,0□0.63 □EET NAD 83/90, SAI□ P□I□T BEING 180.23 □EET □ISTA□T FRO M □□EP M□□UME□T T-79 IND R 1978 HAVING C□□□□I□ATES OF NOR THING 1,209,891.56 □EET AND EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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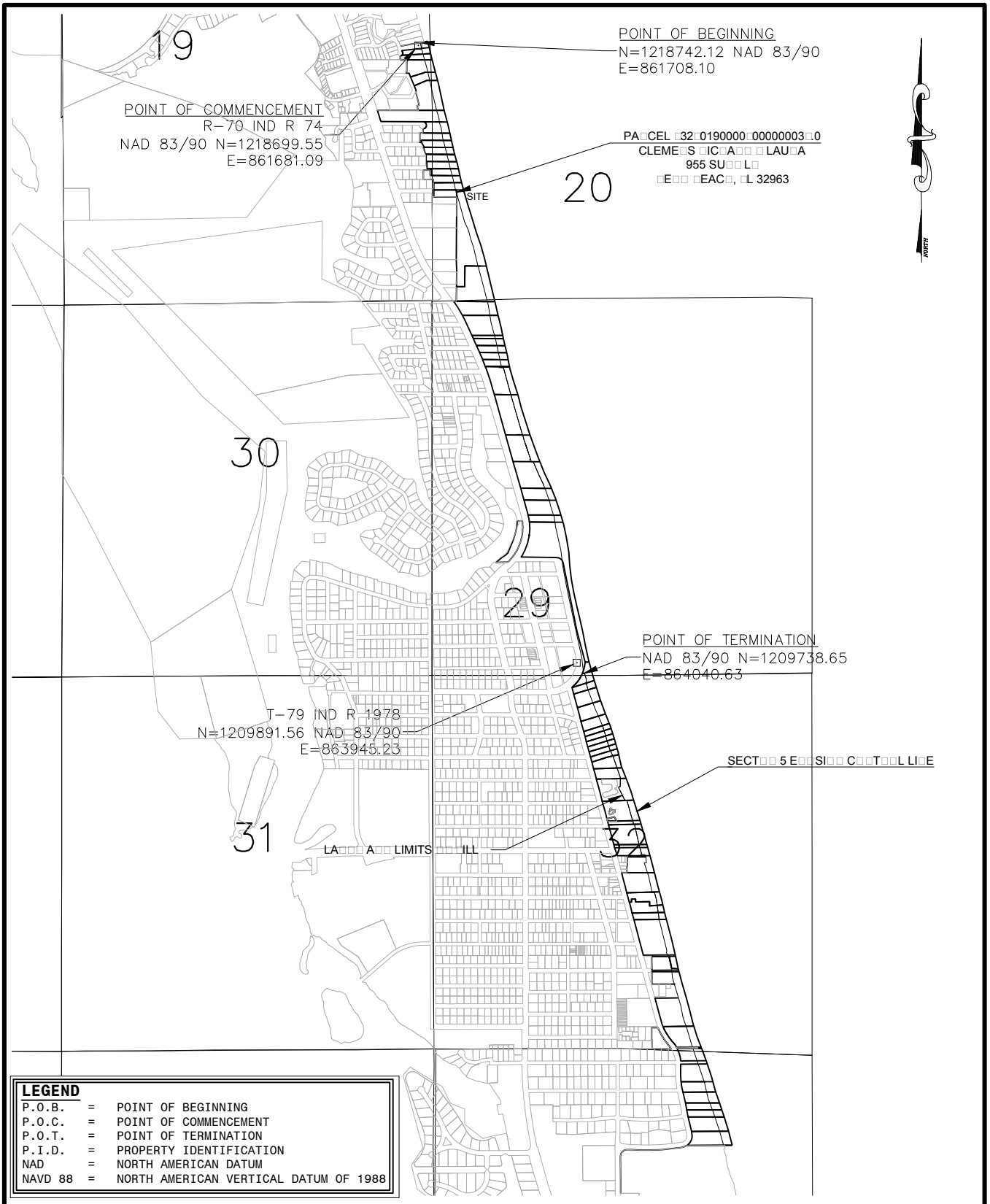
SCHEDULE A



LEGEND

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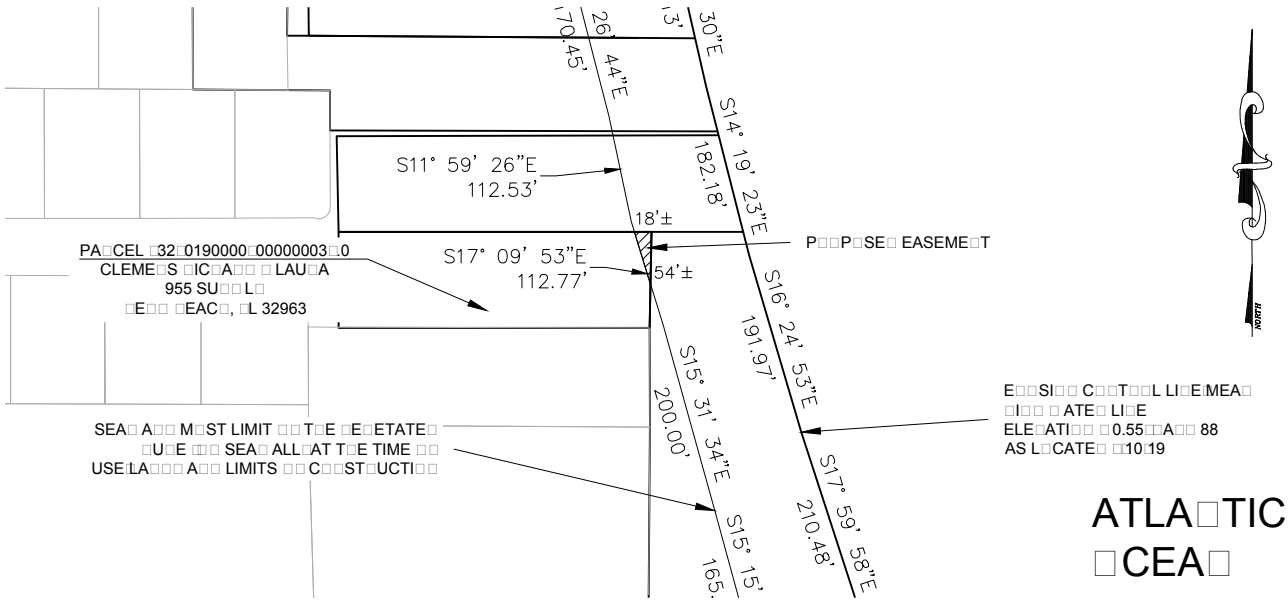

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T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□S □□□□ 2767, PA□E 171 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□ TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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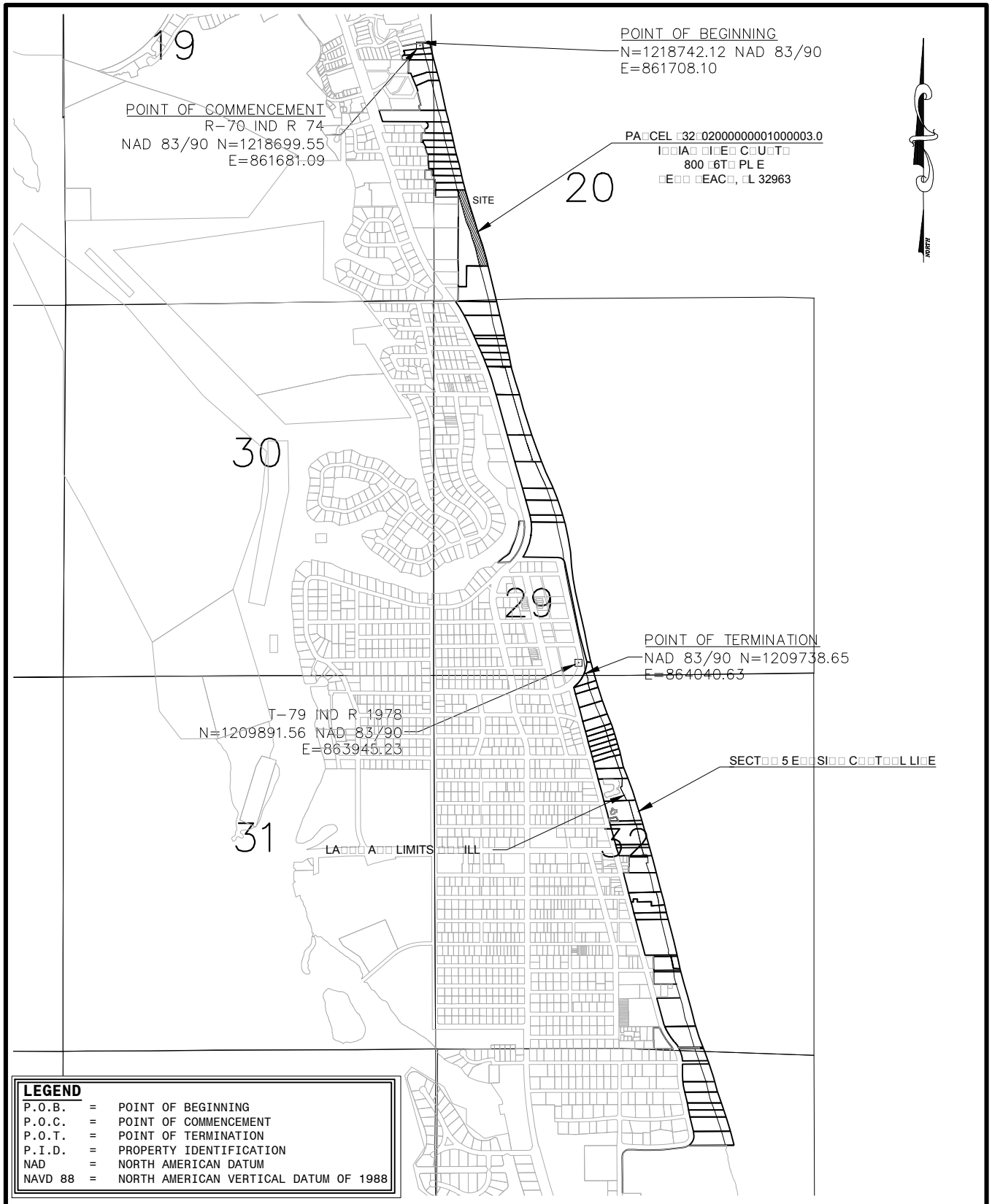
SCHEDULE A



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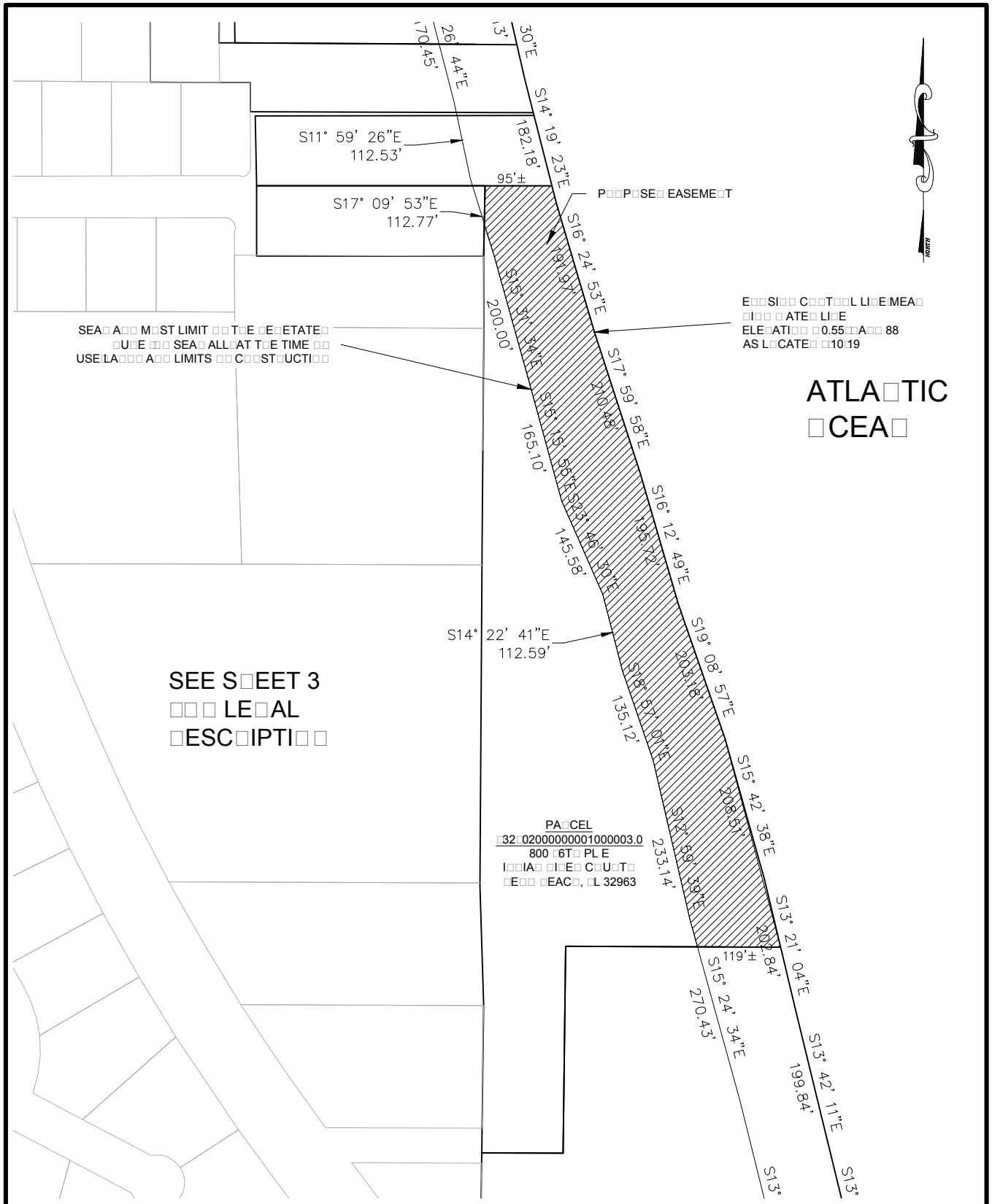
SCHEDULE A



SEAWARD MOST LIMIT OF THE ESTATE DUE TO SEAWARD ALLOWABLE USE LAWFUL LIMITS OF CONSTRUCTION

EASTERLY LIMIT OF ESTATE DUE TO ELEVATION OF 0.55 AS LOCATED IN 10-19

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T□AT P□□TI□□ OF LA□□S □ESC□I□E□ AND R ECORD ED I□ □□□ICIAL □EC□□□S BOOK 2767, PA□E 171 OF T□E PU□LIC □EC□□□S OF I□□IA□ RIVER C□U□T□, □L□□I□A, LYING EASTE□L□ OF T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E □OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T R- 70 IND □ 74 HAVING C□□□□I□ATES □□ NOR THING 1,218,699.55 □EET AND EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T□E FO LLOW ING □ESC□I□E□ LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,218,7□2.12 □EET AND EASTI□□ 861,708.10 □EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T OF TE□MI□ATI□□, HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,0□0.63 □EET NAD 83□90, SAI□ P□I□T BEING 180.23 □EET □ISTA□T FRO M □□EP M□□UME□T T-79 IND R 1978 HAVING C□□□□I□ATES OF NOR THING 1,209,891.56 □EET AND EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

Morgan & Eklund Inc.
PROFESSIONAL SURVEY CONSULTANTS
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PHONE: (954) 421-6882
FAX: (954) 421-0425
LB #4298

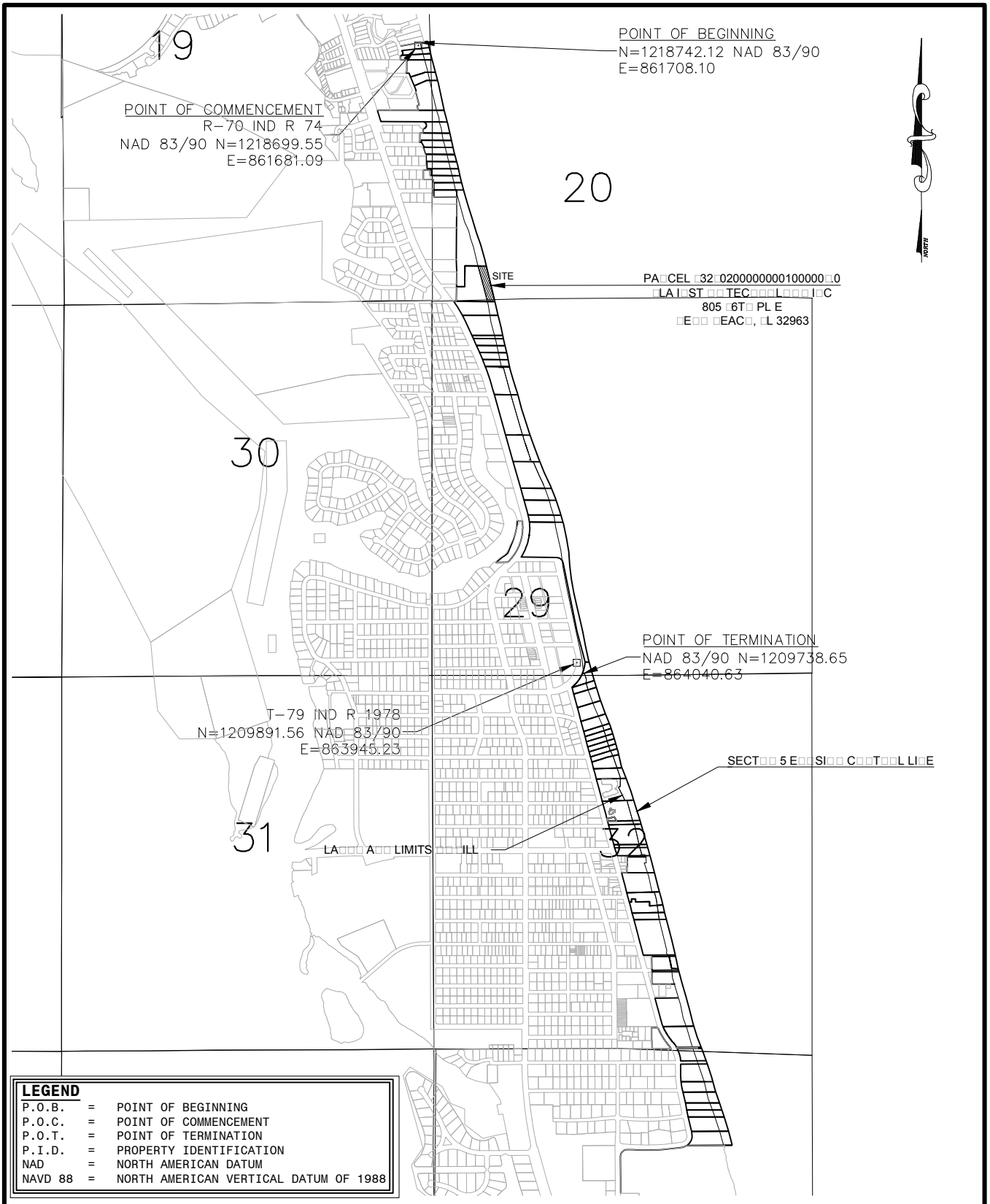
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402000000001000003.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	3 OF 3

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, IRC1-LEGAL, lou Thu, 16 May 2019 - 11:06am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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LFP	JRM	N/A / N/A	N/A	1 OF 2

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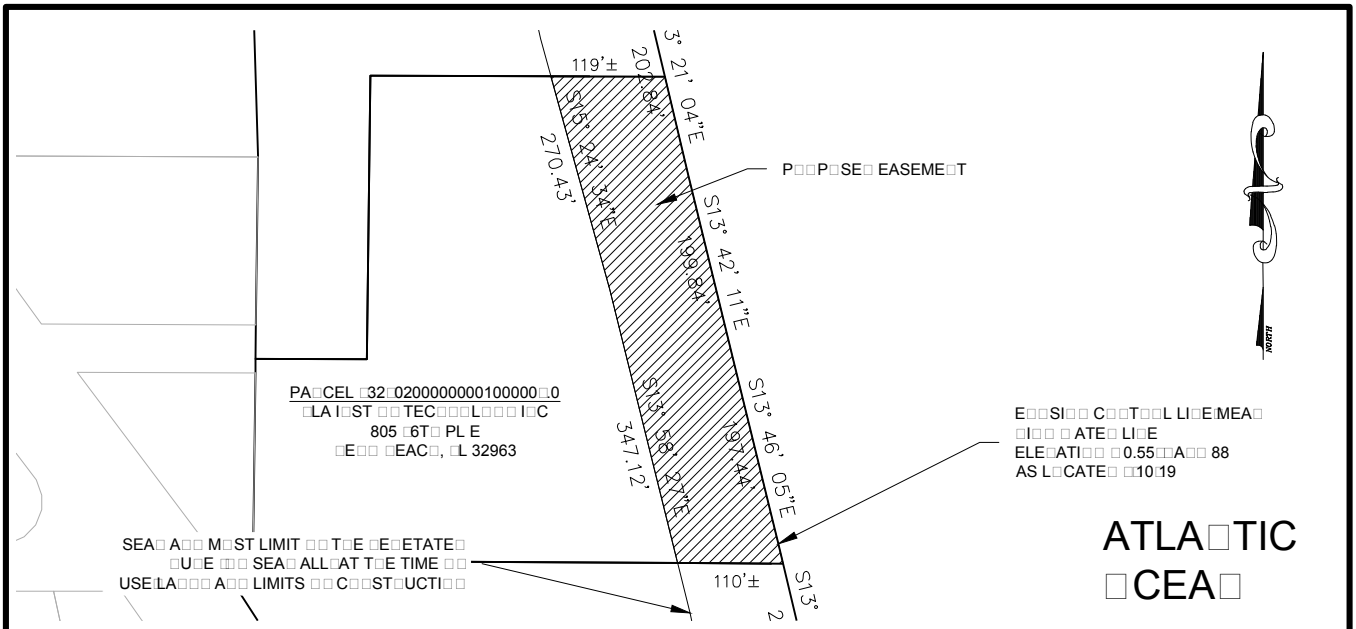

SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ OF LA□□S □ESC□I□E□ AND R ECORD ED I□ □□□ICIAL □EC□□□S BOOK 3148, PA□E 705 OF T□E PU□LIC □EC□□□S OF I□□IA□ RIVER C□U□T□, □L□□I□A, LYING EASTE□L□ OF T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E □OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□S:

C□MME□CI□□ AT T□E □EPA□TME□T □□E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T R-70 IND □ 74 HAVING C□□□□I□ATES □□ NOR THING 1,218,699.55 □EET AND EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T□E FO LLOW ING □ESC□I□E□ LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,218,7□2.12 □EET AND EASTI□□ 861,708.10 □EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T OF TE□MI□ATI□□, HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,0□0.63 □EET NAD 83/90, SAI□ P□I□T BEING 180.23 □EET □ISTA□T FRO M □□EP M□□UME□T T-79 IND R 1978 HAVING C□□□□I□ATES OF NOR THING 1,209,891.56 □EET AND EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402000000001000004.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

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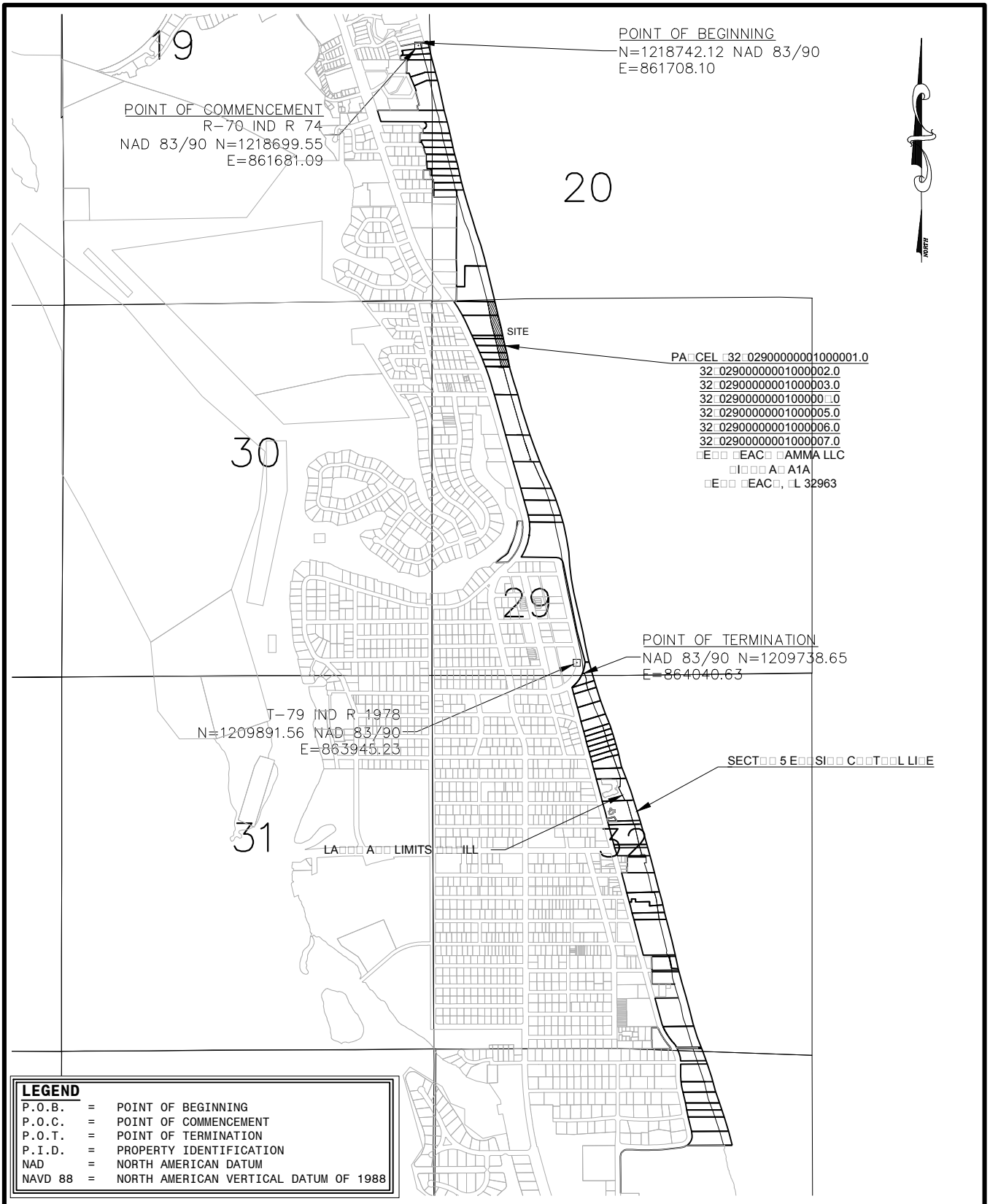
SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
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P.O.T.	=	POINT OF TERMINATION
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LB #4298

SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900000001000001.0-32402900000001000007.0

COMMISSION NO.	SCALE	DATE
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LFP	JRM	N/A / N/A	N/A	1 OF 3

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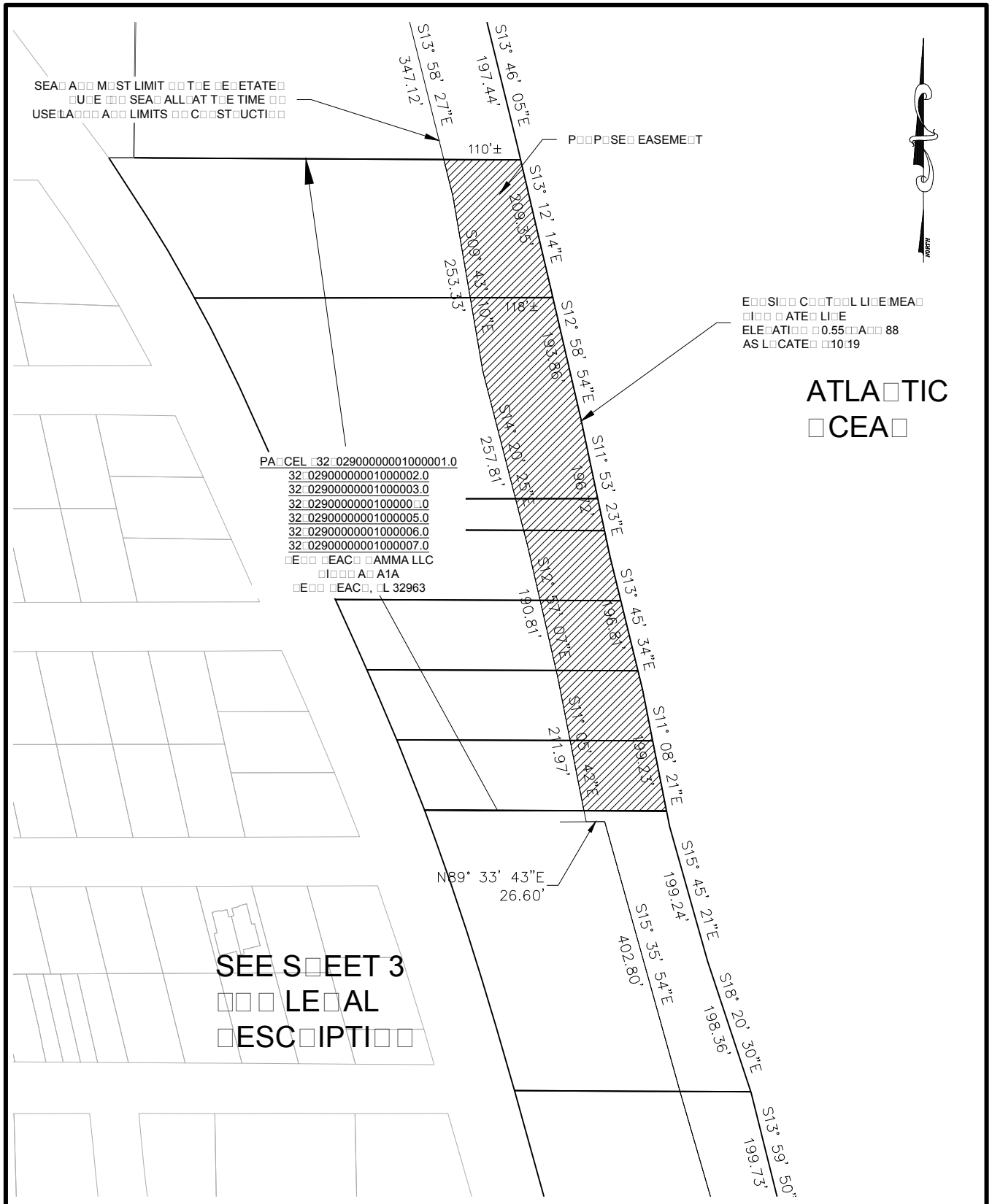
SCHEDULE A



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P.I.D. NO. 32402900000001000001.0-32402900000001000007.0

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COMMISSION NO.	SCALE	DATE	SHEET
35315-11	1" = 200'	4/29/19	2 OF 3

SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□S □□□□ 2767, PA□E 171 □□ T□E PU□LIC □EC□□□S OF I□□IA□ RIVER C□U□T□, □L□□I□A, LYING EASTE□L□ OF T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E □OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T R- 70 IND □ 74 HAVING C□□□□I□ATES □□ NOR THING 1,218,699.55 □EET AND EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T□E FO LLOW ING □ESC□I□E□ LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,218,7□2.12 □EET AND EASTI□□ 861,708.10 □EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T OF TE□MI□ATI□□, HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,0□0.63 □EET NAD 83/90, SAI□ P□I□T BEING 180.23 □EET □ISTA□T FRO M □□EP M□□UME□T T-79 IND R 1978 HAVING C□□□□I□ATES OF NOR THING 1,209,891.56 □EET AND EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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LB #4298

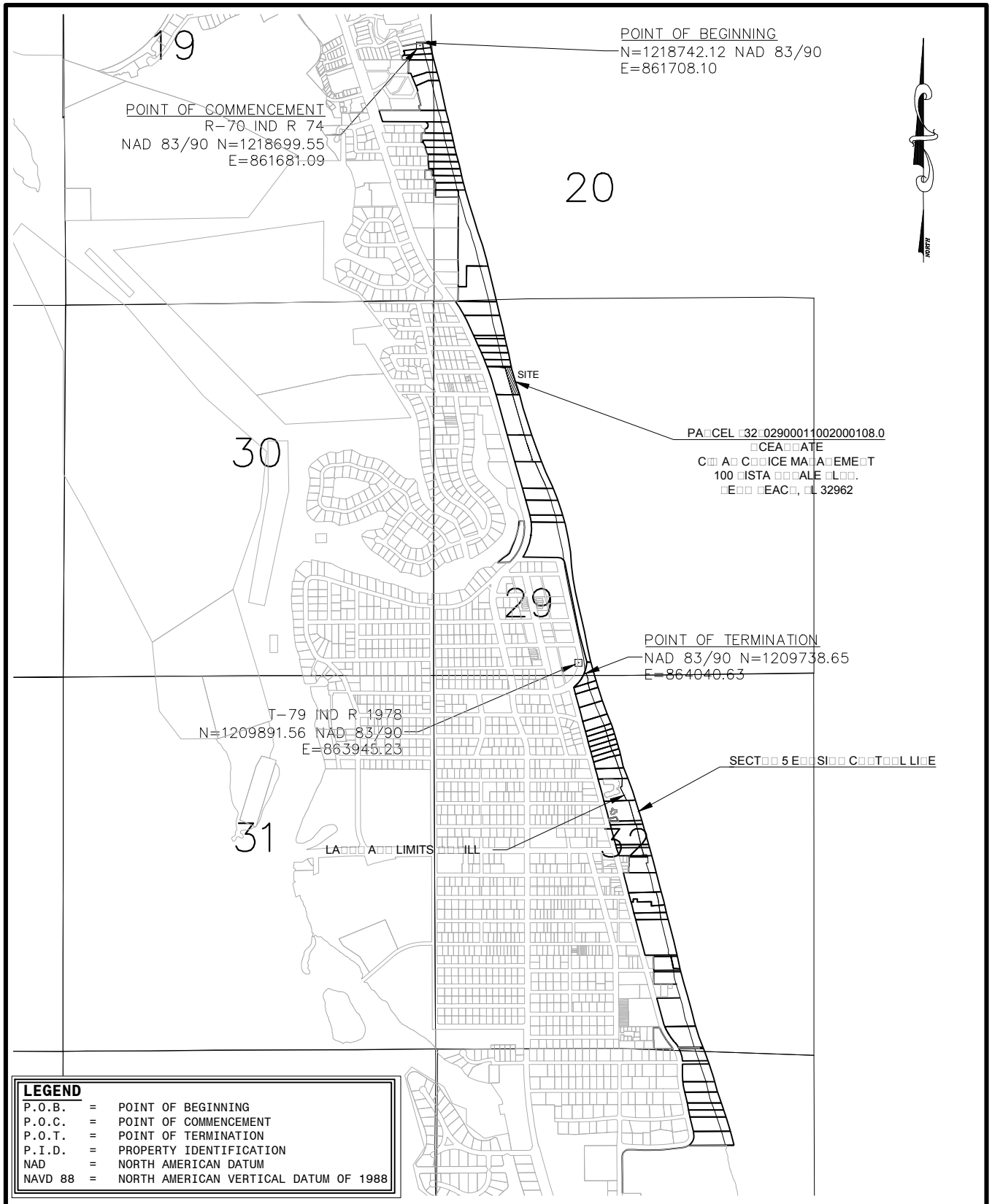
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 3240290000001000001.0-3240290000001000007.0

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY
LFP	JRM	N/A / N/A	N/A

COMMISSION NO. 35315-11
SCALE 1" = 200'
DATE 4/29/19
SHEET 3 OF 3

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2208-P2492 LEGAL, lou Thu, 16 May 2019 - 11:06am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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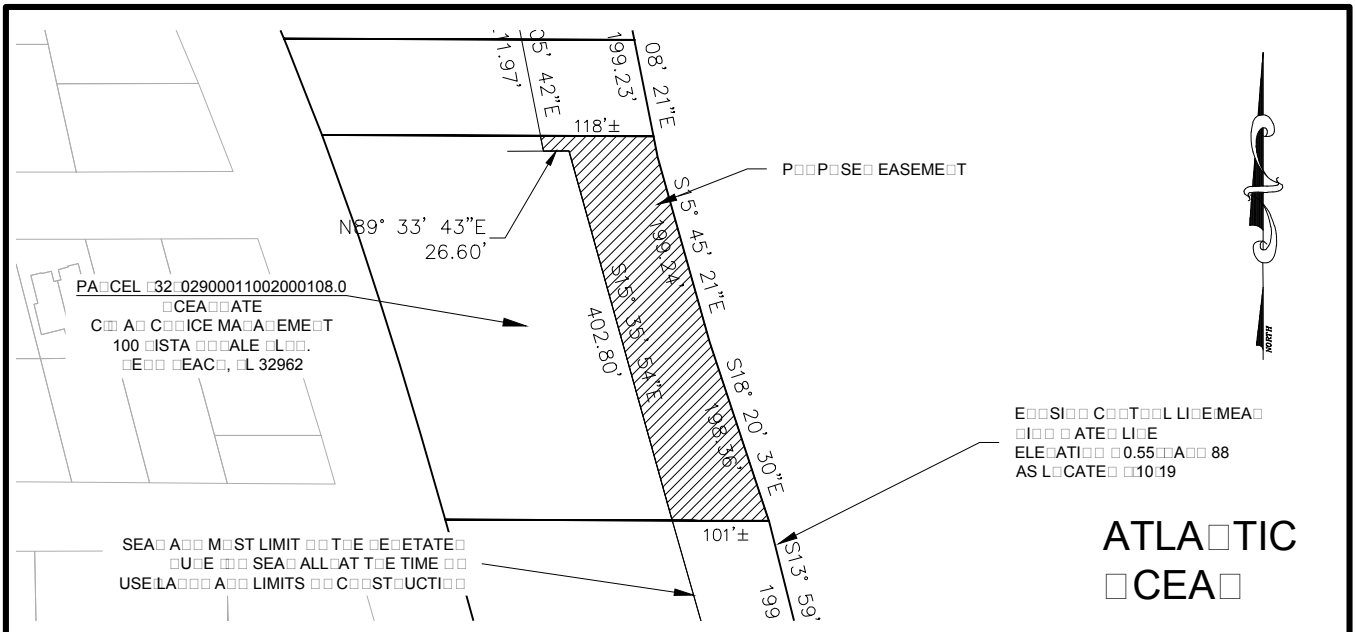
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900011002000108.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB1786-P-138CRV, Chris Wed, 22 May 2019 - 3:00pm

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

THAT PORTION OF LANDS DESCRIBED AS OFFICIAL RECORDS 1786, PAGE 138 OF THE PUBLIC RECORDS OF INDIAN RIVER COUNTY, FLORIDA, LYING EASTERLY OF THE SEACOAST LIMIT LINE AS LOCATED IN 2010 IN ACCORDANCE WITH CHAPTER 161.053, FLORIDA STATUTES, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE EPA TMENT OF ENVIRONMENTAL PROTECTION MONUMENT R- 70 IN THE 7TH ADJUSTMENT OF COORDINATES OF THE 1,218,699.55 FEET AND EASTING 861,681.09 AS REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF THE HEREIN DESCRIBED LINE, SAID POINT HAVING COORDINATES OF THE NORTHING 1,218,742.12 FEET AND EASTING 861,708.10 FEET OF SAID 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO THE POINT OF TERMINATION, SAID POINT HAVING COORDINATES OF THE NORTHING 1,209,738.65 FEET AND EASTING 860,0 0.63 FEET OF SAID 83/90, SAID POINT BEING 180.23 FEET DISTANT FROM MONUMENT R-79 IN THE 1978 ADJUSTMENT OF COORDINATES OF THE 1,209,891.56 FEET AND EASTING 863,9 5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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LB #4298

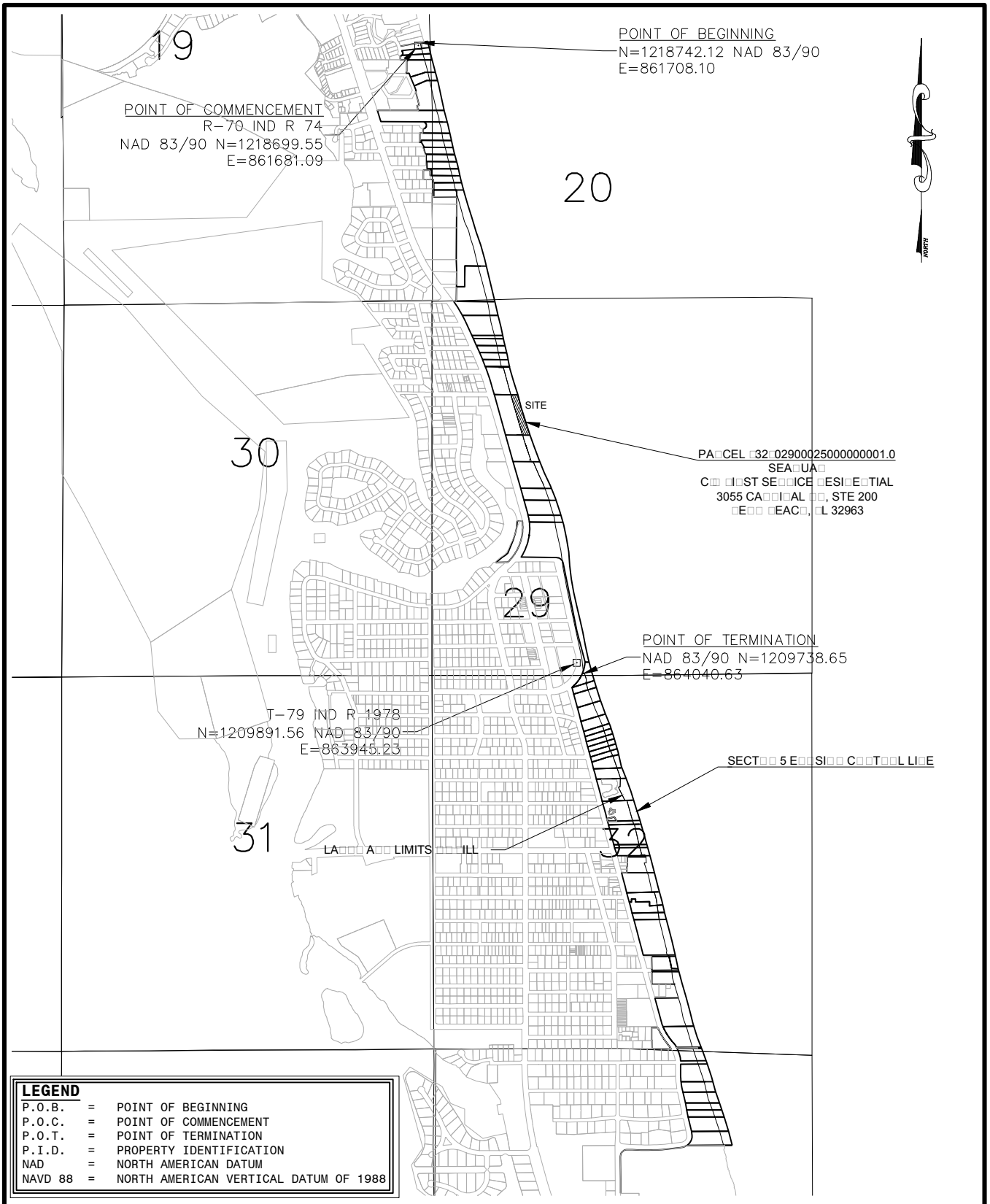
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900011002000108.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB1786-P138, Chris Wed, 22 May 2019 - 3:01pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
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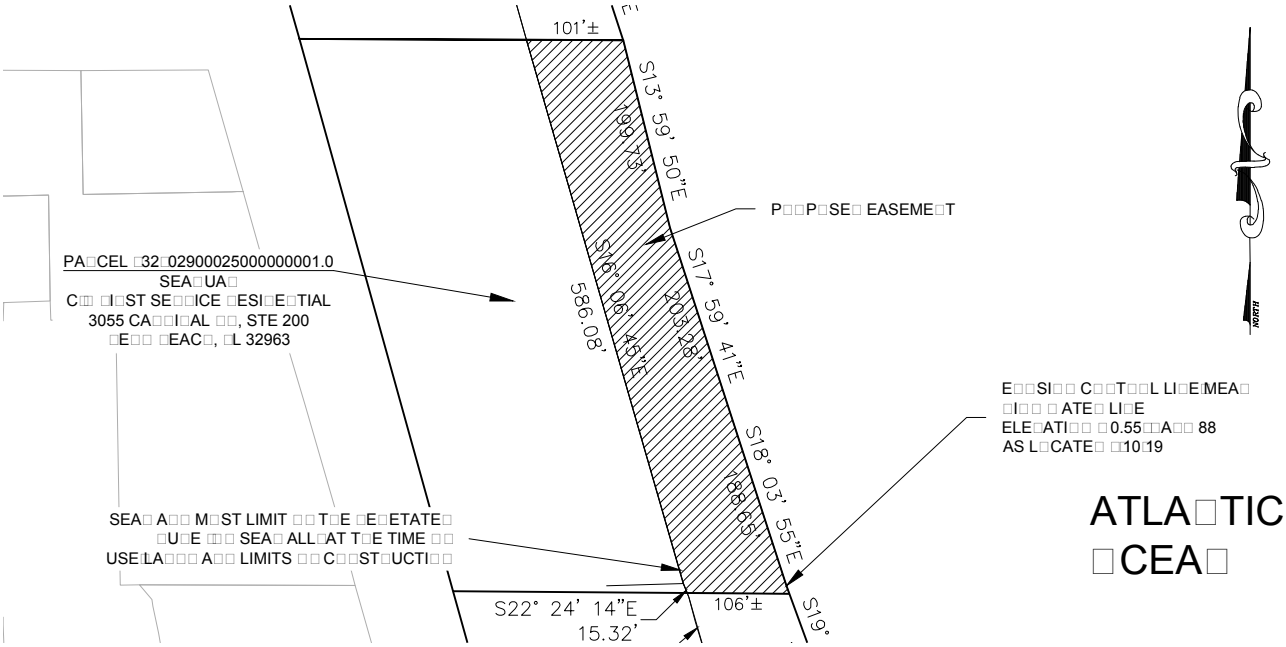
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900025000000001.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB1616-P-1124CRV, Chris Wed, 22 May 2019 - 3:04pm

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□S □□□□ 1616, PA□E 112□ □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□ TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

Morgan & Eklund Inc.
PROFESSIONAL SURVEY CONSULTANTS
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FAX: (772) 388-3165
1612 NW 2ND AVENUE
SUITE 3
BOCA RATON, FL 33432
PHONE: (954) 421-6882
FAX: (954) 421-0425
LB #4298

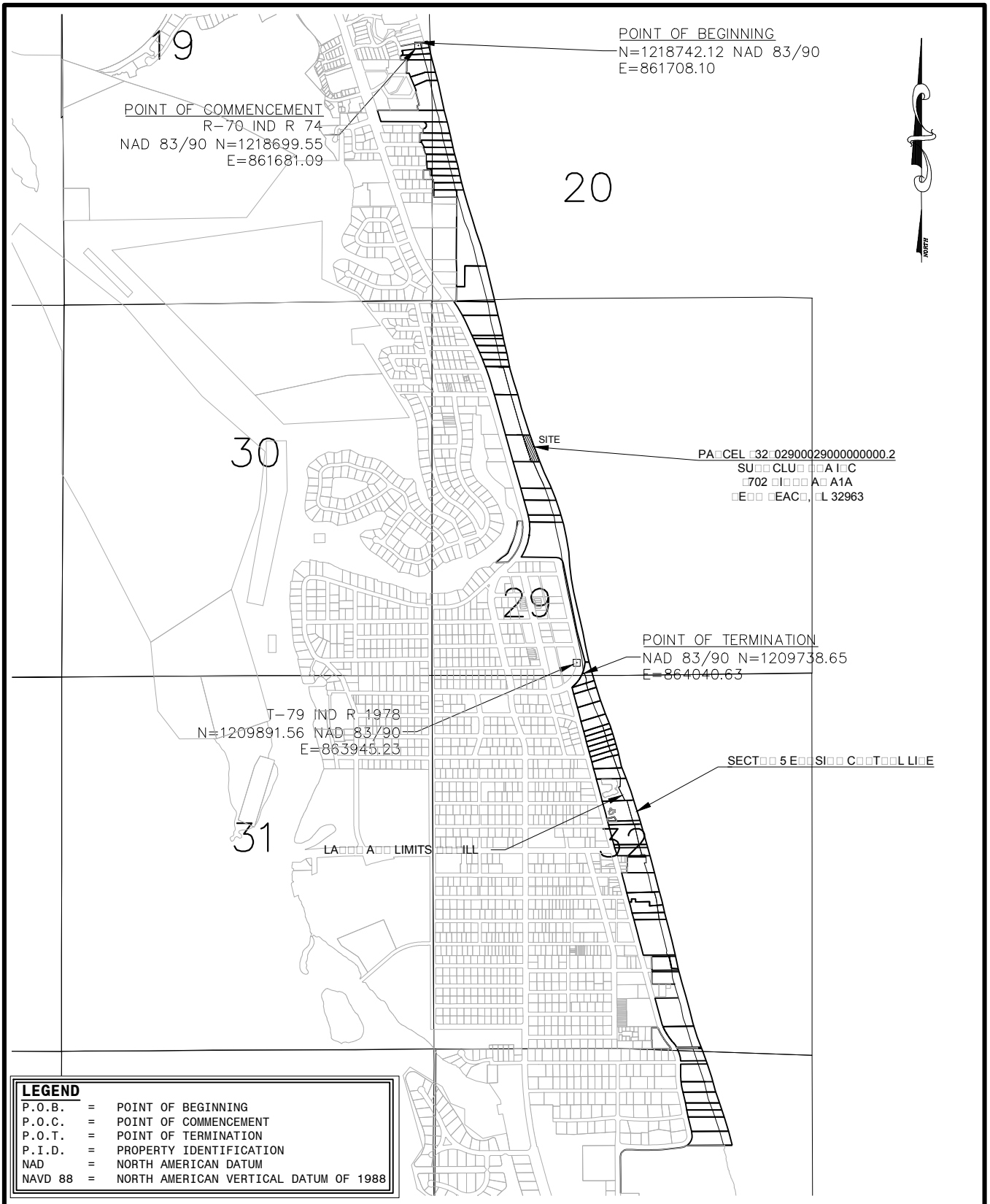
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900025000000001.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB1616-P1124, Chris Wed, 22 May 2019 - 3:05pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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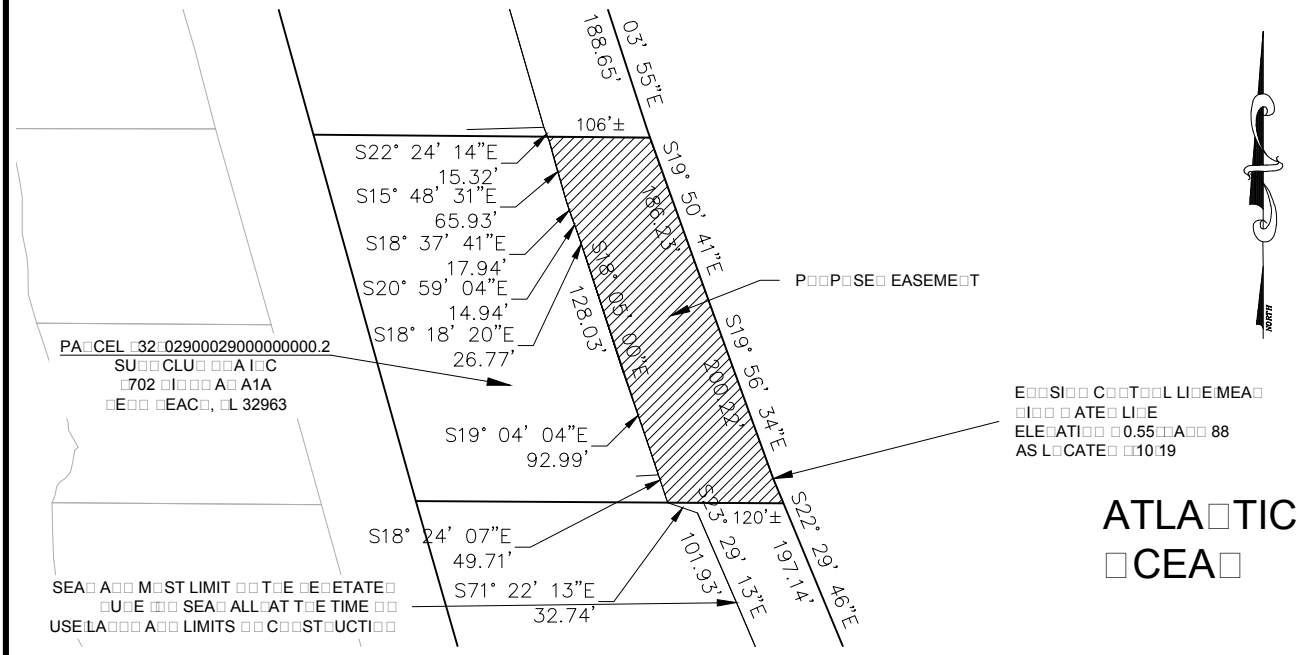
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900029000000000.2

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, SURF CLUB-CRV, lou Thu, 16 May 2019 - 11:06am

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ P□I 27-67 □ P□I 27-82 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□ TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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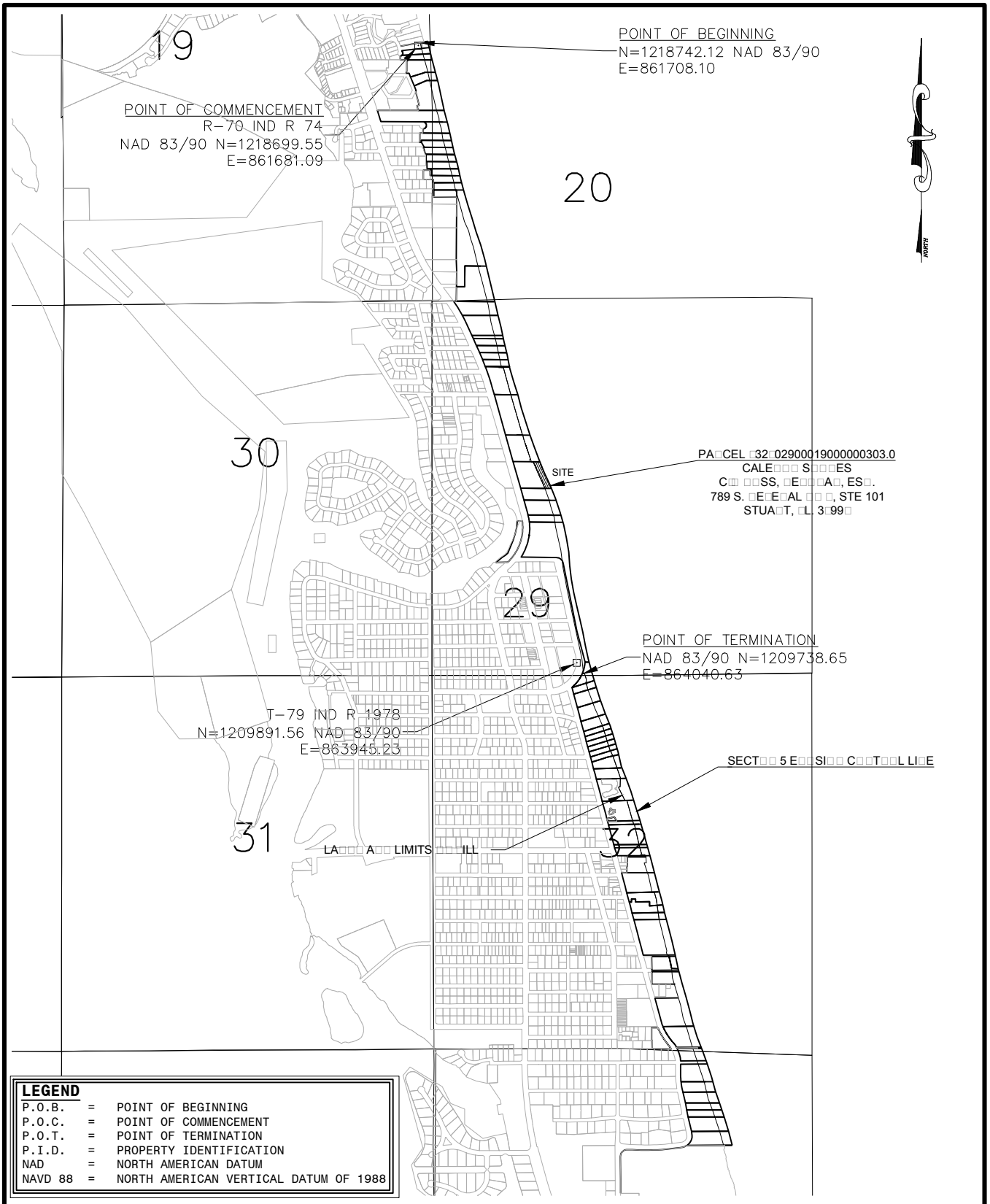
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900029000000000.2

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, SURF CLUB, lou Thu, 16 May 2019 - 11:07am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
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COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK	PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A	N/A	N/A	1 OF 2

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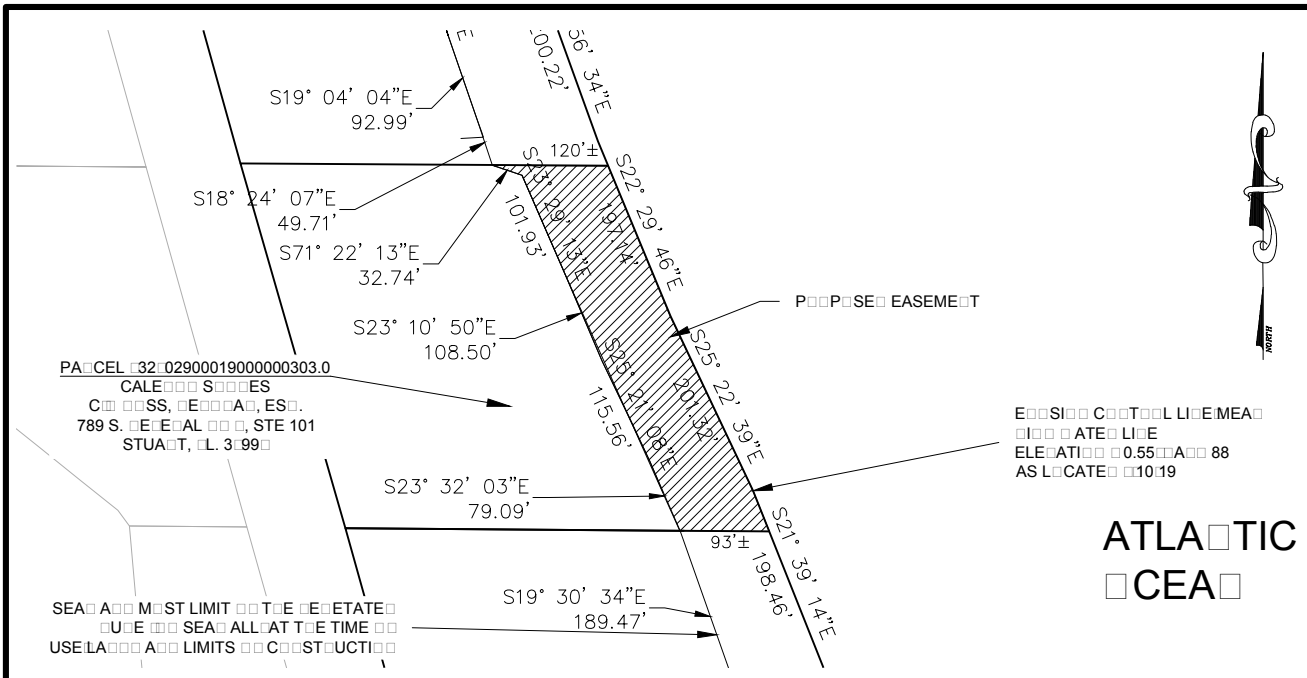
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

THAT PORTION OF LANDS DESCRIBED IN OFFICIAL RECORDS BOOK 2991, PAGE 1937 OF THE PUBLIC RECORDS OF INDIAN RIVER COUNTY, FLORIDA, LYING EASTERLY OF THE SEACOAST LIMIT LINE AS MOST RECENTLY ESTABLISHED, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE DEPARTMENT OF ENVIRONMENTAL PROTECTION MONUMENT R- 70 HAVING A GRID VALUE OF 1,218,699.55 FEET AND EASTING OF 861,681.09 AS REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF THE SEACOAST LIMIT LINE, SAID POINT HAVING COORDINATES OF 1,218,742.12 FEET AND EASTING OF 861,708.10 FEET (NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO THE POINT OF TERMINATION, SAID POINT HAVING COORDINATES OF 1,209,738.65 FEET AND EASTING OF 863,090.63 FEET (SAID POINT BEING 180.23 FEET DISTANT FROM THE MONUMENT R-79 HAVING A 1978 ADJUSTMENT COORDINATES OF 1,209,891.56 FEET AND EASTING OF 863,905.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

Morgan & Eklund Inc.
PROFESSIONAL SURVEY CONSULTANTS
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PHONE: (954) 421-6882
FAX: (954) 421-0425
LB #4298

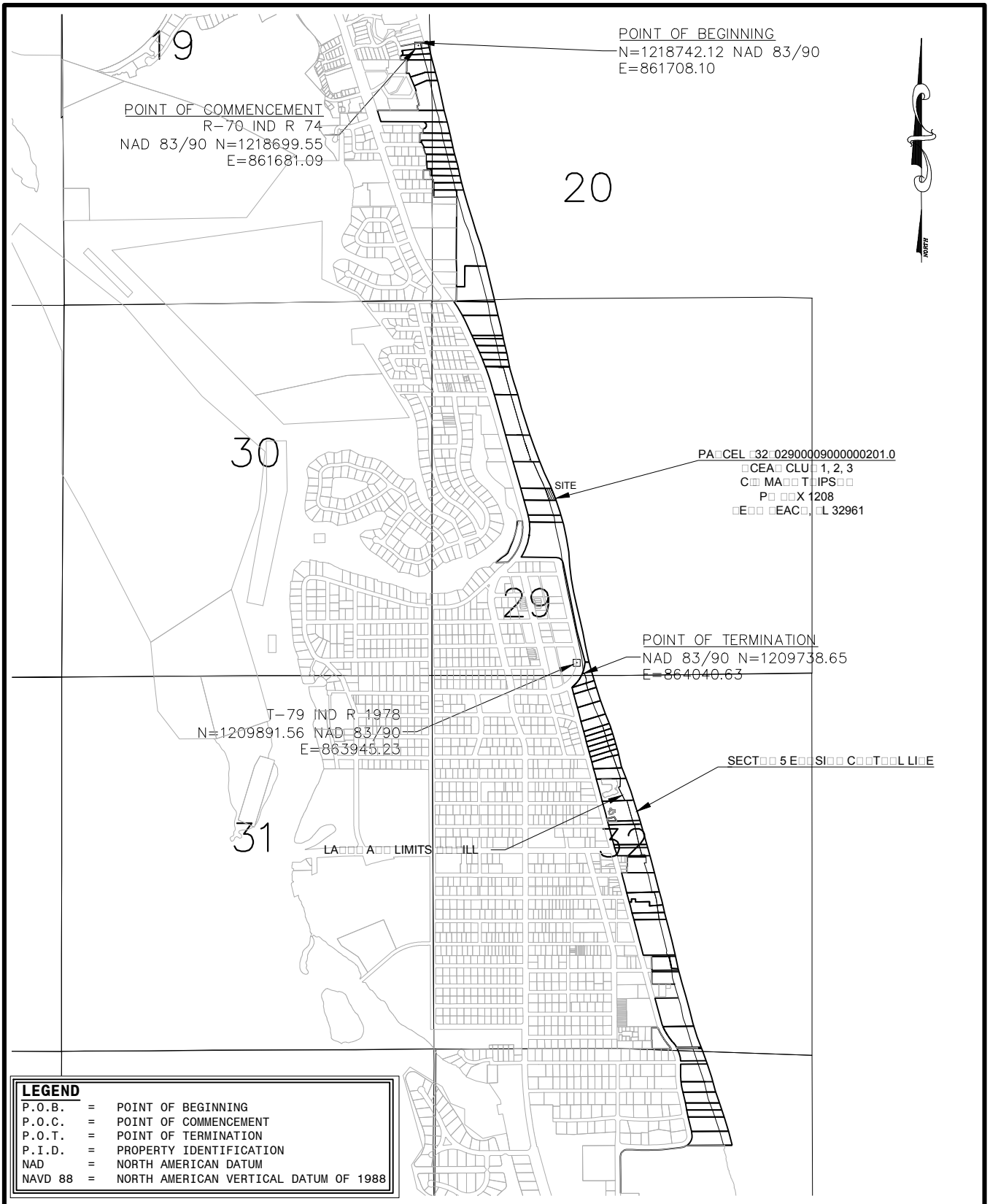
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900019000000303.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2991-P1937, Chris Wed, 22 May 2019 - 3:09pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900009000000201.0

COMMISSION NO.	SCALE	DATE
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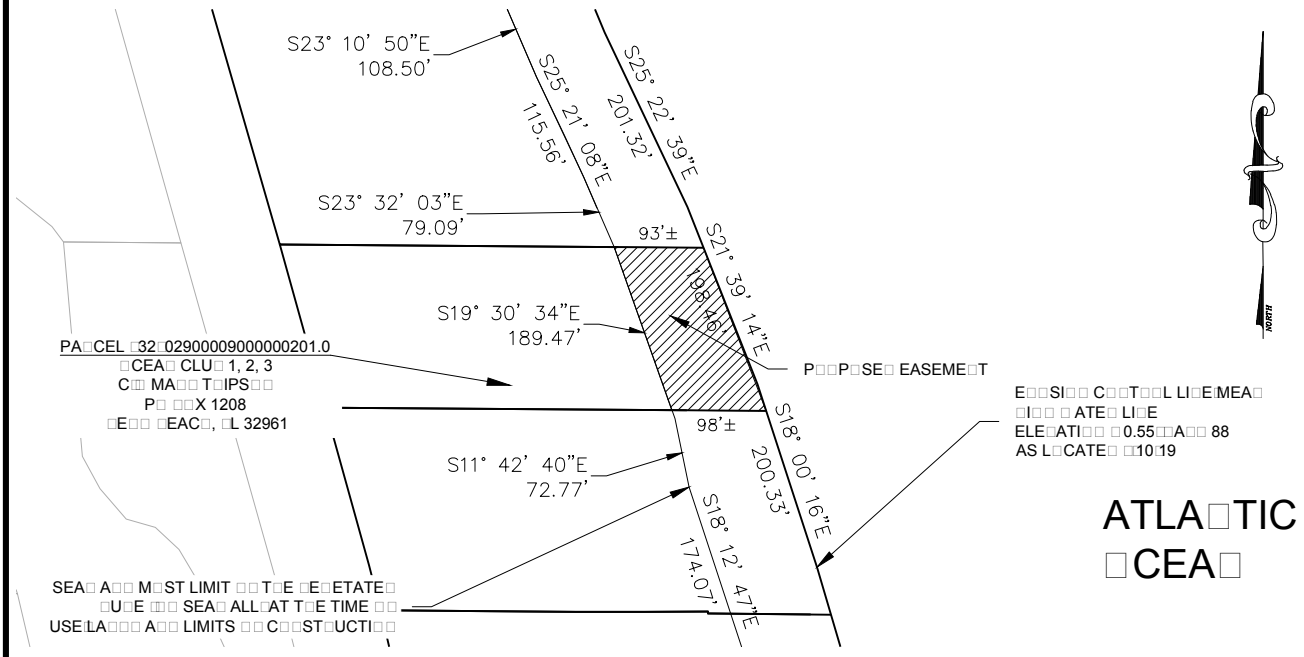
DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB1331-P1391CRV, Chris Wed, 22 May 2019 - 3:14pm

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 1331, PA□E 1391 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□EP□M□□UME□T □- 70 I□□ □ 7□□A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,699.55 □EET A□□ EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, □□□T□ AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING □□ T□E □□LL□□ I□□ □ESC□I□E□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,218,7□2.12 □EET A□□ EASTI□□ 861,708.10 □EET □A□ 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T □□ TE□MI□ATI□□, □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 180.23 □EET □ISTA□T □□□M □□EP M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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LB #4298

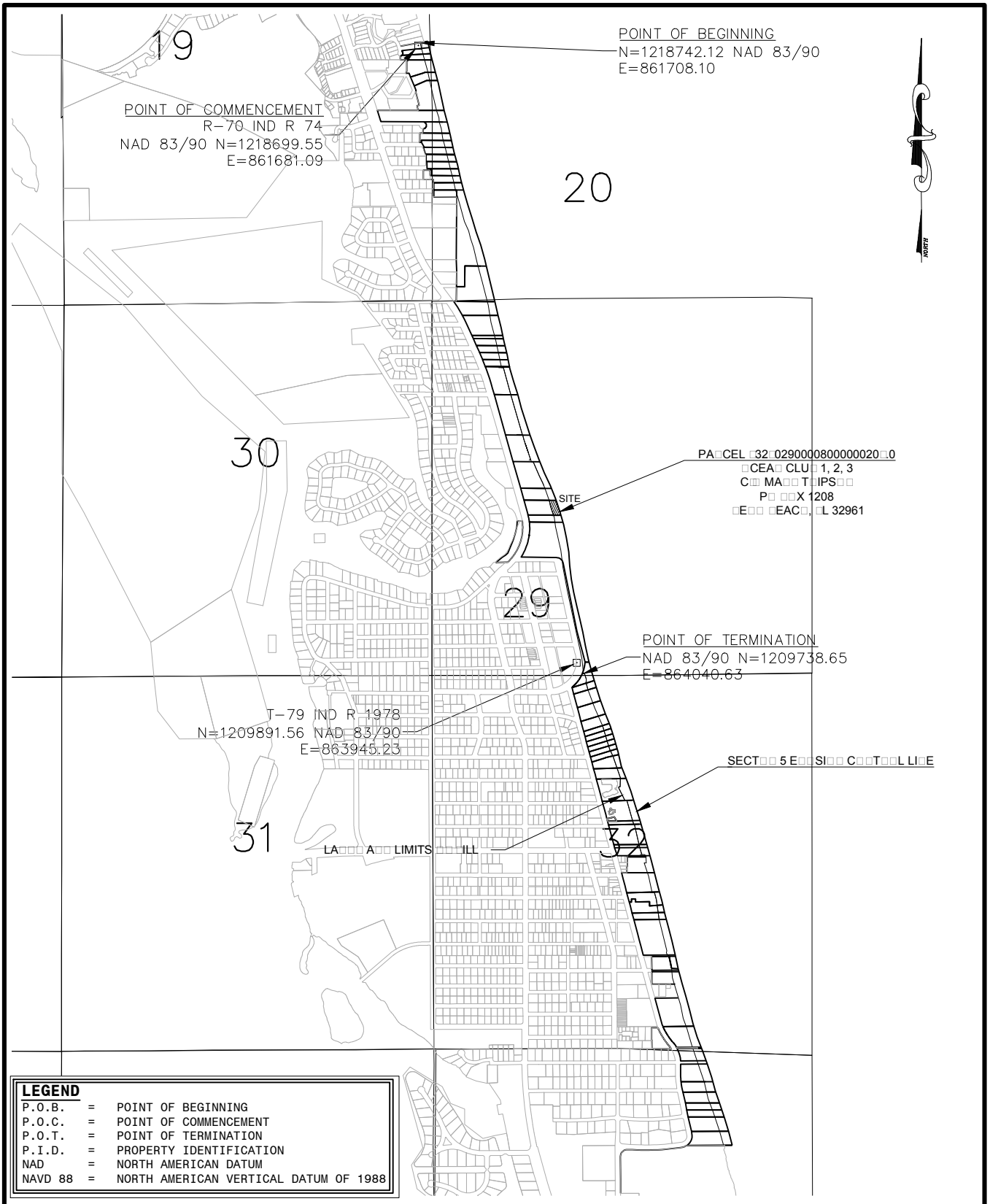
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900009000000201.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB1331-P1391, Chris Wed, 22 May 2019 - 3:14pm

SCHEDULE A



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SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900008000000204.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

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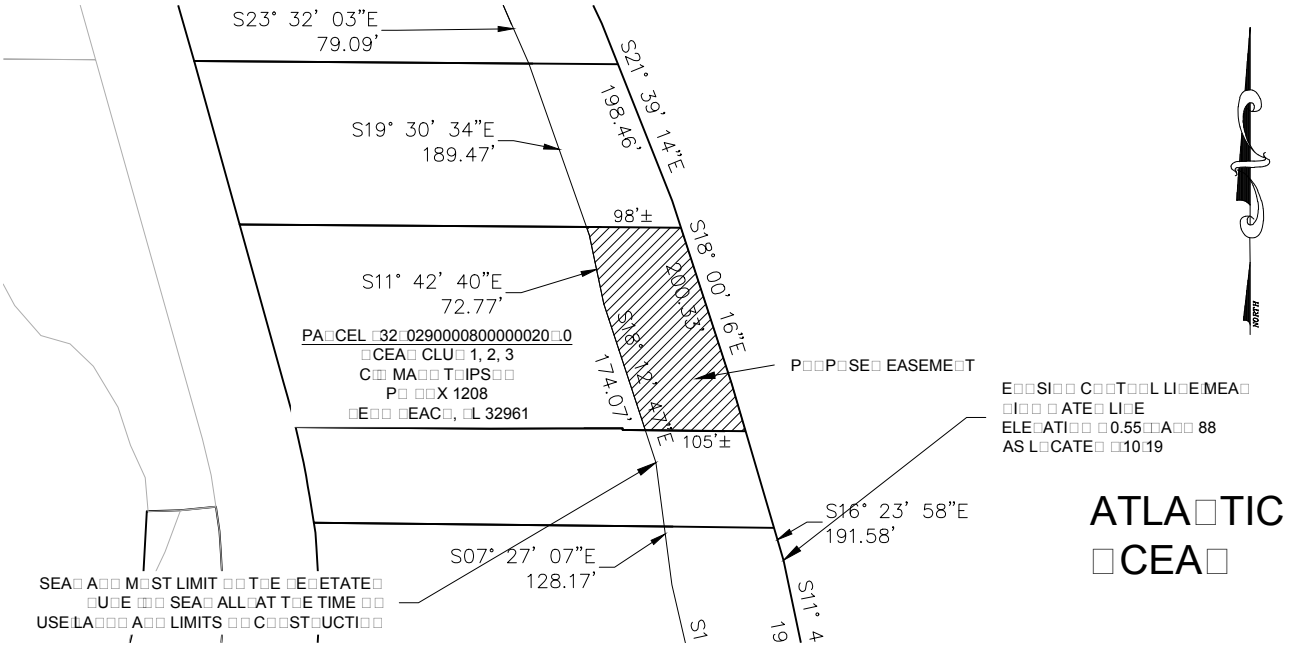

SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ OF LA□□S □ESC□I□E□ AND R ECORD ED I□ □□□ICIAL RECORD BOOK 3075, PA□E 1213 OF T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E □OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T R- 70 IND □ 74 HAVING C□□□□I□ATES □□ NOR THING 1,218,699.55 □EET AND EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T□E FO LLOW ING □ESC□I□E□ LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,218,7□2.12 □EET AND EASTI□□ 861,708.10 □EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T OF TE□MI□ATI□□, HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,0□0.63 □EET NAD 83/90, SAI□ P□I□T BEING 180.23 □EET □ISTA□T FRO M □□EP M□□UME□T T-79 IND R 1978 HAVING C□□□□I□ATES OF NOR THING 1,209,891.56 □EET AND EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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LB #4298

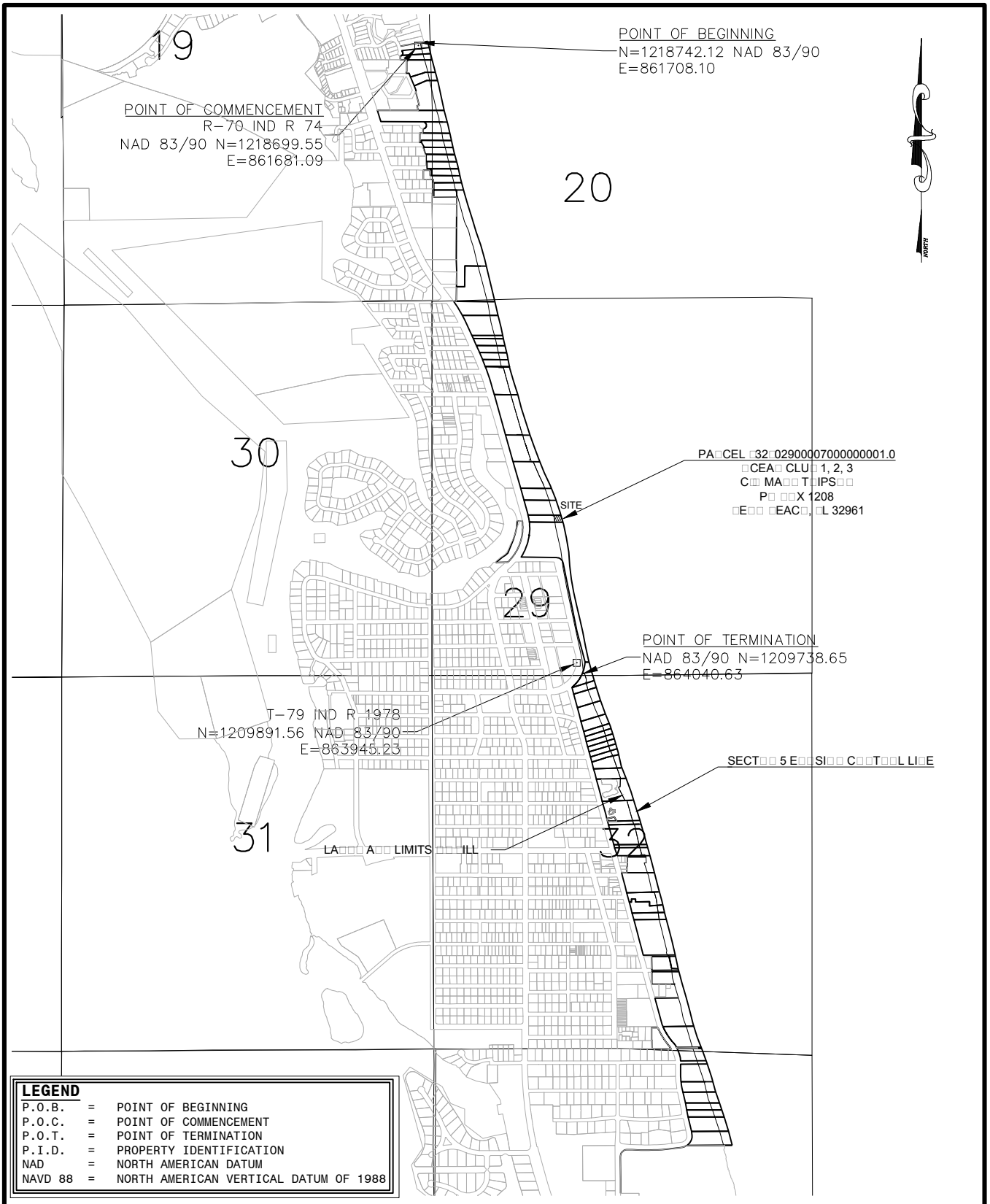
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32402900008000000204.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB3075-P1213, Chris Wed, 22 May 2019 - 3:17pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

Morgan & Eklund Inc.

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P.I.D. NO. 32402900007000000001.0

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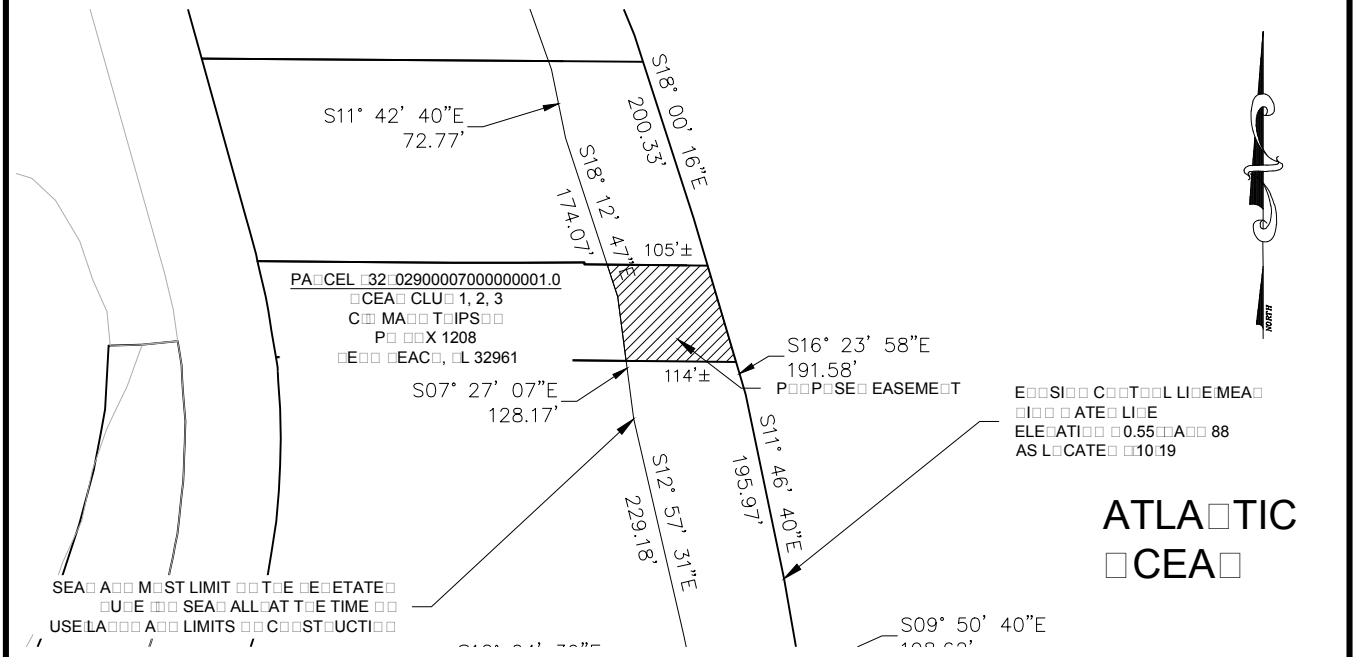
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2512-P1521CRV, Chris Wed, 22 May 2019 - 3:18pm



SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T AT P TI OF LA S ESC I E AND R ECORD ED I OFFICIAL RECORD BOOK 2512, PA E 1521 OF T E PU LIC EC S I IA I E C U T, L I A, L I A STE L T E SEA A M ST LIMIT OF T E E ETATE U E (OR SEA ALL) AT T E TIME OF USE AND B EING M E PA TICULA L ESC I E AS LL S:

C MME CI AT T E EPA TME T E I ME TAL P TECTI (EP) M UME T R-70 IND 74 HAVING C I ATES NOR THING 1,218,699.55 EET AND EASTI 861,681.09 AS E E E CE T T E L IA STATE PLA E C I ATE S STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T E FO LLOW ING ESC I E LI E, SAI P I T HAVING C I ATES OF NOR THING 1,218,72.12 EET AND EASTI 861,708.10 EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T E P I T OF TE MI ATI , HAVING C I ATES OF NOR THING 1,209,738.65 EET AND EASTI 864,0 0.63 EET NAD 83 90, SAI P I T BEING 180.23 EET ISTA T FRO M EP M UME T T-79 IND R 1978 HAVING C I ATES OF NOR THING 1,209,891.56 EET AND EASTI 863,9 5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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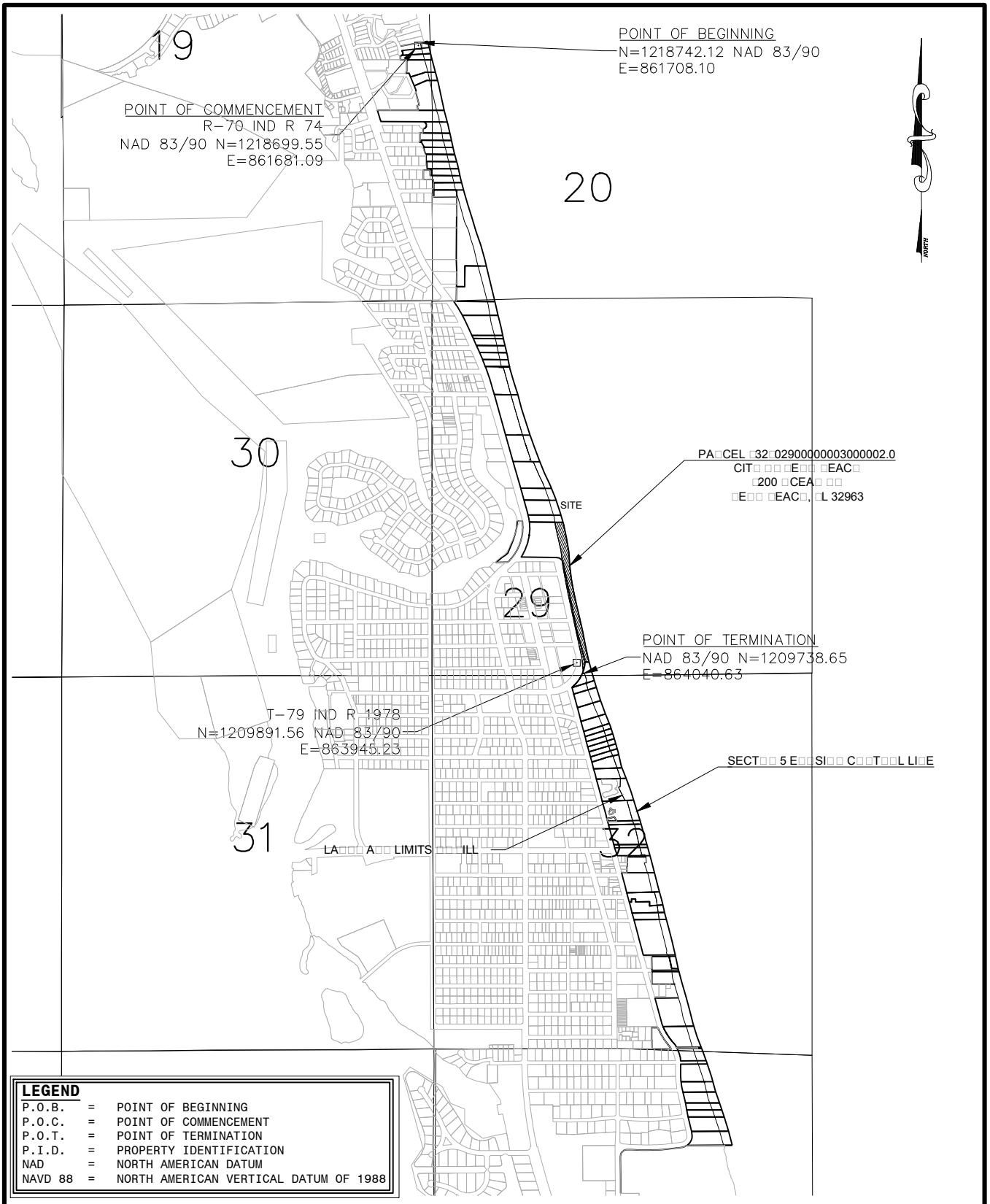
LFP	JRM	PAGE NO. N/A	N/A	2 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, ORB2512-P1521, Chris Wed, 22 May 2019 - 3:19pm

SCHEDULE A



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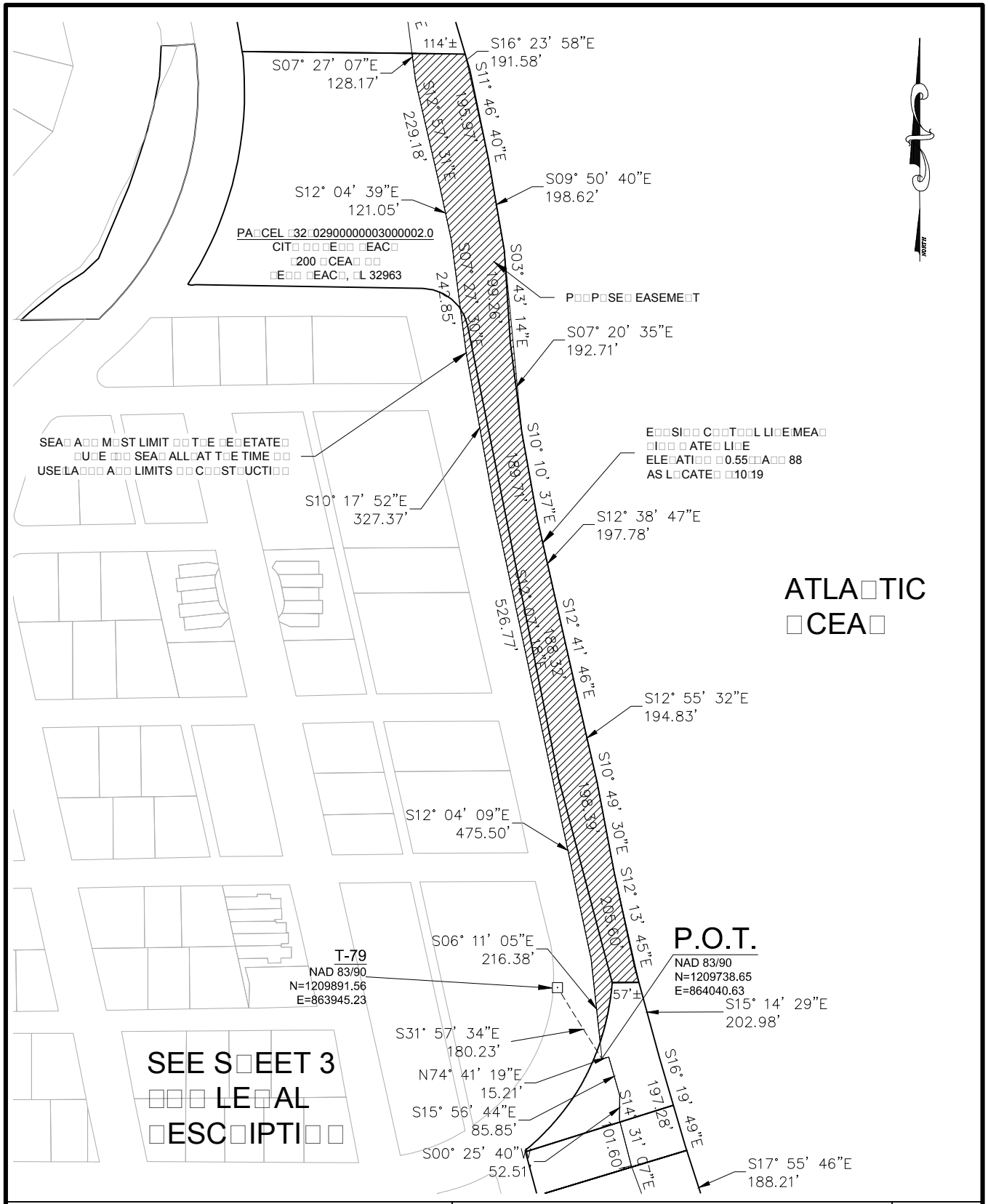
H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, CITY OF VB-CVR, lou Thu, 16 May 2019 - 11:07am

SCHEDULE A



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35315-11	1" = 300'	4/29/19

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H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-19&20-32-40.dwg, CITY OF VB, lou Thu, 16 May 2019 - 11:07am

SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ OF LA□□S □ESC□I□E□ AND R ECORD ED I□ □□□ICIAL RECORD BOOK 2512, PA□E 1521 OF T□E PU□LIC □EC□□□S OF I□□IA□ RIVER C□U□T□, □L□□I□A, LYING EASTE□L□ OF T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E □OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T R- 70 IND □ 74 HAVING C□□□□I□ATES □□ NOR THING 1,218,699.55 □EET AND EASTI□□ 861,681.09 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NOR TH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED N 32° 23' 47" E A DISTANCE OF 50.41 FEET TO THE POINT OF BEGINNING OF T□E FO LLOW ING □ESC□I□E□ LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,218,7□2.12 □EET AND EASTI□□ 861,708.10 □EET NAD 83/90; PROCEED S 14° 33' 35" E A DISTANCE OF 212.61 FEET TO A POINT; THENCE S 14° 48' 48" E A DISTANCE OF 187.59 FEET TO A POINT; THENCE S 13° 17' 27" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 12° 05' 02" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 13° 12' 24" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 18° 25' 21" E A DISTANCE OF 107.23 FEET TO A POINT; THENCE S 03° 08' 51" E A DISTANCE OF 59.99 FEET TO A POINT; THENCE S 17° 41' 36" E A DISTANCE OF 95.86 FEET TO A POINT; THENCE S 08° 34' 53" E A DISTANCE OF 143.67 FEET TO A POINT; THENCE S 15° 51' 45" E A DISTANCE OF 122.67 FEET TO A POINT; THENCE S 13° 13' 00" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 14° 07' 08" E A DISTANCE OF 140.65 FEET TO A POINT; THENCE S 14° 26' 44" E A DISTANCE OF 170.45 FEET TO A POINT; THENCE S 11° 59' 26" E A DISTANCE OF 112.53 FEET TO A POINT; THENCE S 17° 09' 53" E A DISTANCE OF 112.77 FEET TO A POINT; THENCE S 15° 31' 34" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 15' 55" E A DISTANCE OF 165.10 FEET TO A POINT; THENCE S 23° 46' 30" E A DISTANCE OF 145.58 FEET TO A POINT; THENCE S 14° 22' 41" E A DISTANCE OF 112.59 FEET TO A POINT; THENCE S 18° 57' 01" E A DISTANCE OF 135.12 FEET TO A POINT; THENCE S 12° 59' 39" E A DISTANCE OF 233.14 FEET TO A POINT; THENCE S 15° 24' 34" E A DISTANCE OF 270.43 FEET TO A POINT; THENCE S 13° 58' 27" E A DISTANCE OF 347.12 FEET TO A POINT; THENCE S 09° 43' 10" E A DISTANCE OF 253.33 FEET TO A POINT; THENCE S 14° 20' 25" E A DISTANCE OF 257.81 FEET TO A POINT; THENCE S 12° 57' 07" E A DISTANCE OF 190.81 FEET TO A POINT; THENCE S 11° 05' 42" E A DISTANCE OF 211.97 FEET TO A POINT; THENCE N 89° 33' 43" E A DISTANCE OF 26.60 FEET TO A POINT; THENCE S 15° 35' 54" E A DISTANCE OF 402.80 FEET TO A POINT; THENCE S 16° 06' 45" E A DISTANCE OF 586.08 FEET TO A POINT; THENCE S 22° 24' 14" E A DISTANCE OF 15.32 FEET TO A POINT; THENCE S 15° 48' 31" E A DISTANCE OF 65.93 FEET TO A POINT; THENCE S 18° 37' 41" E A DISTANCE OF 17.94 FEET TO A POINT; THENCE S 20° 59' 04" E A DISTANCE OF 14.94 FEET TO A POINT; THENCE S 18° 18' 20" E A DISTANCE OF 26.77 FEET TO A POINT; THENCE S 18° 05' 00" E A DISTANCE OF 128.03 FEET TO A POINT; THENCE S 19° 04' 04" E A DISTANCE OF 92.99 FEET TO A POINT; THENCE S 18° 24' 07" E A DISTANCE OF 49.71 FEET TO A POINT; THENCE S 71° 22' 13" E A DISTANCE OF 32.74 FEET TO A POINT; THENCE S 23° 29' 13" E A DISTANCE OF 101.93 FEET TO A POINT; THENCE S 23° 10' 50" E A DISTANCE OF 108.50 FEET TO A POINT; THENCE S 25° 21' 08" E A DISTANCE OF 115.56 FEET TO A POINT; THENCE S 23° 32' 03" E A DISTANCE OF 79.09 FEET TO A POINT; THENCE S 19° 30' 34" E A DISTANCE OF 189.47 FEET TO A POINT; THENCE S 11° 42' 40" E A DISTANCE OF 72.77 FEET TO A POINT; THENCE S 18° 12' 47" E A DISTANCE OF 174.07 FEET TO A POINT; THENCE S 07° 27' 07" E A DISTANCE OF 128.17 FEET TO A POINT; THENCE S 12° 57' 31" E A DISTANCE OF 229.18 FEET TO A POINT; THENCE S 12° 04' 39" E A DISTANCE OF 121.05 FEET TO A POINT; THENCE S 07° 27' 30" E A DISTANCE OF 242.85 FEET TO A POINT; THENCE S 10° 17' 52" E A DISTANCE OF 327.37 FEET TO A POINT; THENCE S 12° 07' 18" E A DISTANCE OF 526.77 FEET TO A POINT; THENCE S 12° 04' 09" E A DISTANCE OF 475.50 FEET TO A POINT; THENCE S 06° 11' 05" E A DISTANCE OF 216.38 FEET TO T□E P□I□T OF TE□MI□ATI□□, HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,0□0.63 □EET NAD 83□90, SAI□ P□I□T BEING 180.23 □EET □ISTA□T FRO M □□EP M□□UME□T T-79 IND R 1978 HAVING C□□□□I□ATES OF NOR THING 1,209,891.56 □EET AND EASTI□□ 863,9□5.23 FEET NAD 83/90 ALONG A BEARING OF S 31° 57' 34" E.

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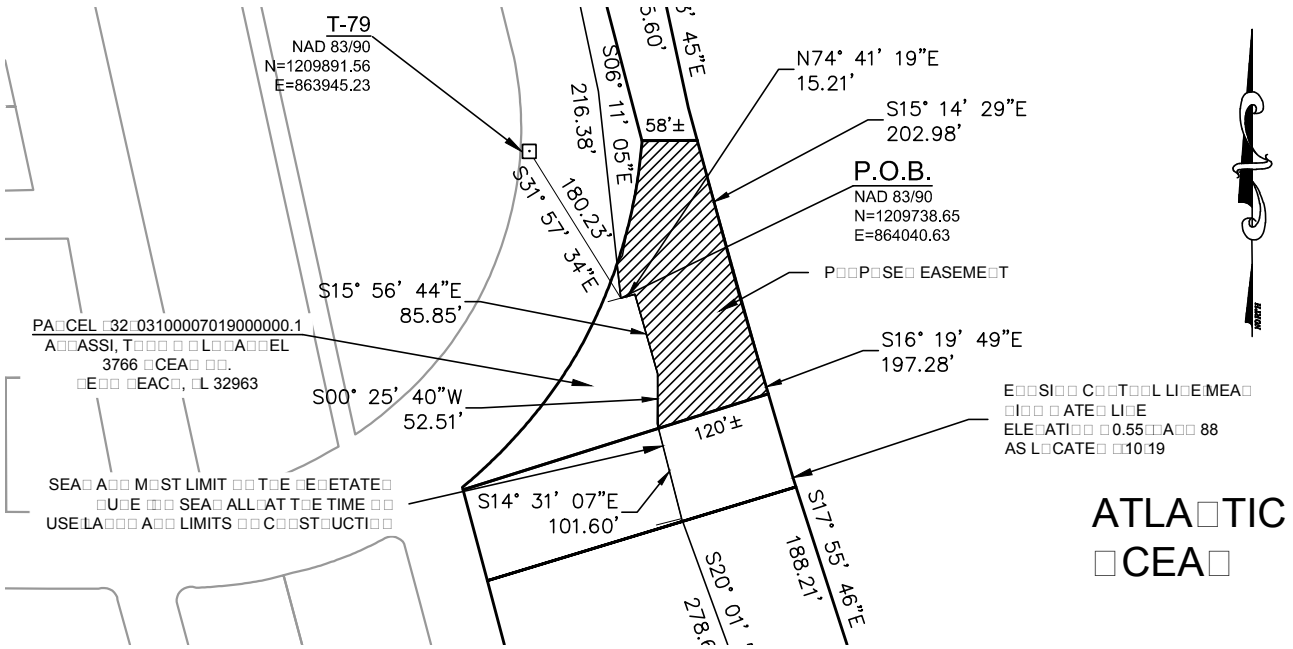
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 163□, PA□E 16 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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LB #4298

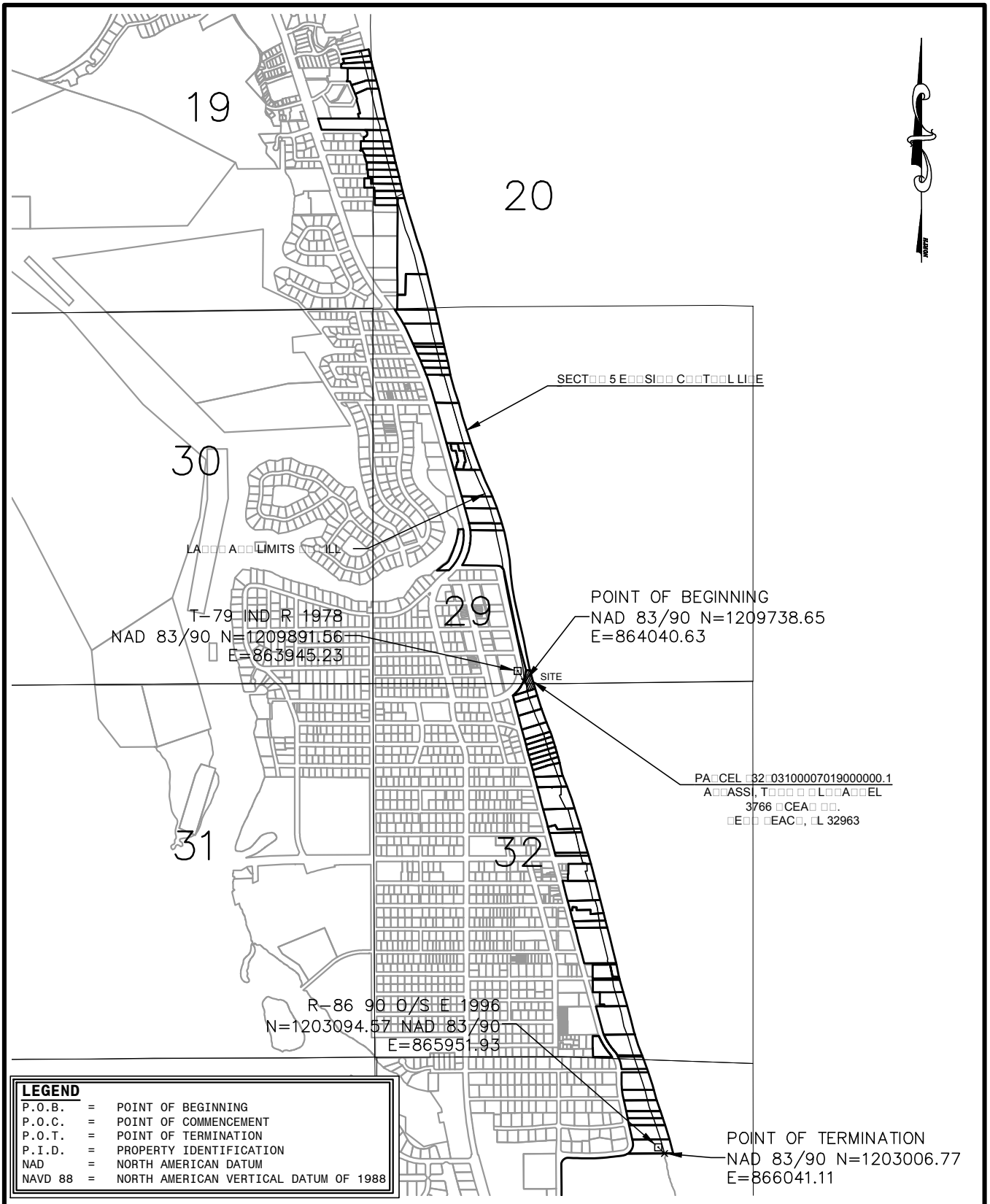
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403100007019000000.1

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB1634-P16, Iou Thu, 16 May 2019 - 11:16am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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INDIAN RIVER COUNTY, FLORIDA
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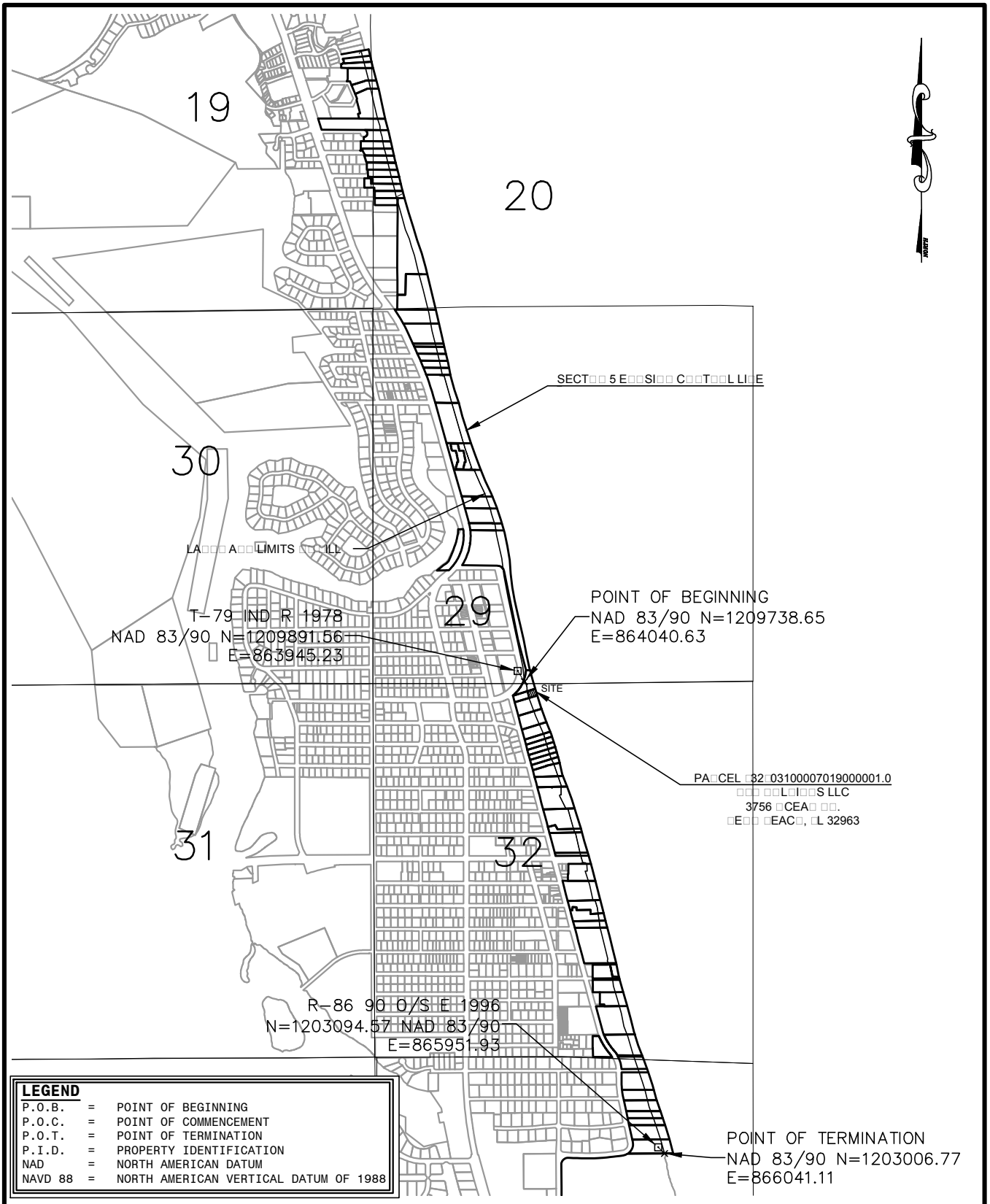
H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB1634-P16CRV, lou Thu, 16 May 2019 - 11:16am

SCHEDULE A



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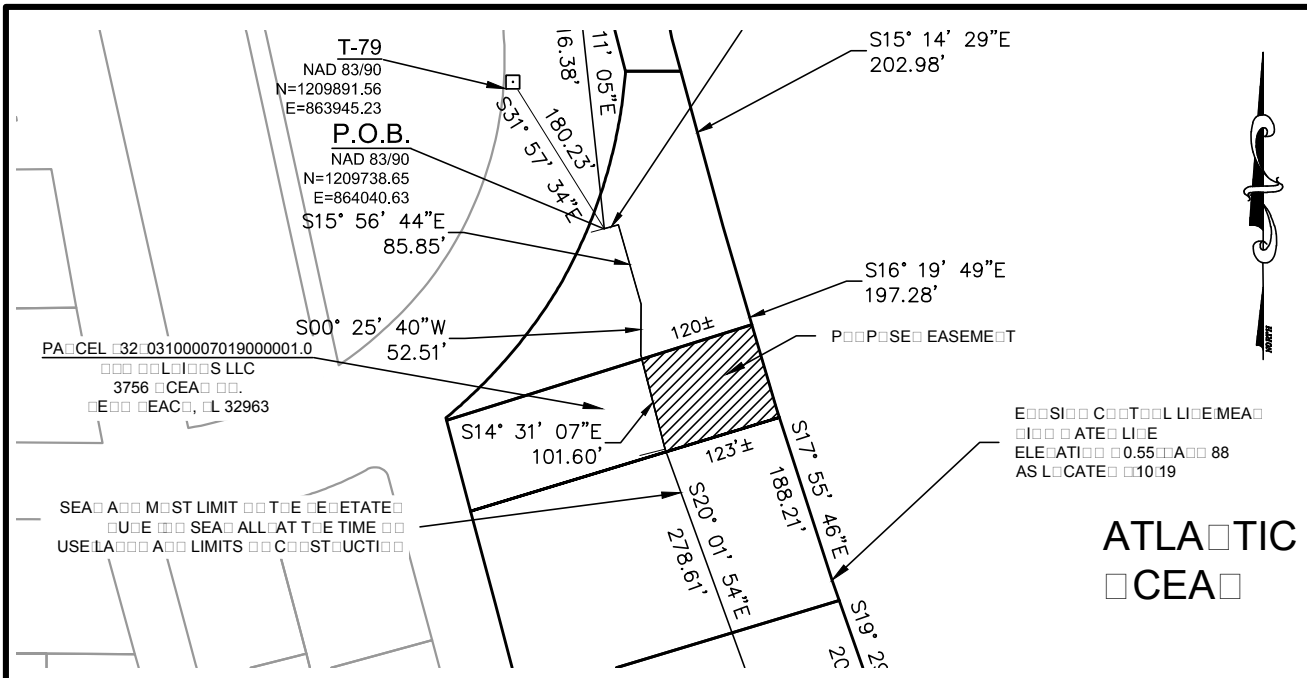
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403100007019000001.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB3163-P3770RV, lou Thu, 16 May 2019 - 11:16am

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

THAT PORTION OF LANDS DESCRIBED AS PARCEL A IN OFFICIAL RECORDS BOOK 3163, PAGE 377 OF THE PUBLIC RECORDS OF INDIAN RIVER COUNTY, FLORIDA, LYING EASTERLY OF THE SEAWARD MOST LIMIT OF THE ESTATE OF USE AND LYING WESTERLY OF THE SEAWARD MOST LIMIT OF THE ESTATE OF USE AND ALL AT THE TIME OF USE AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCE AT THE APPARENT POINT OF INTERSECTION OF THE EXISTING SOUTHERLY RIGHT-OF-WAY LINE OF STATE ROAD 60 (A 200 FOOT RIGHT-OF-WAY AS NOW ESTABLISHED) AND THE WESTERLY RIGHT-OF-WAY LINE OF STATE ROAD 79 (A 200 FOOT RIGHT-OF-WAY AS NOW ESTABLISHED) AS SHOWN ON THE FLORIDA DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY MAPS FOR SECTION 88190-2519, SAID POINT HAVING COORDINATES OF NORTHING 1,209,891.56 FEET AND EASTING 863,945.23 FEET BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF BEGINNING OF THE HEREIN DESCRIBED LINE, SAID POINT HAVING COORDINATES OF NORTHING 1,209,738.65 FEET AND EASTING 864,040.63 FEET BASED ON NAD 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTING 866,041.11 FEET BASED ON NAD 83/90, SAID POINT BEING 125.15 FEET DISTANT FROM AND MEASURED AT RIGHT ANGLES TO SAID SOUTHERLY RIGHT-OF-WAY LINE OF STATE ROAD 60 AND THE WESTERLY RIGHT-OF-WAY LINE OF STATE ROAD 79 AS SHOWN ON THE FLORIDA DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY MAPS FOR SECTION 88190-2519 DATED 1996 BASED ON NAD 83/90 COORDINATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403100007019000001.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

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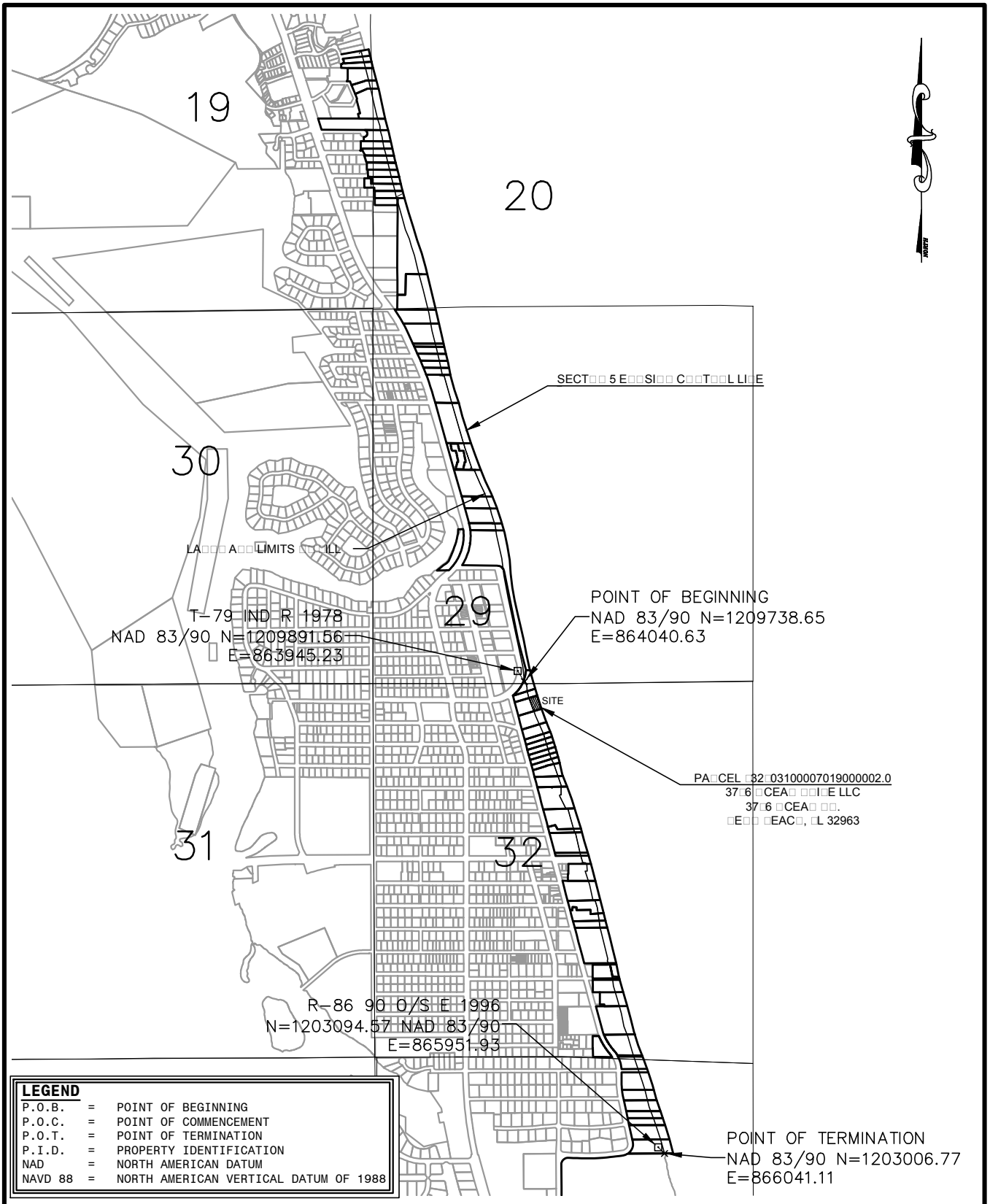
SCHEDULE A



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LFP	JRM	N/A / N/A	N/A	1 OF 2

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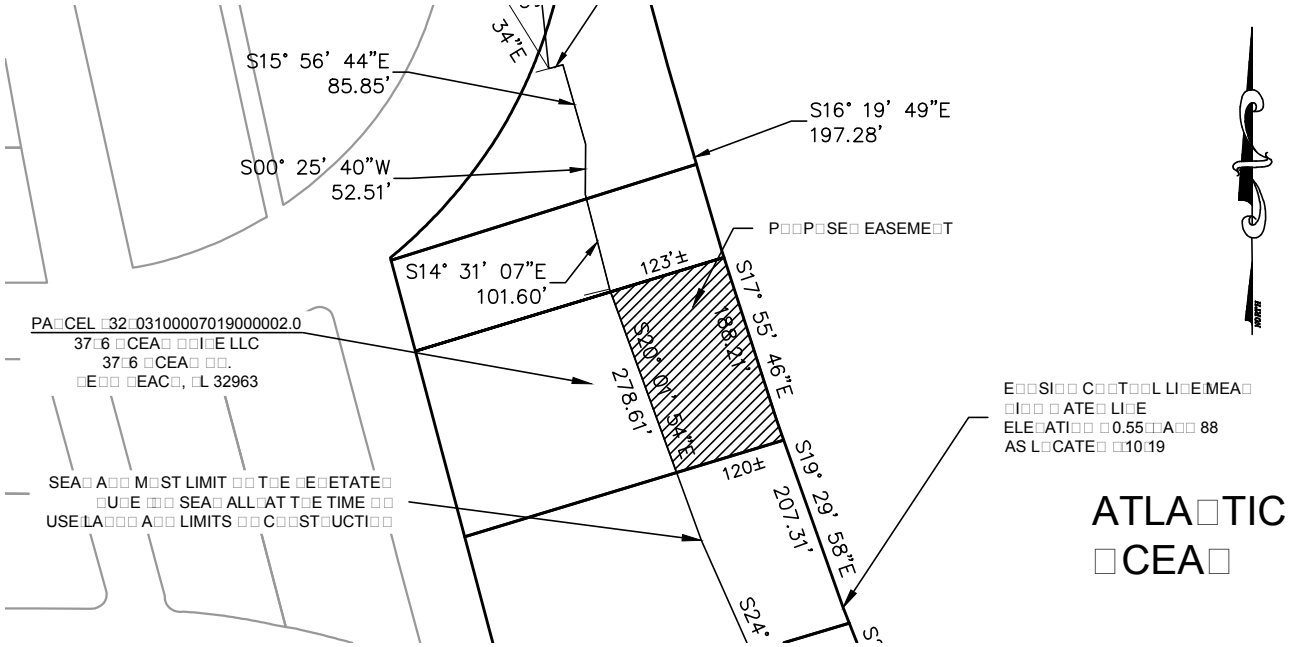
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 2810, PA□E 117□□□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

Morgan & Eklund Inc.
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FAX: (954) 421-0425
LB #4298

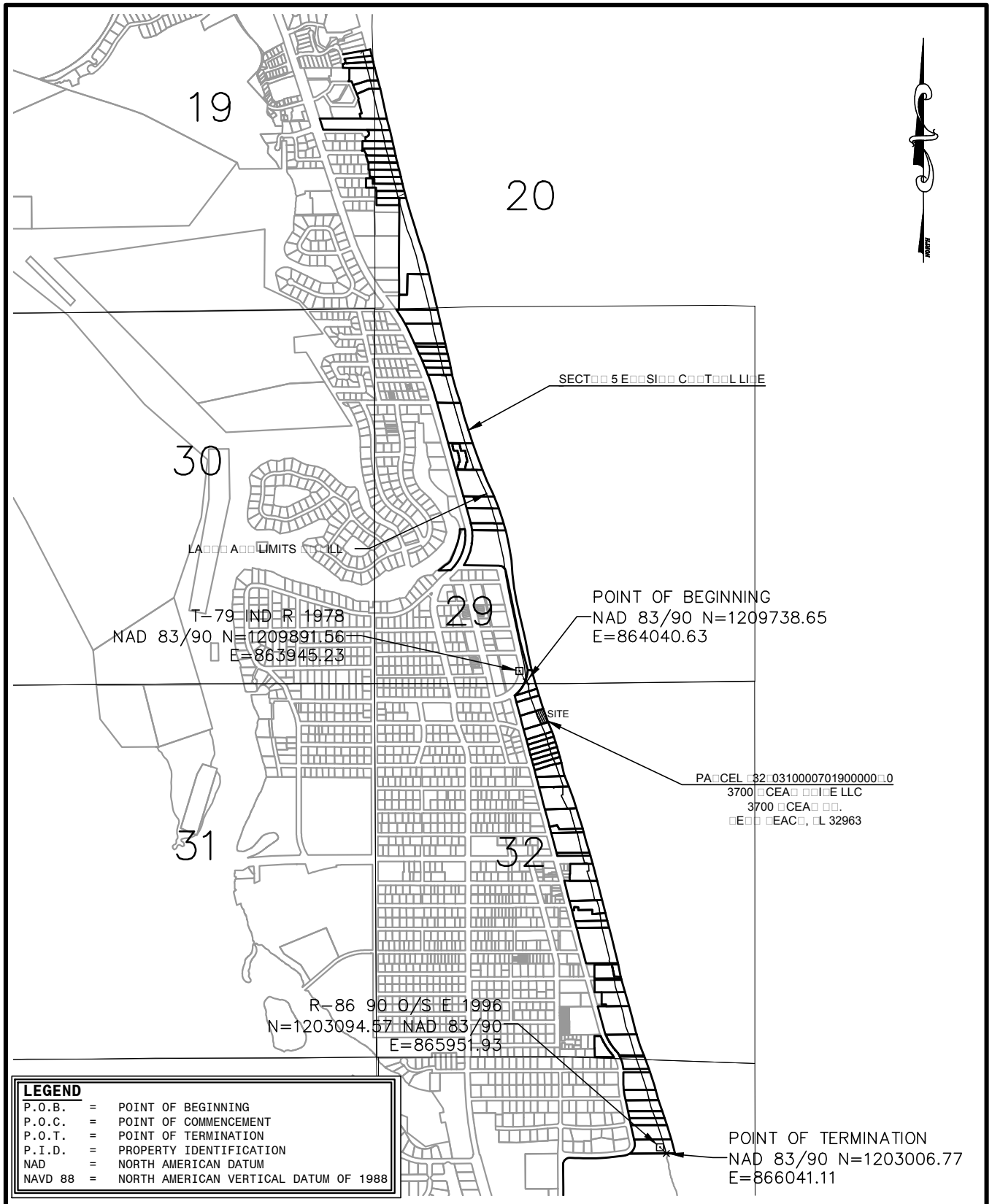
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403100007019000002.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2810-P1174, lou Thu, 16 May 2019 - 11:16am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
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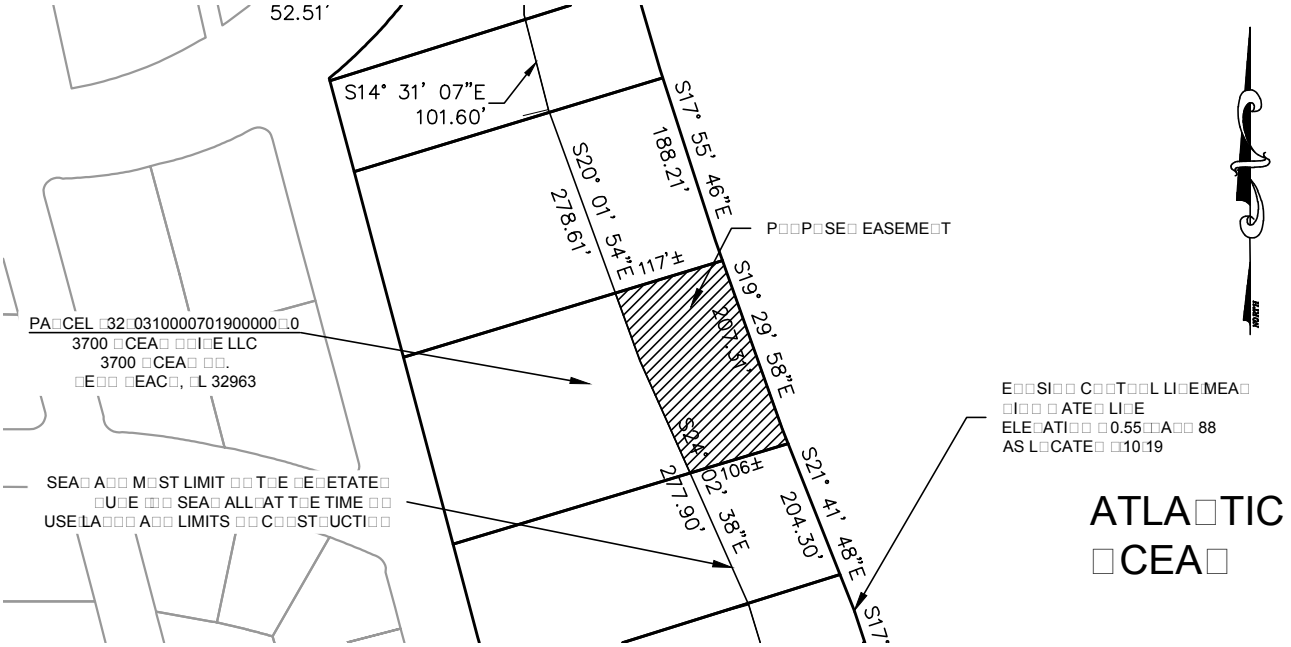

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C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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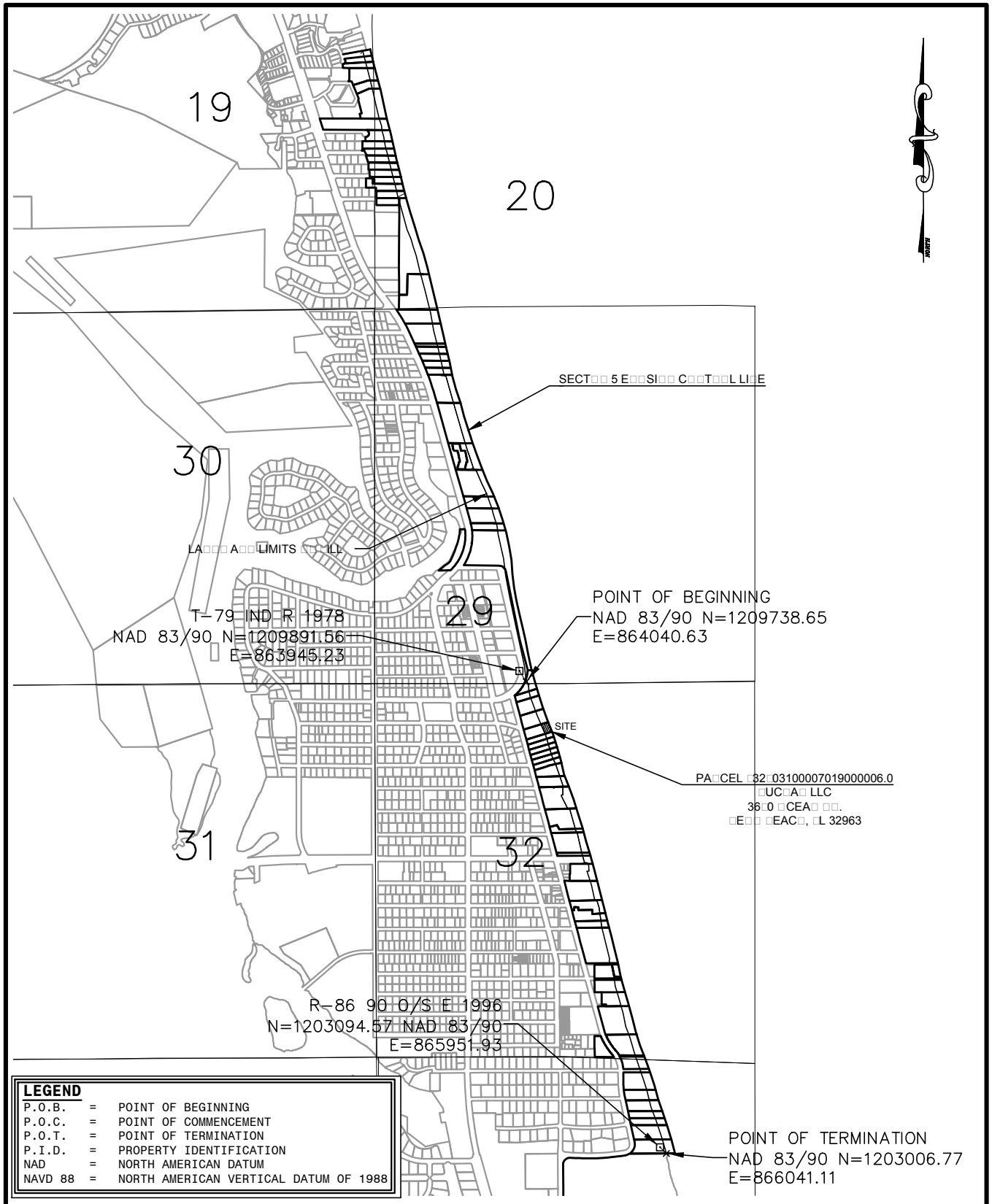
SCHEDULE A



LEGEND

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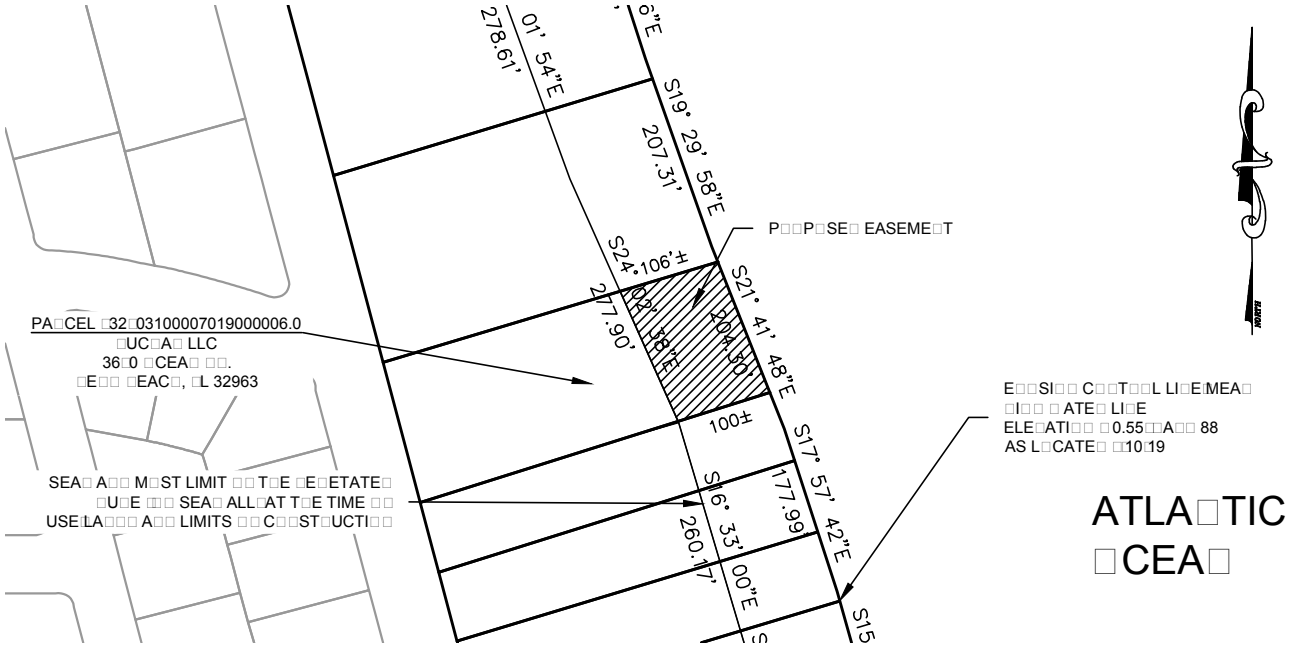
SCHEDULE A



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T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 2159, PA□E 1671 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

Morgan & Eklund Inc.
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FAX: (954) 421-0425
LB #4298

SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403100007019000006.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

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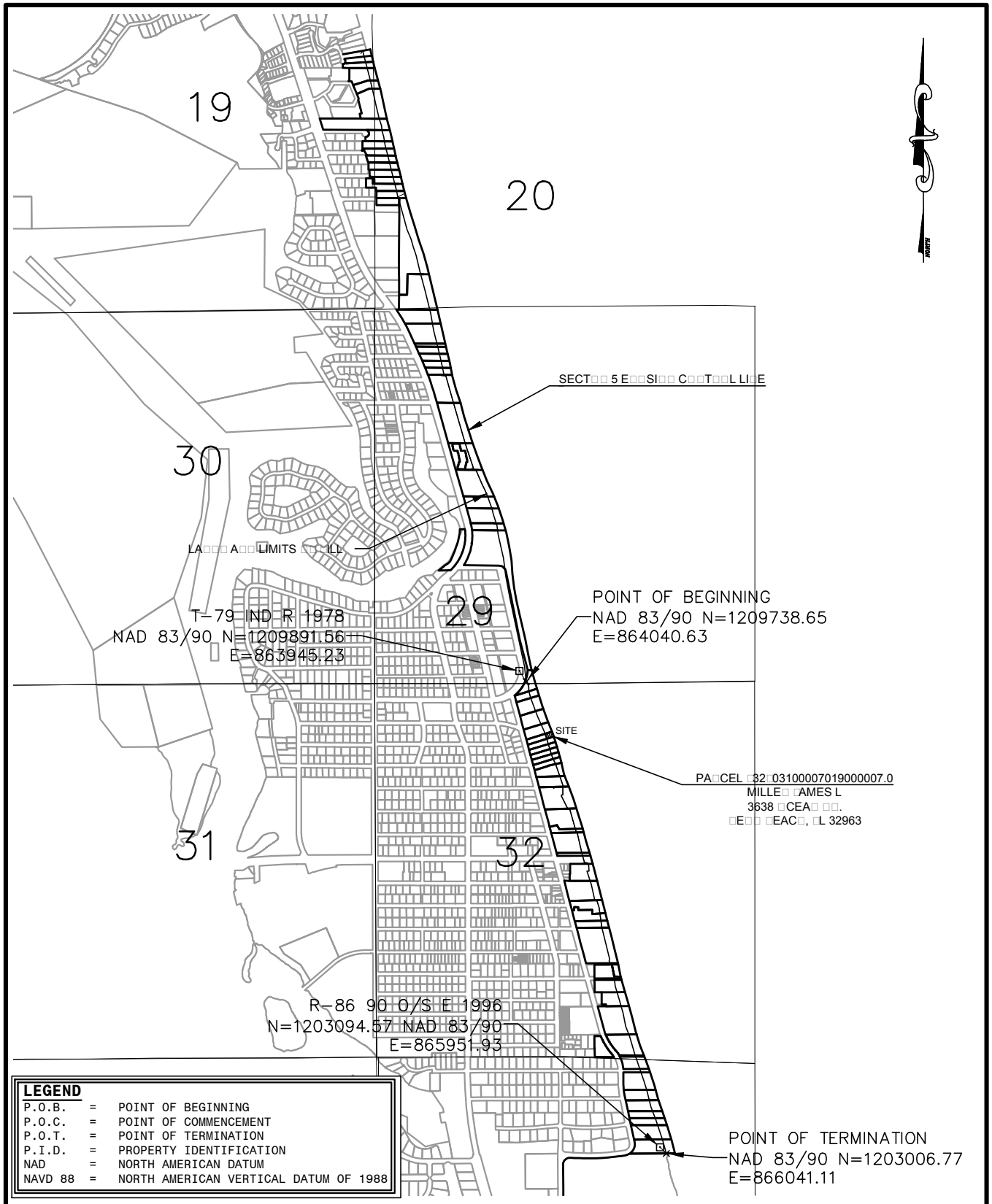
SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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P.I.D. NO. 32403100007019000007.0

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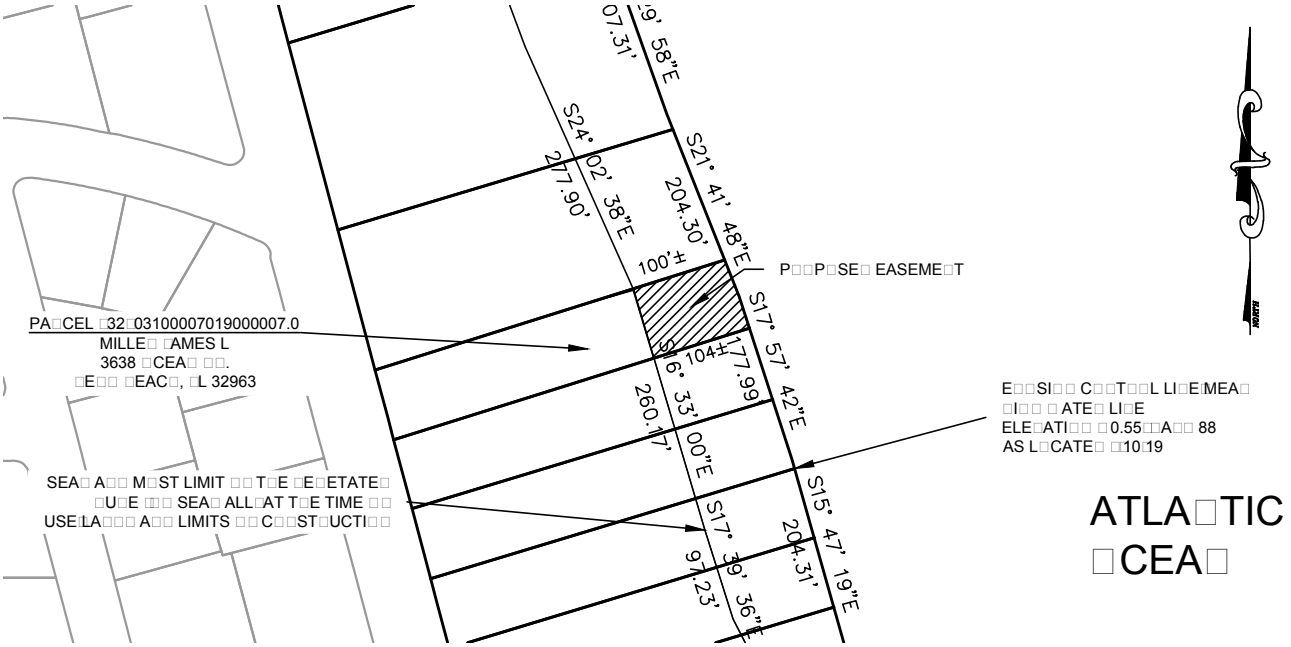
SCHEDULE A



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C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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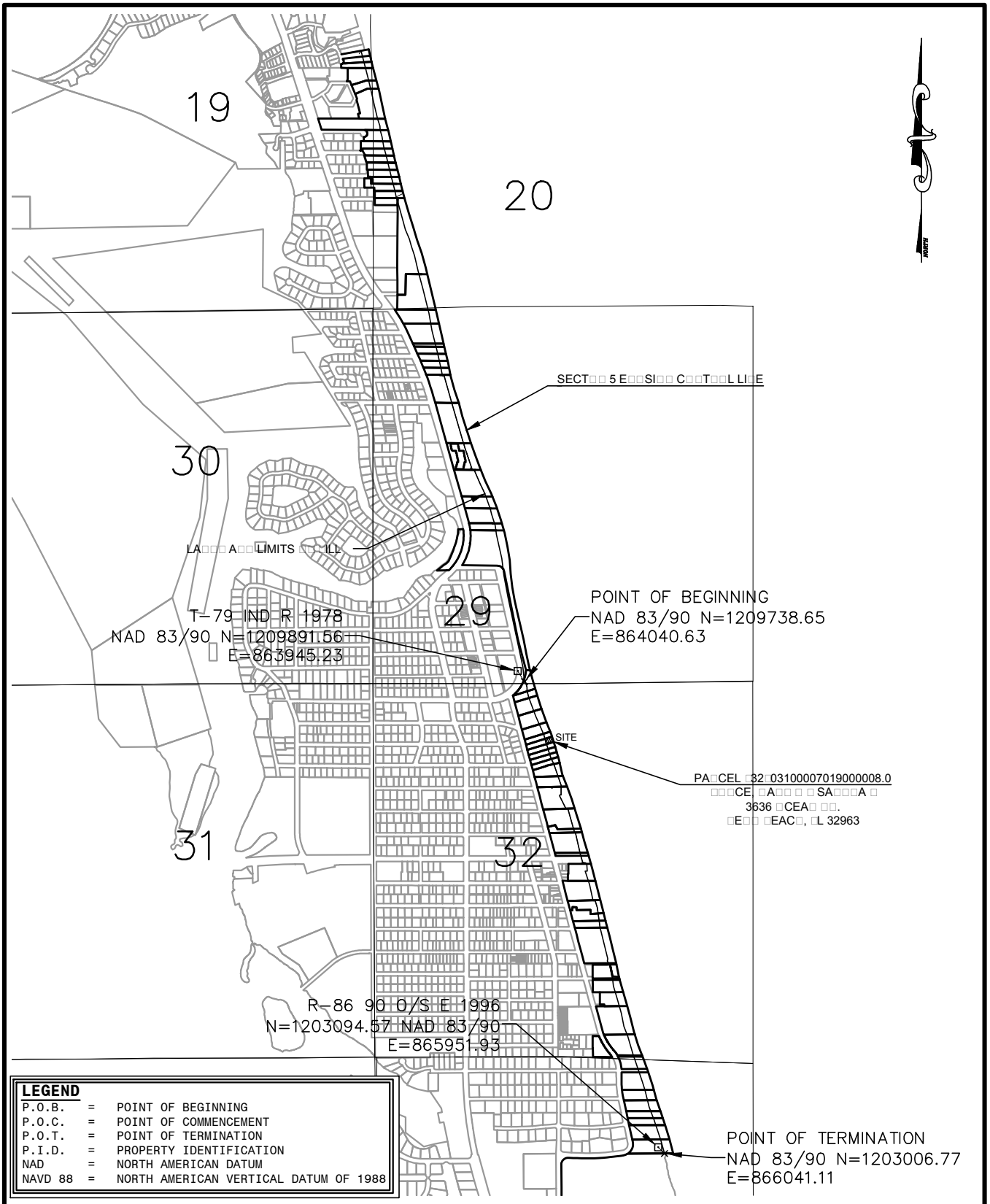
SCHEDULE A



LEGEND

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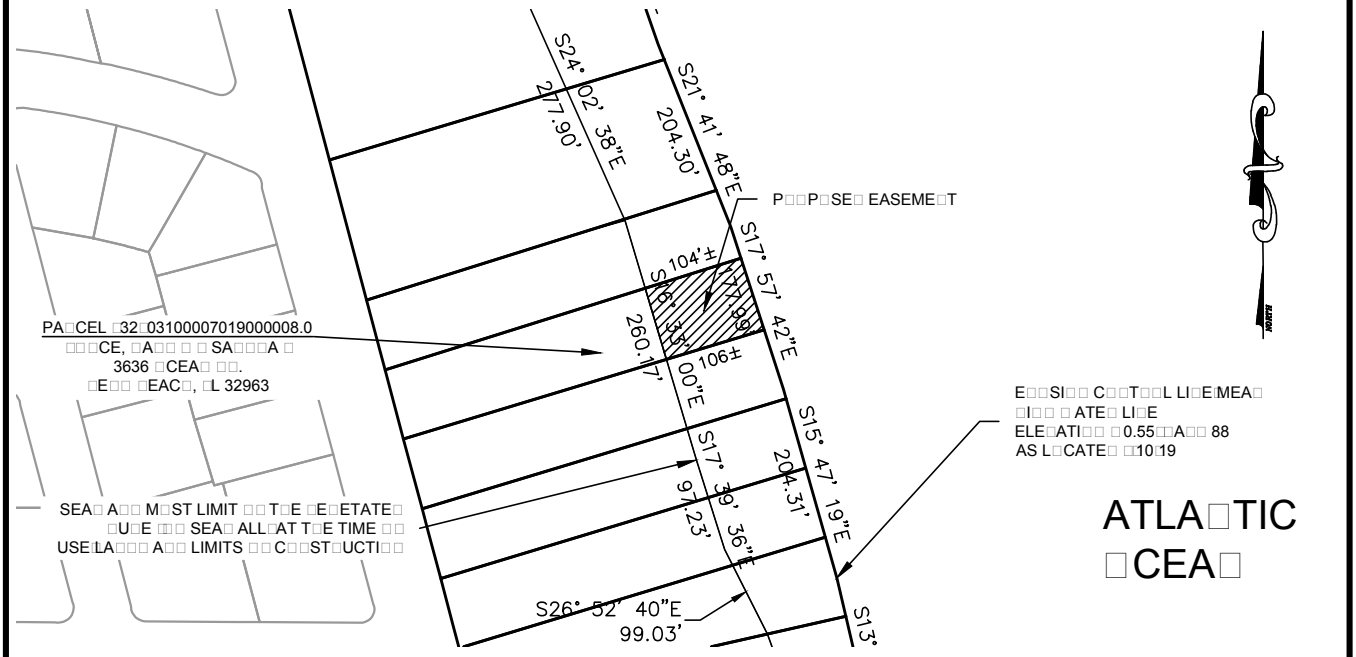
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 3189, PA□E 2 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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FAX: (954) 421-0425
LB #4298

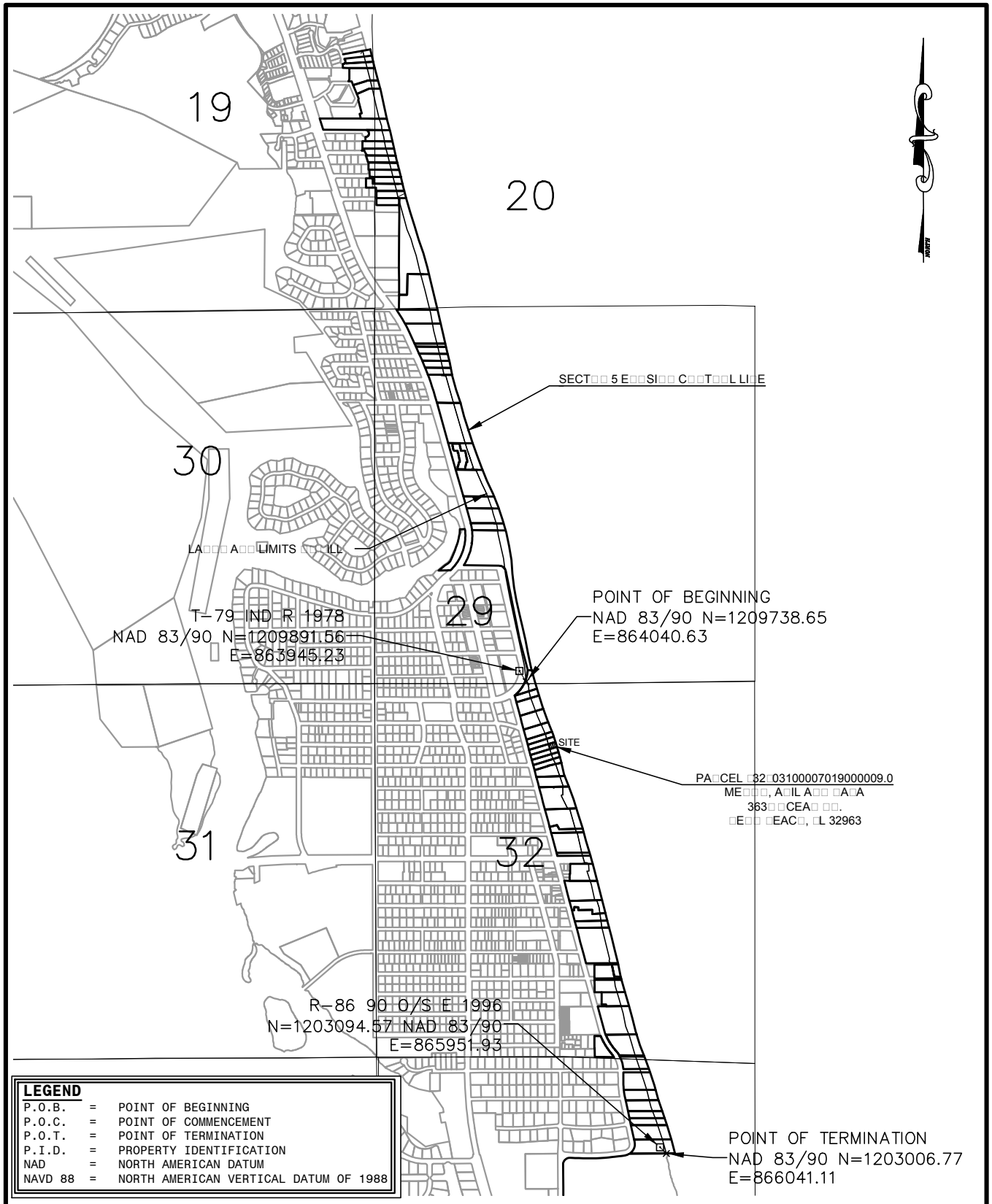
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403100007019000008.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB3189-P2, Tou Thu, 16 May 2019 - 11:17am

SCHEDULE A



LEGEND

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P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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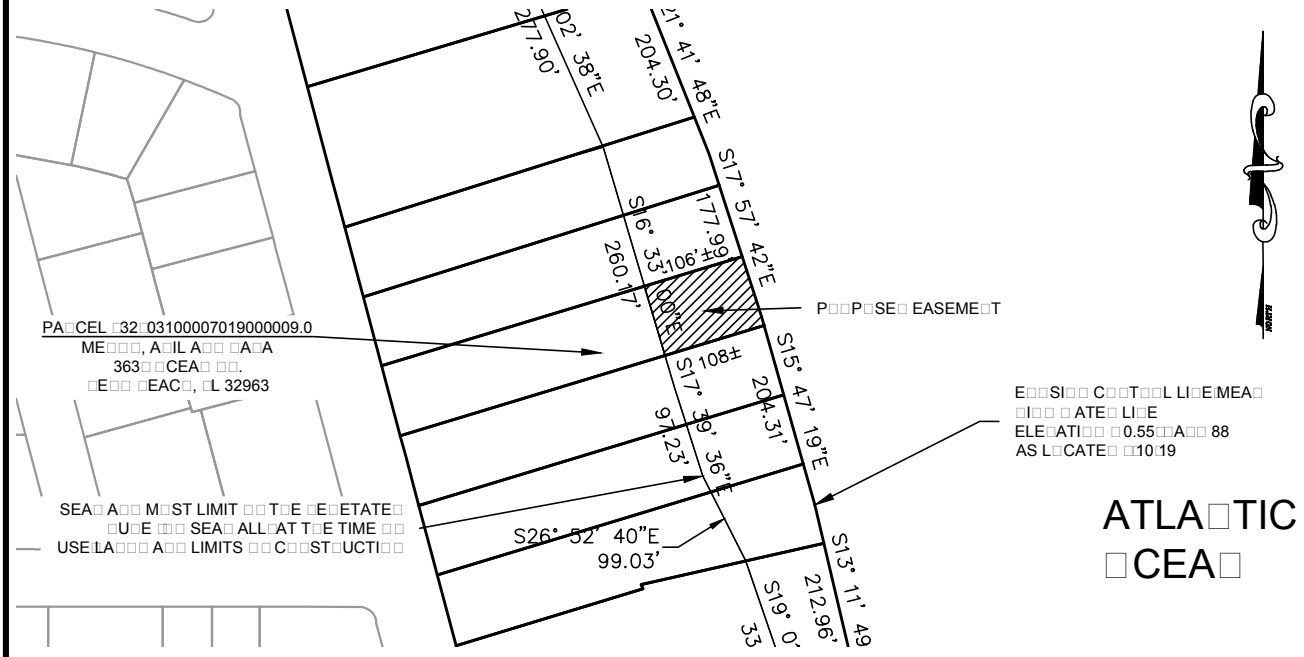
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

THAT PORTION LANDS DESCRIBED AND RECORDED IN OFFICIAL RECORDS BOOK 2850, PAGE 567 OF THE PUBLIC RECORDS OF INDIAN RIVER COUNTY, FLORIDA, LYING WITHIN EASTERLY AND MOST LIMIT OF THE SEAL AND MOST LIMIT OF THE DELETATE OUTLINE OF SEAL ALL AT THE TIME OF USE AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE APPROXIMATE GEOGRAPHIC MONUMENT T-79 IN 1978 FOR THE COORDINATES OF NORTHING 1,209,891.56 FEET AND EASTING 863,905.23 FEET AT 83/90 AS BEING ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF BEGINNING AT THE SAID POINT OF COORDINATES OF NORTHING 1,209,738.65 FEET AND EASTING 86[illegible]0.63 FEET AT 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTING 866,0[illegible]1.11 FEET AT 83/90, SAID POINT BEING 125.15 FEET DISTANT FROM MONUMENT T-86 90 DS E 1996 AT COORDINATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403100007019000009.0

COMMISSION NO.	SCALE	DATE
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LFP	JRM	N/A / N/A	N/A	2 OF 2

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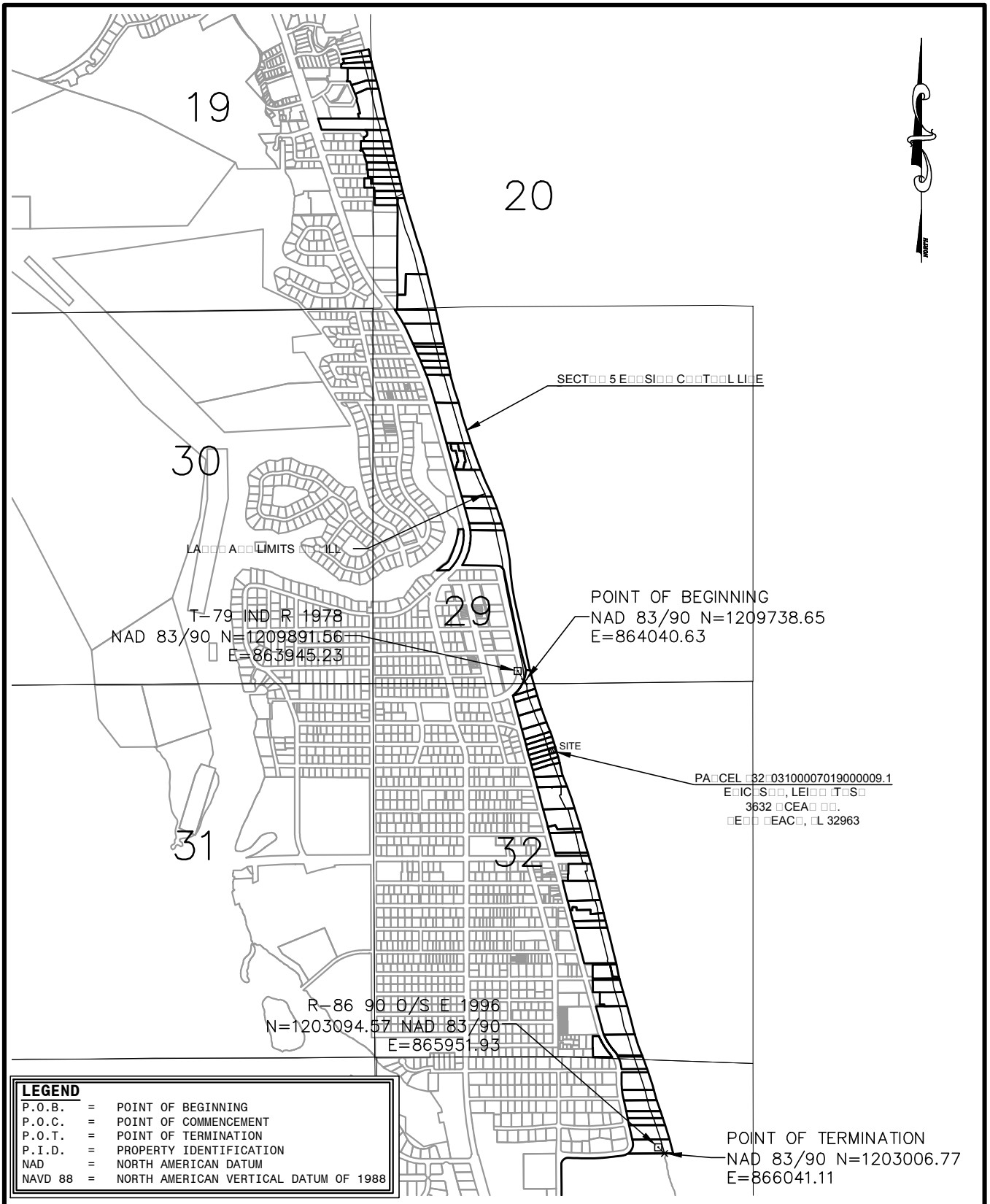
SCHEDULE A



LEGEND

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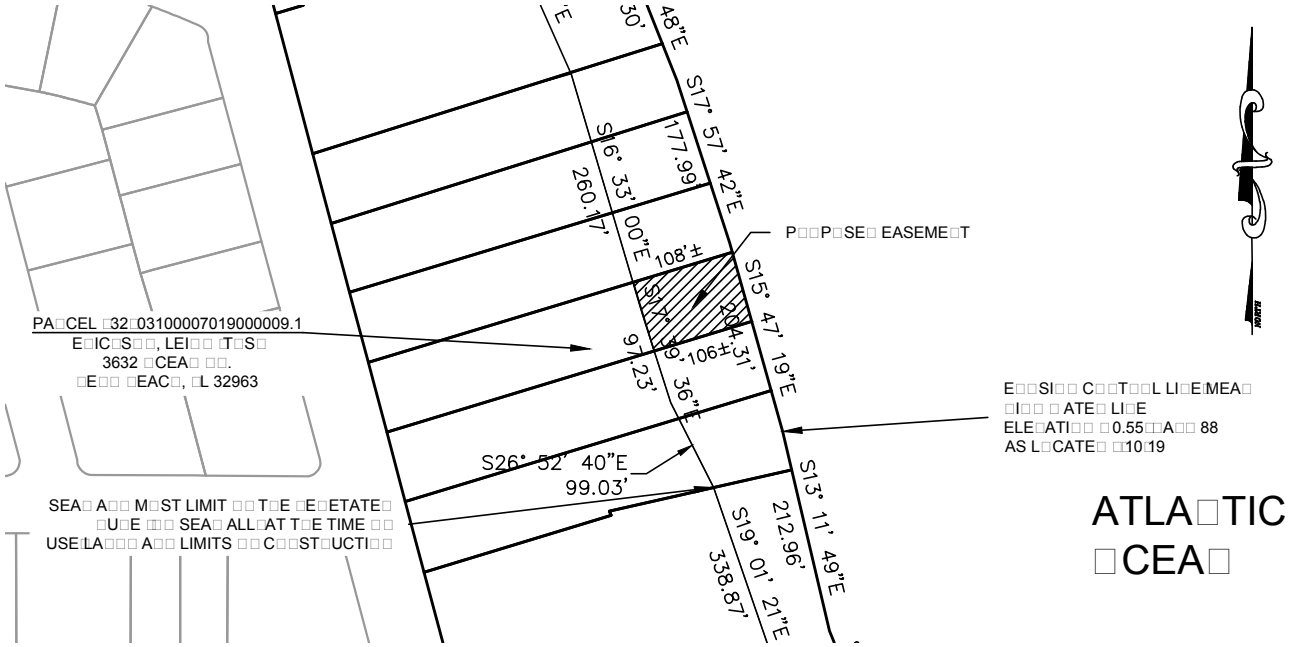

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T AT P TI LA S ESC I E A EC E I ICIAL EC 2510, PA E 10 7 T E PU LIC EC S I IA I E C U T, L I A, L I EASTE L T E SEA A M ST LIMIT T E E ETATE U E SEA ALL AT T E TIME USE A EI M E PA TICULA L ESC I E AS LL S:

C MME CI AT T E EPA TME T E I ME TAL P TECTI EP M UME T T-79 I 1978 A I C I ATES T I 1,209,891.56 EET A EASTI 863,9 5.23 EET A 83 90 AS E E E CE T T E L I A STATE PLA E C I ATE S STEM, EAST E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF E I I T E LL I E, SAI P I T A I C I ATES T I 1,209,738.65 EET A EASTI 86 ,0 0.63 EET A 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI 866,0 1.11 EET A 83/90, SAI P I T EI 125.15 EET ISTA T M M UME T -86 90 S E 1996 A I C I ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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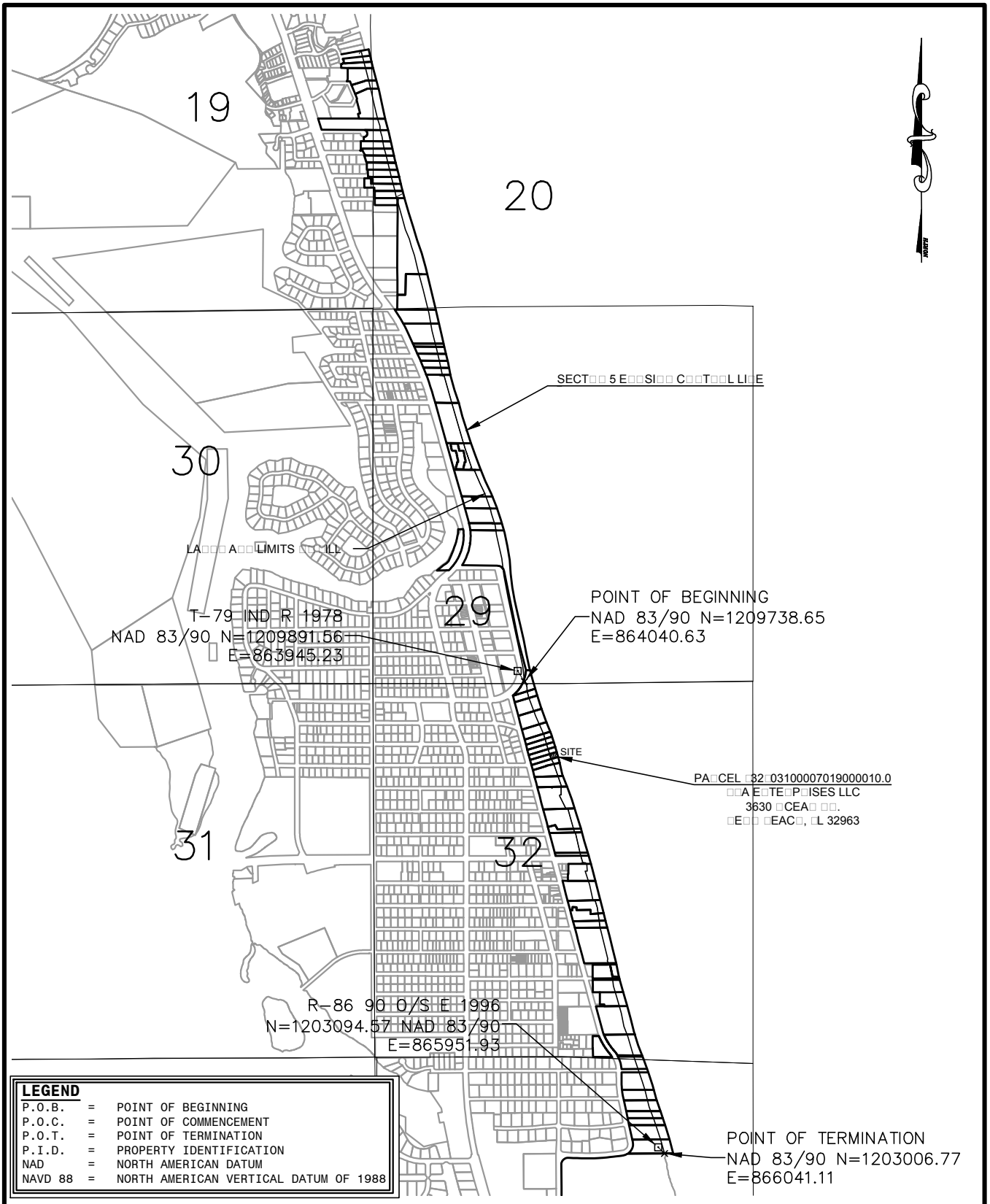

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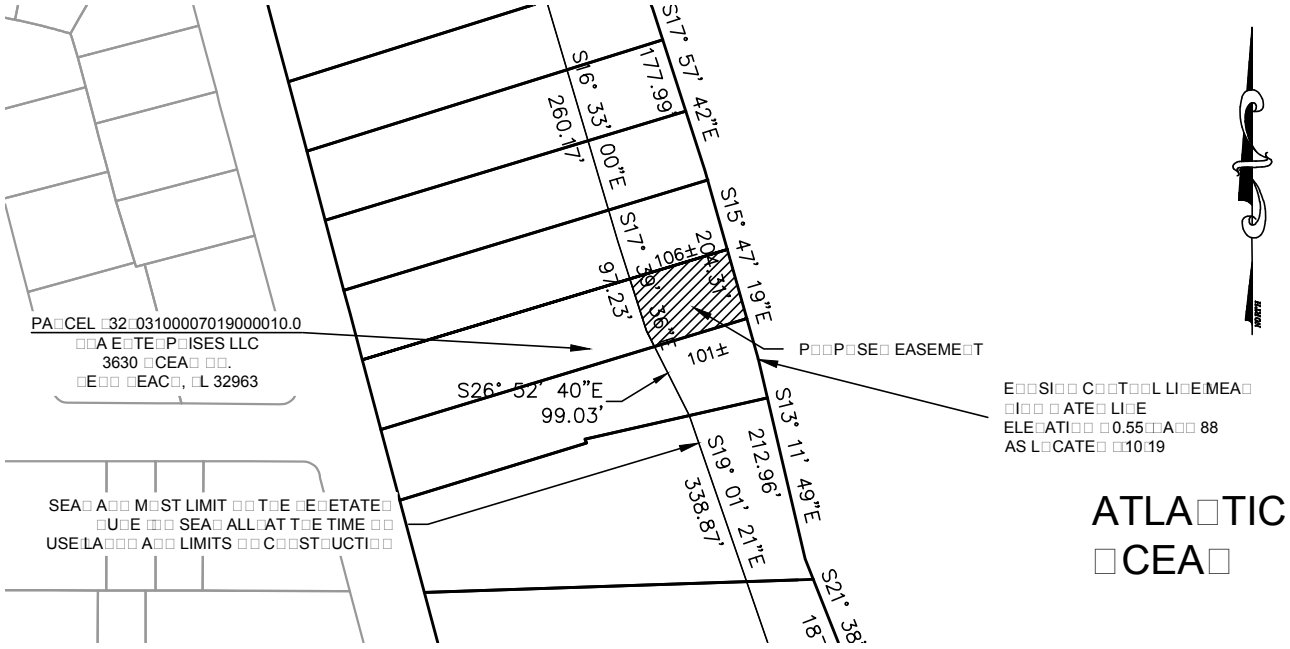
H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2482-P927CRV, lou Thu, 16 May 2019 - 11:17am

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T AT P TI LA S ESC I E A EC E I ICIAL EC 2 82, PA E 927 T E PU LIC EC S I IA I E C U T, L I A, L I EASTE L T E SEA A M ST LIMIT T E E ETATE U E SEA ALL AT T E TIME USE A EI M E PA TICULA L ESC I E AS LL S:

C MME CI AT T E EPA TME T E E I ME TAL P TECTI EP M UME T T-79 I 1978 A I C I ATES T I 1,209,891.56 EET A EASTI 863,9 5.23 EET A 83 90 AS E E E CE T T E L I A STATE PLA E C I ATE S STEM, EAST E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF E I I T E LL I LI E, SAI P I T A I C I ATES T I 1,209,738.65 EET A EASTI 86 ,0 0.63 EET A 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI 866,0 1.11 EET A 83/90, SAI P I T EI 125.15 EET ISTA T M M UME T -86 90 S E 1996 A I C I ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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FAX: (954) 421-0425
LB #4298

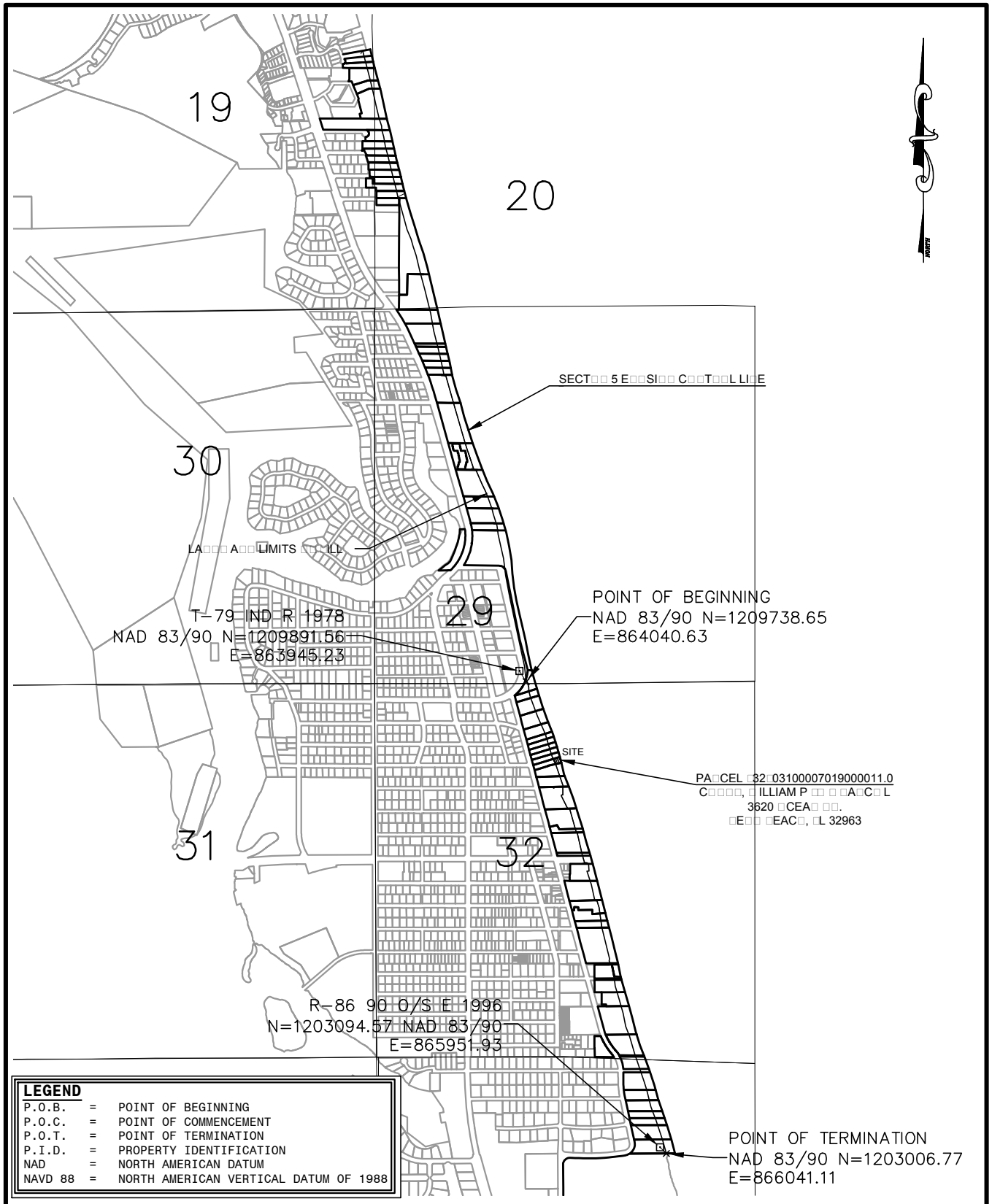
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403100007019000010.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2482-P927, Iou Thu, 16 May 2019 - 11:17am

SCHEDULE A



LEGEND		
P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
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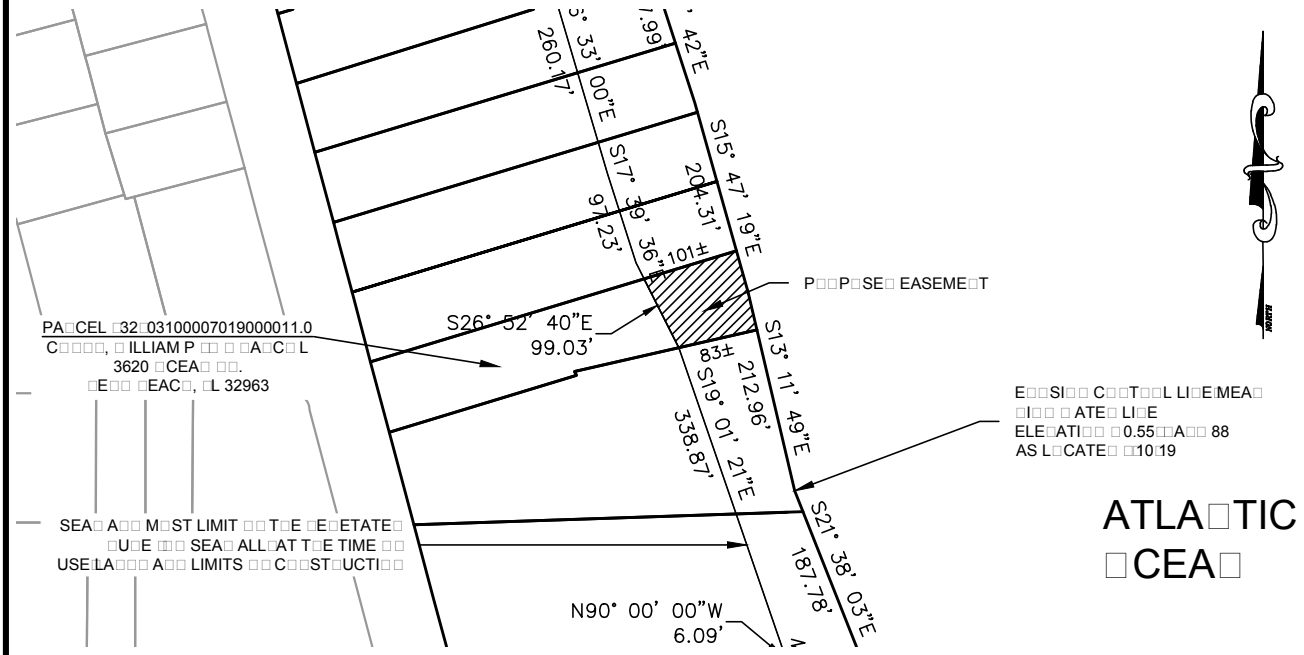

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 3175, PA□E 1730 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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LB #4298

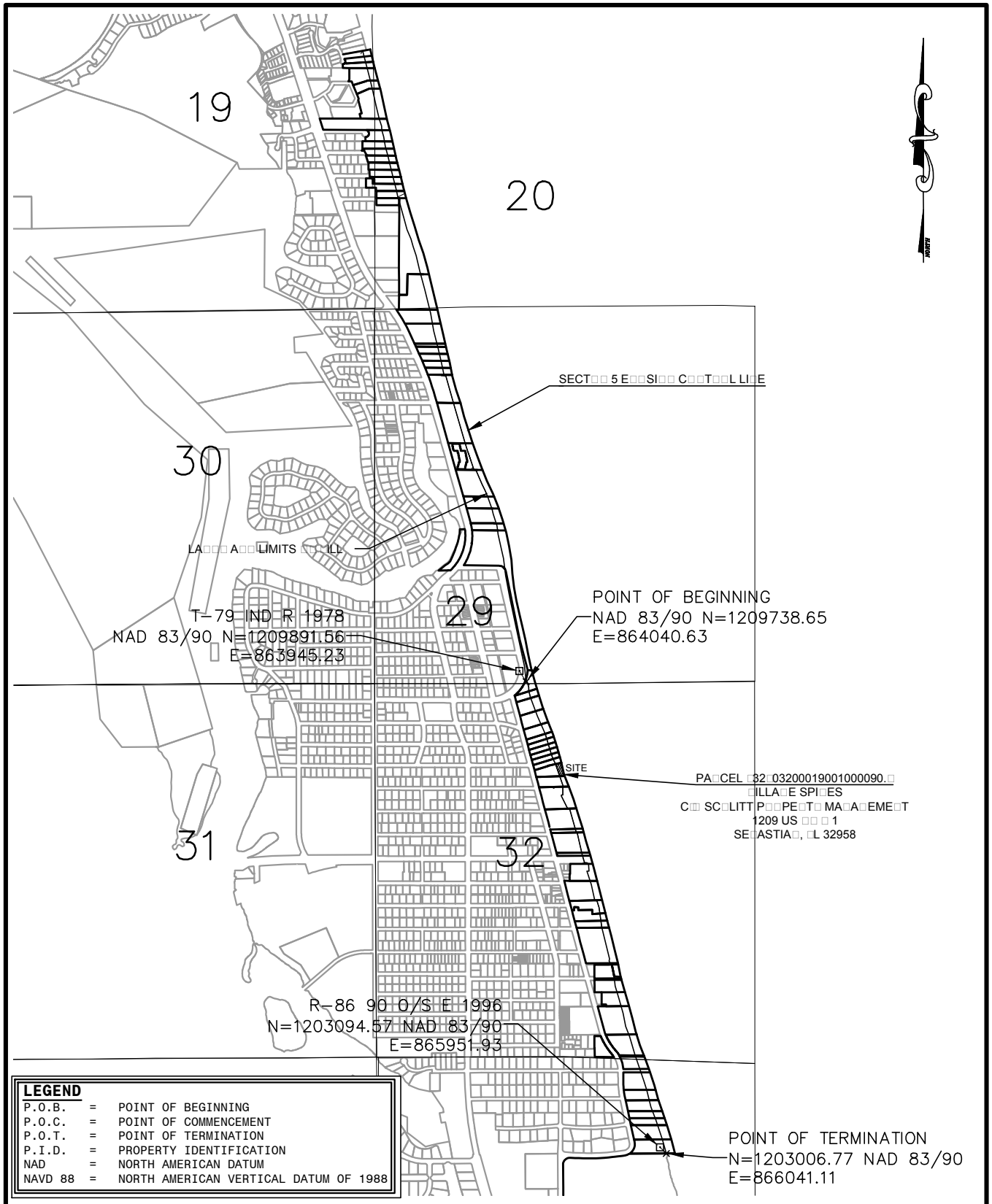
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403100007019000011.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB3175-P1730, lou Thu, 16 May 2019 - 11:18am

SCHEDULE A



LEGEND

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P.O.T.	=	POINT OF TERMINATION
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PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200019001000090.4

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

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LFP	JRM	N/A / N/A	N/A	1 OF 2

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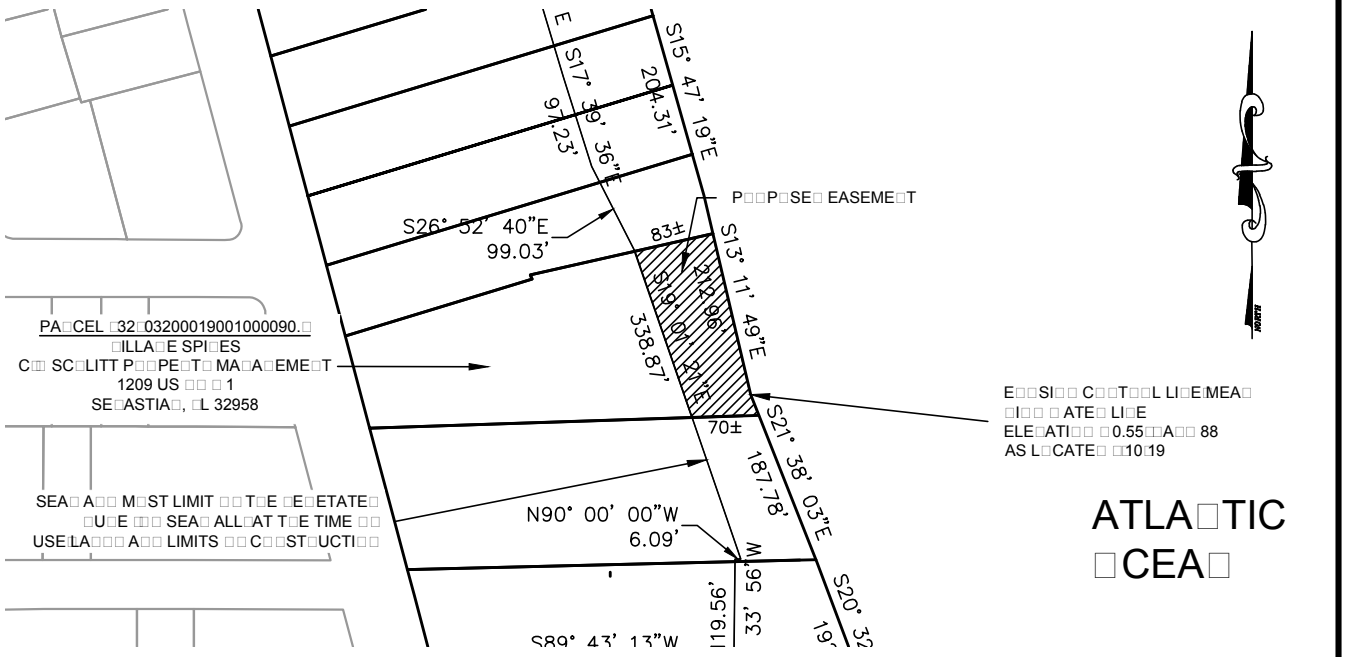
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

THAT PORTION OF LANDS DESCRIBED AS PARCEL A OF THE OFFICIAL RECORDS BOOK 1223, PAGE 676 OF THE PUBLIC RECORDS OF INDIAN RIVER COUNTY, FLORIDA, LYING EASTERLY OF AND ADJACENT TO THE SEAWARD MOST LIMIT OF THE ESTATE OF UPLAND SEAWARD ALL AT THE TIME OF USE LAWFUL LIMITS OF CONSTRUCTION, SAID PARCEL A BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE EPATME NT OF ENVIRONMENTAL PROTECTION MONUMENT T-79 IN 1978 FOR AIDS OF COORDINATES OF 1,209,891.56 FEET AND EASTING 863,95.23 FEET ON A 83/90 AS DERIVED FROM THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF BEGINNING OF THE HEREIN DESCRIBED LINE, SAID POINT HAVING COORDINATES OF NORTHING 1,209,738.65 FEET AND EASTING 86,0.63 FEET ON A 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTING 866,01.11 FEET ON A 83/90, SAID POINT BEING 125.15 FEET DISTANT FROM MONUMENT T-86 90 AS E 1996 ON A COORDINATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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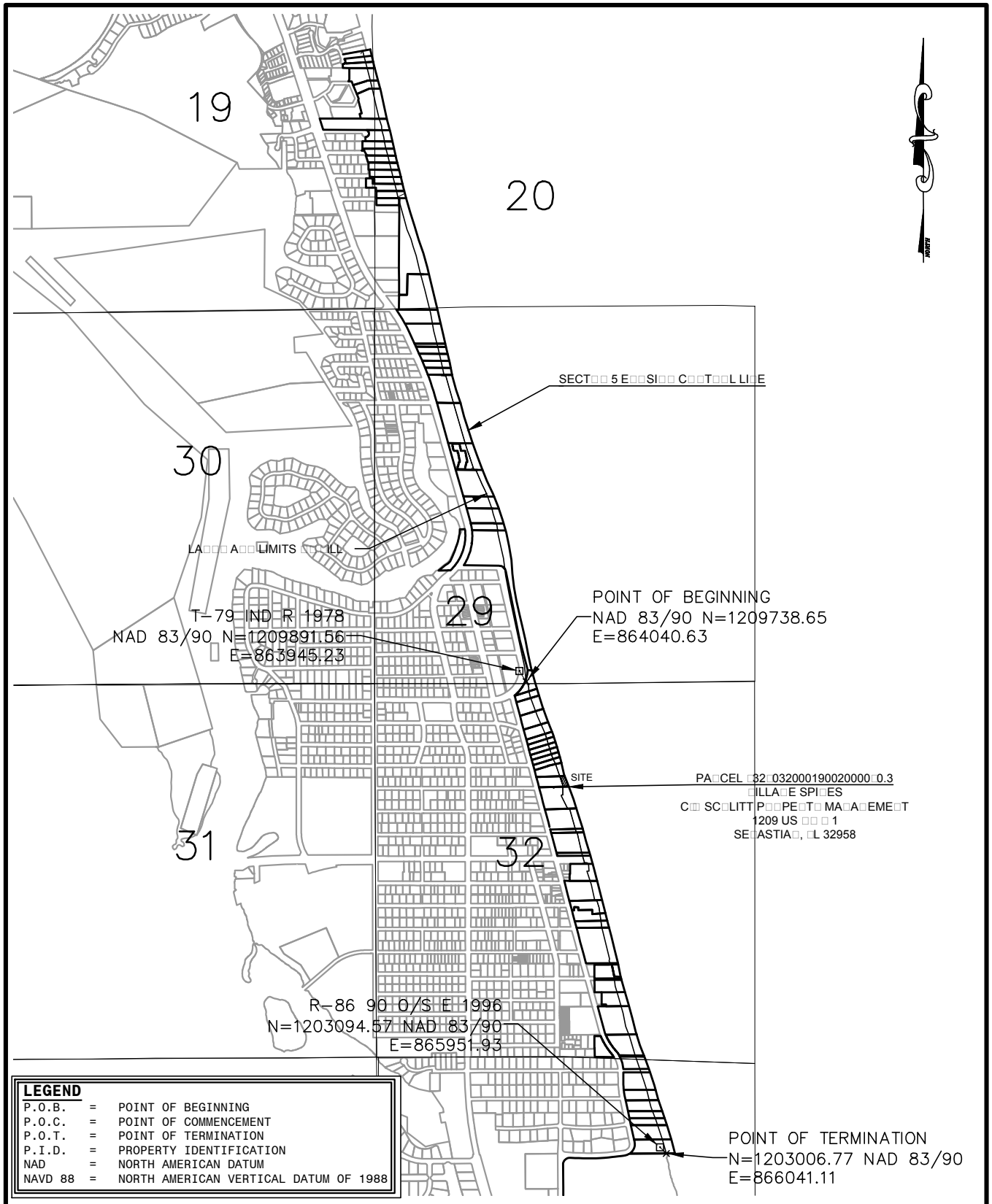
H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB1223-P676, Chris Wed, 22 May 2019 - 3:48pm

SCHEDULE A



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Morgan & Eklund Inc.

PROFESSIONAL SURVEY CONSULTANTS

4909 US HIGHWAY #1
VERO BEACH, FL 32967
PHONE: (772) 388-5364
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BOCA RATON, FL 33432
PHONE: (954) 421-6882
FAX: (954) 421-0425

LB #4298

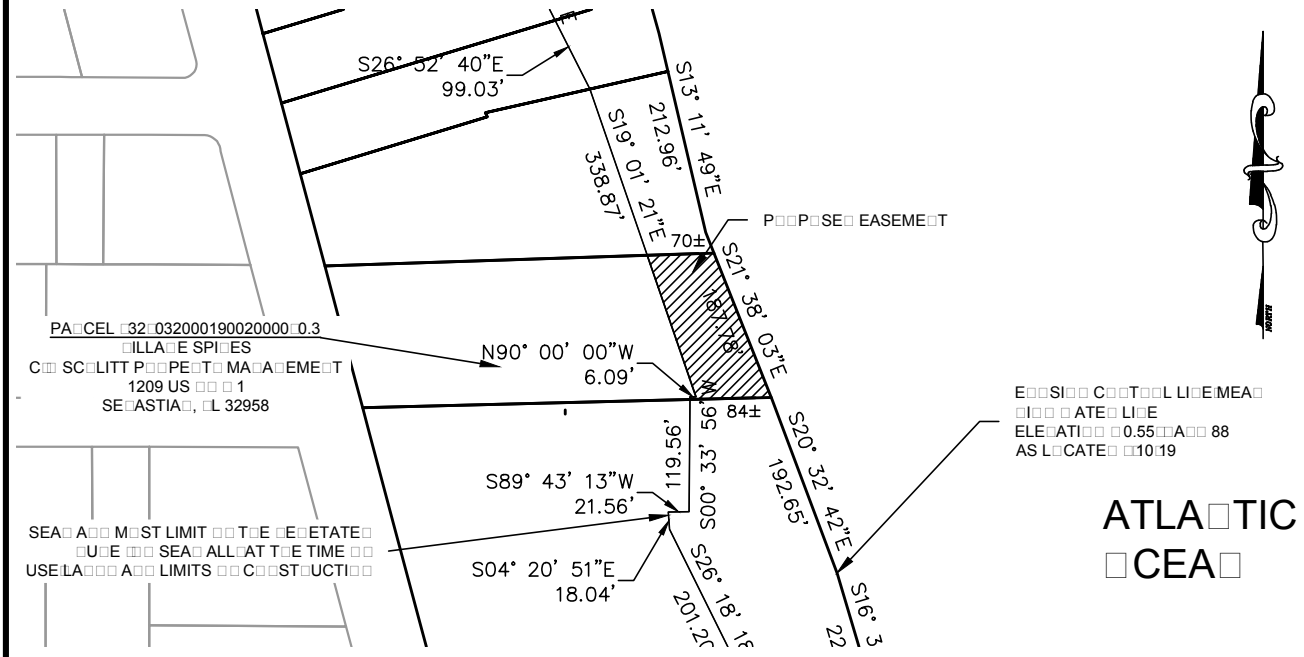
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200019002000040.3

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2752-P2CRV, Chris Wed, 22 May 2019 - 3:50pm

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 2752, PA□E 2 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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LB #4298

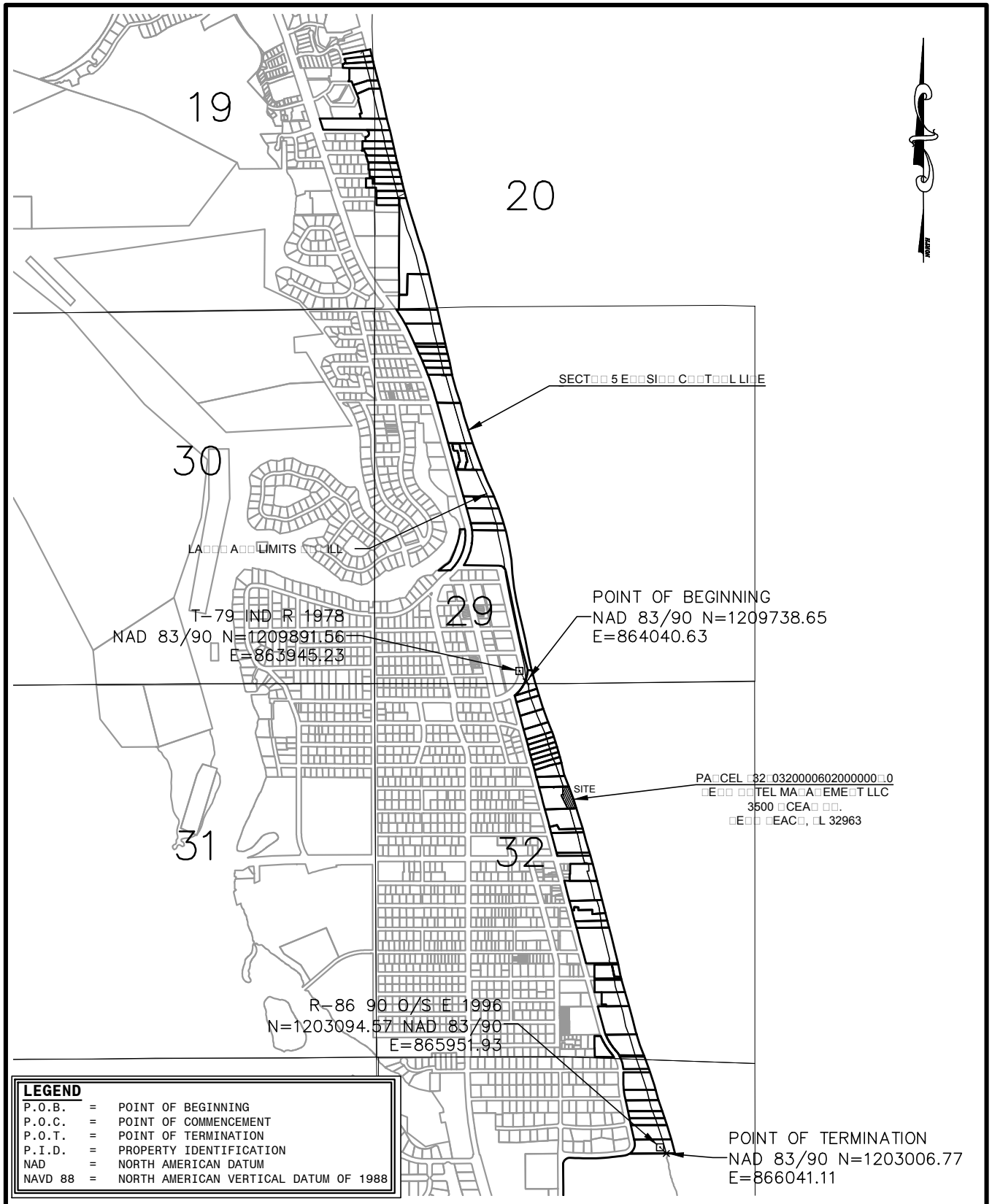
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200019002000040.3

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2752-P2, Chris Wed, 22 May 2019 - 3:51pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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LFP	JRM	N/A / N/A	N/A	1 OF 2

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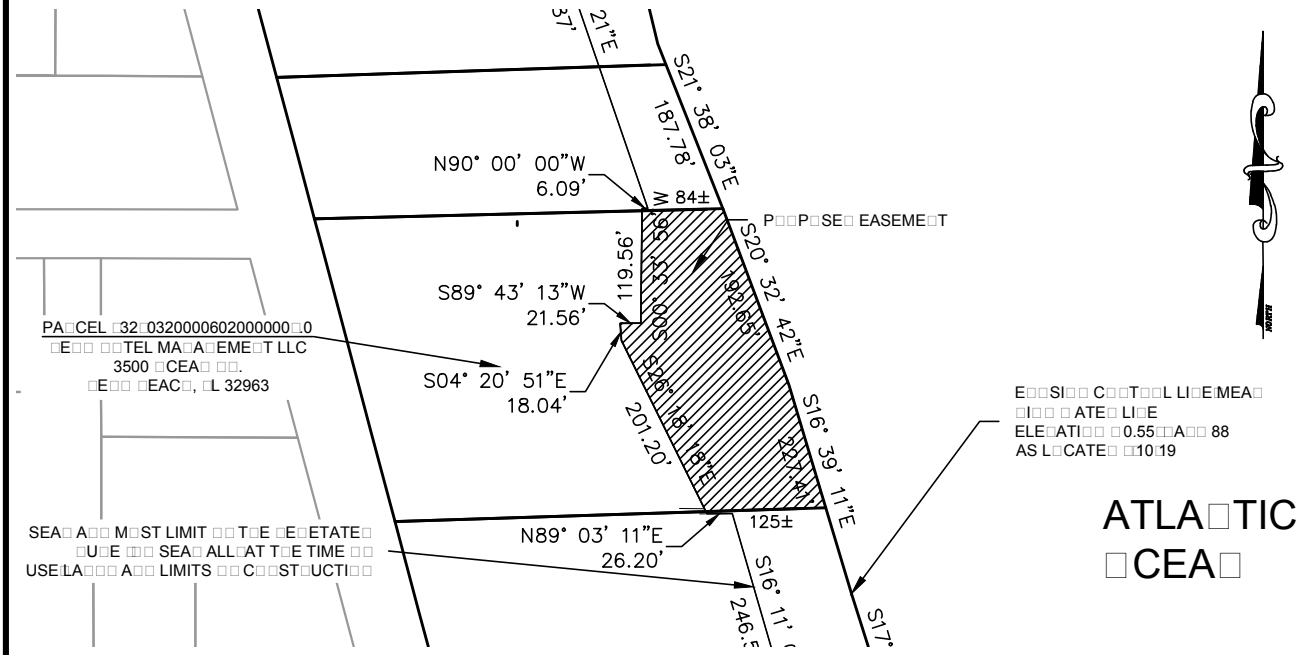

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 2211, PA□E 1297 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200006020000004.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

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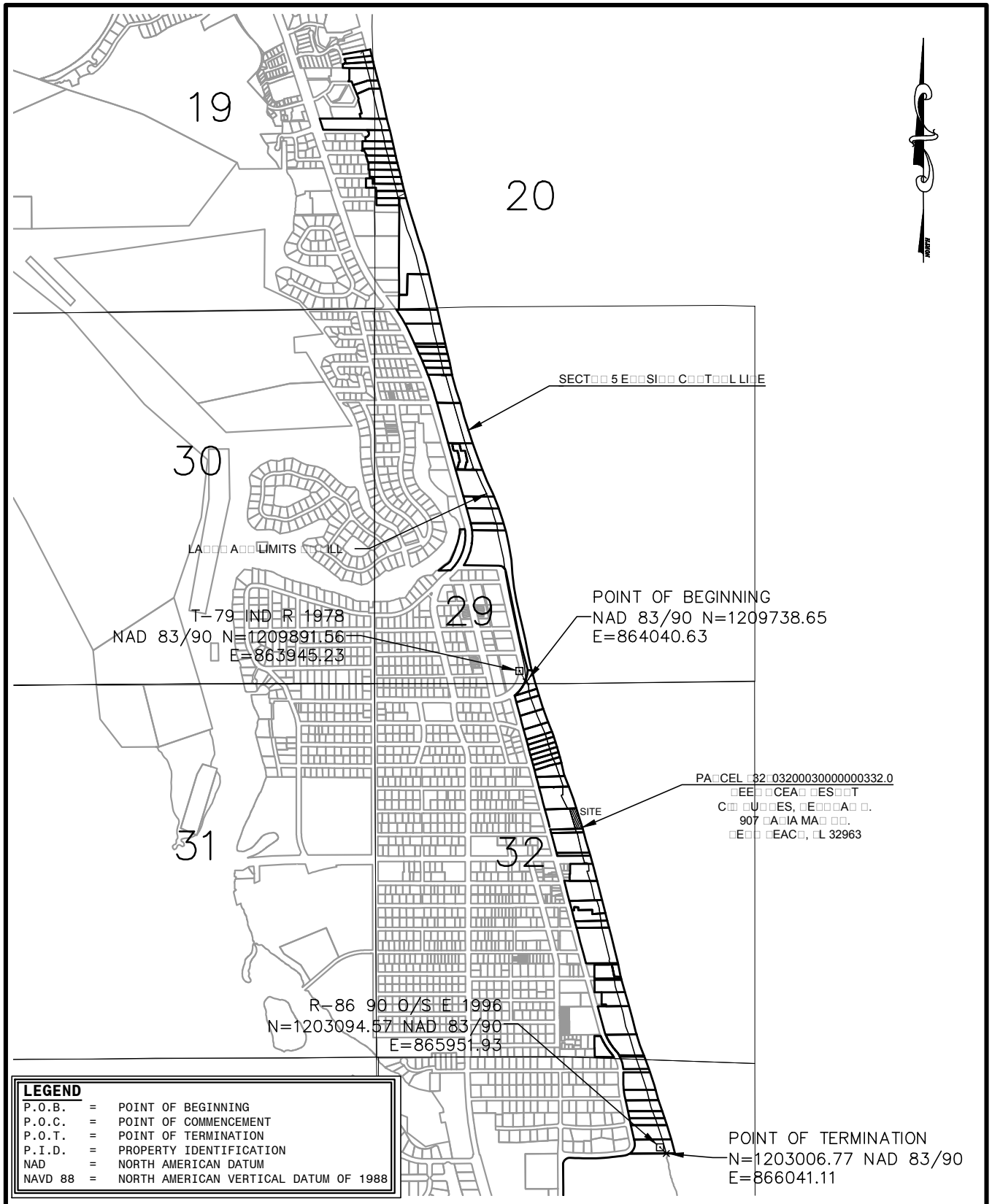
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2211-P1297, lou Thu, 16 May 2019 - 11:18am

SCHEDULE A



LEGEND		
P.O.B.	=	POINT OF BEGINNING
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INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200030000000332.0

COMMISSION NO.	SCALE	DATE
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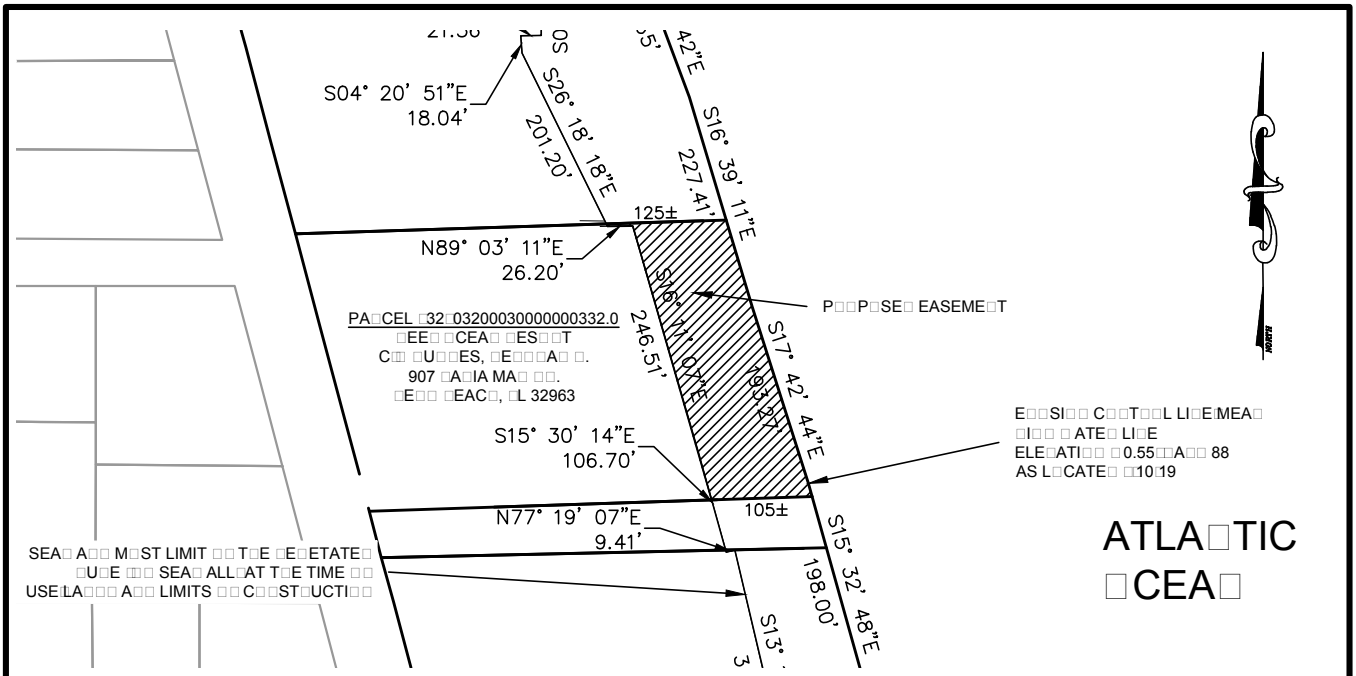
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

THAT PORTION OF LANDS DESCRIBED AND RECORDED IN OFFICIAL RECORDS BOOK 652, PAGE 1995 OF THE PUBLIC RECORDS OF INDIAN RIVER COUNTY, FLORIDA, LYING EASTERLY OF THE SEAWARD LIMIT OF THE PROPOSED CONSTRUCTION EASEMENT AS SEAWARD LIMIT OF THE PROPOSED CONSTRUCTION EASEMENT AS USED AT THE TIME OF USE AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE EPATMENT OF ENVIRONMENTAL PROTECTION MONUMENT T-79 IN 1978 FOR THE COORDINATES OF 1,209,891.56 FEET AND EASTING 863,9[illegible]5.23 FEET FOR A BASIS OF BEARINGS AS REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF INTERSECTION OF THE SOUTH LINE, SAID POINT BEING COORDINATES OF 1,209,738.65 FEET AND EASTING 86[illegible],0[illegible]0.63 FEET FOR A BASIS OF BEARINGS AS REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90); THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTING 866,0[illegible]1.11 FEET FOR A BASIS OF BEARINGS AS REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, SAID POINT BEING 125.15 FEET DISTANT FROM THE MONUMENT T-86 90 [illegible]S E 1996 [illegible]ADJUSTMENT OF 1990 (NAD 83/90) COORDINATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

Morgan & Eklund Inc.
PROFESSIONAL SURVEY CONSULTANTS
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PHONE: (954) 421-6882
FAX: (954) 421-0425
LB #4298

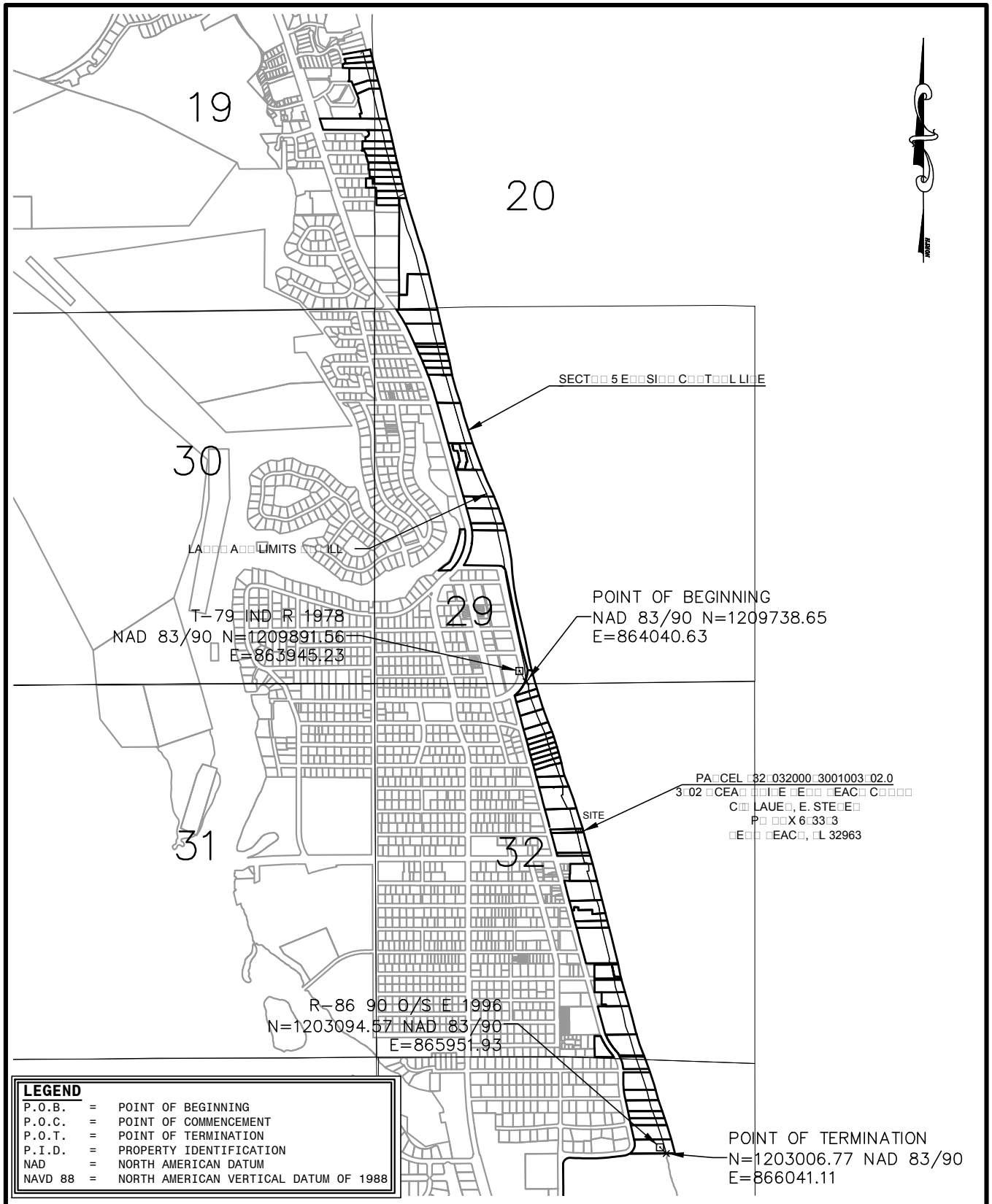
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200030000000332.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB652-P1995, Chris Wed, 22 May 2019 - 3:56pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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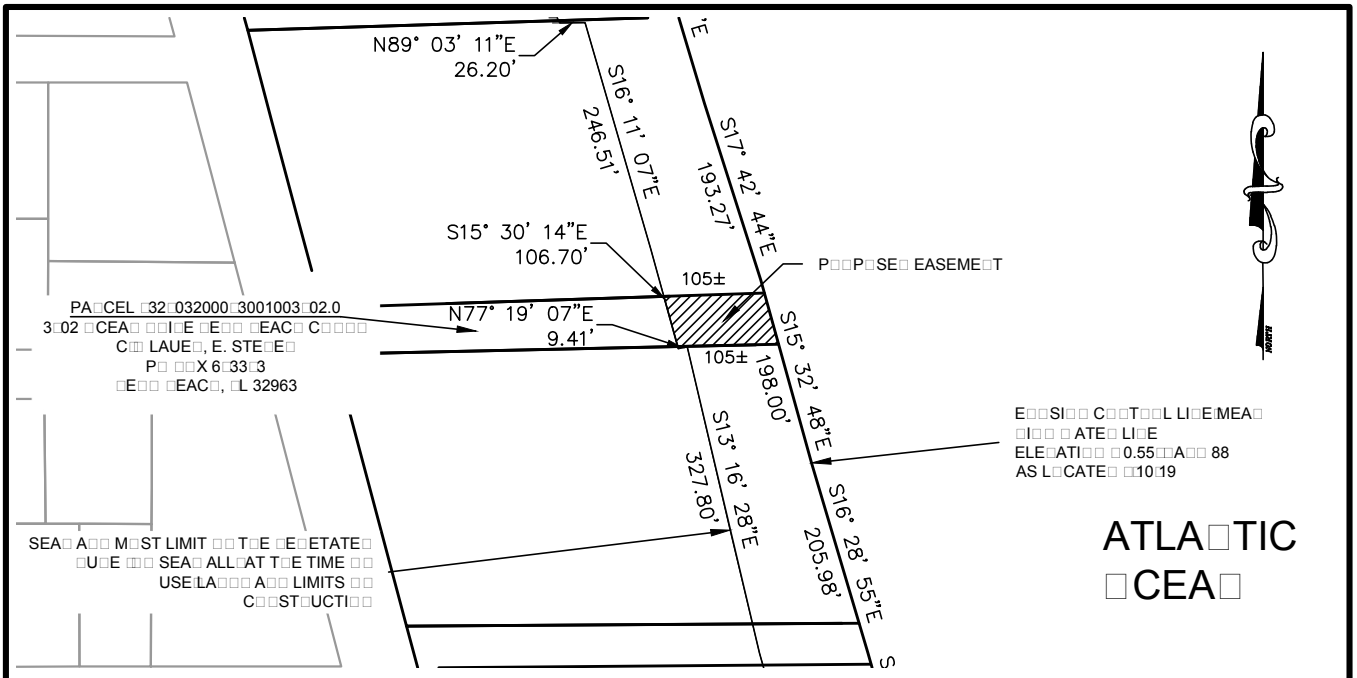
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200043001003402.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB1514-P0782CRV, Chris Wed, 22 May 2019 - 3:31pm

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 151□, PA□E 782 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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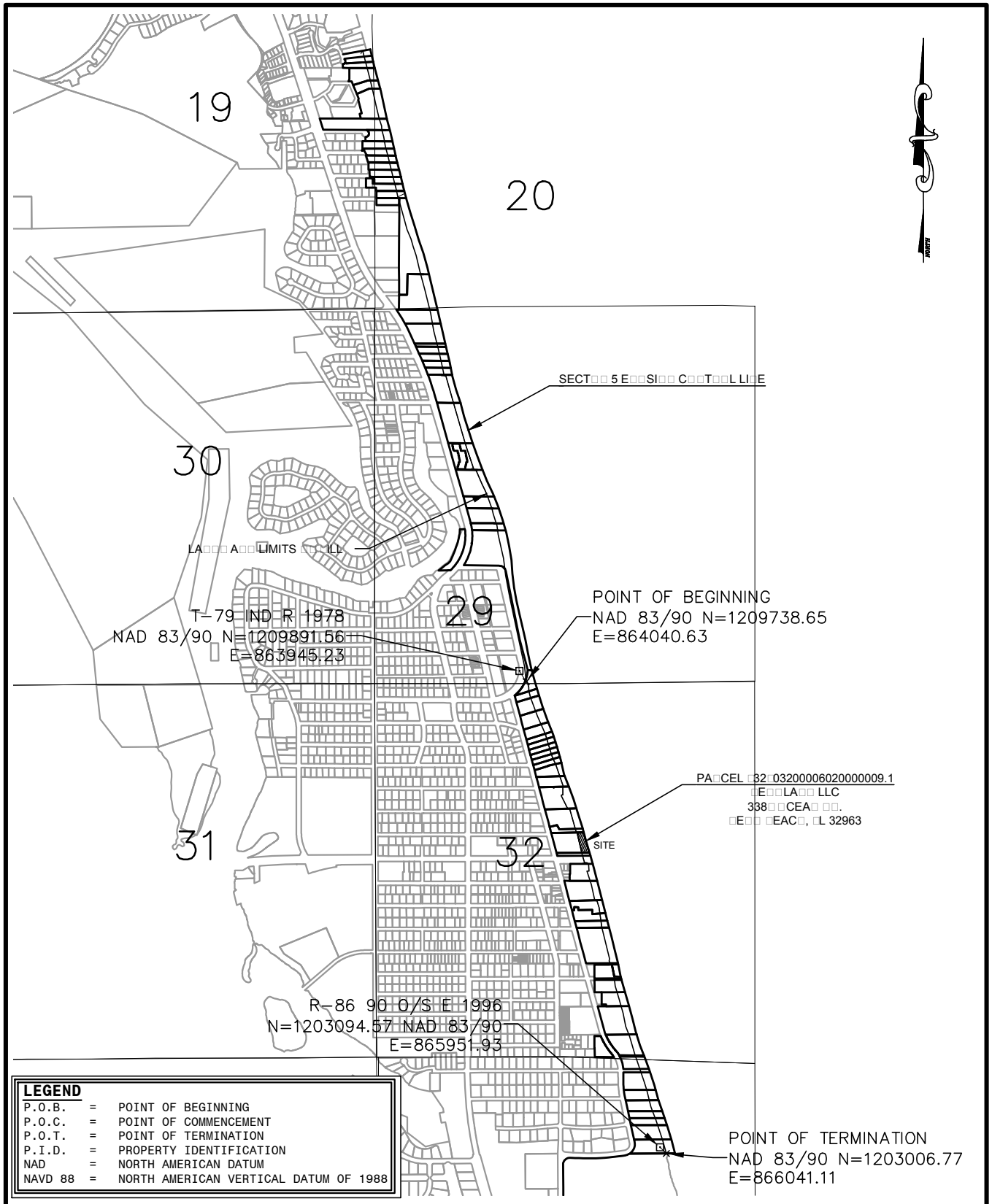
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200043001003402.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB1514-P0782, Chris Wed, 22 May 2019 - 3:35pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
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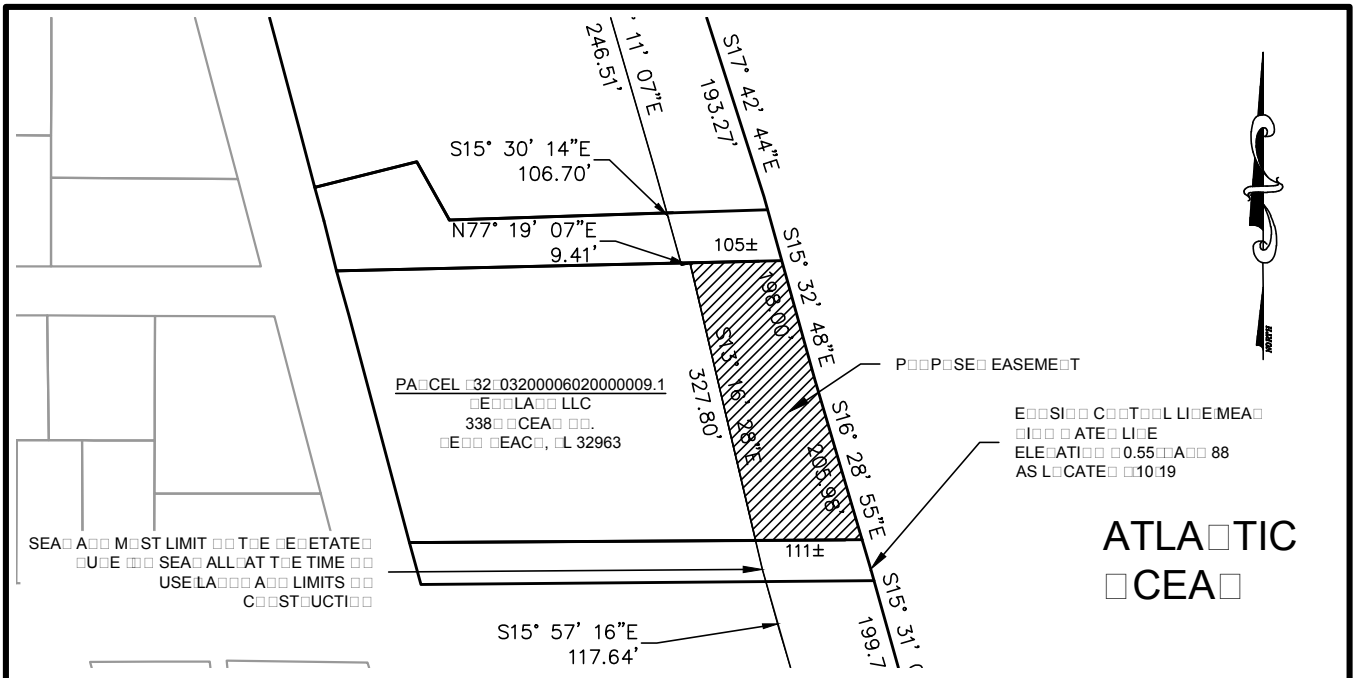
H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB3130-P1493CRV, lou Thu, 16 May 2019 - 11:18am

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 3130, PA□E 2021 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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35315-11	1" = 200'	4/29/19

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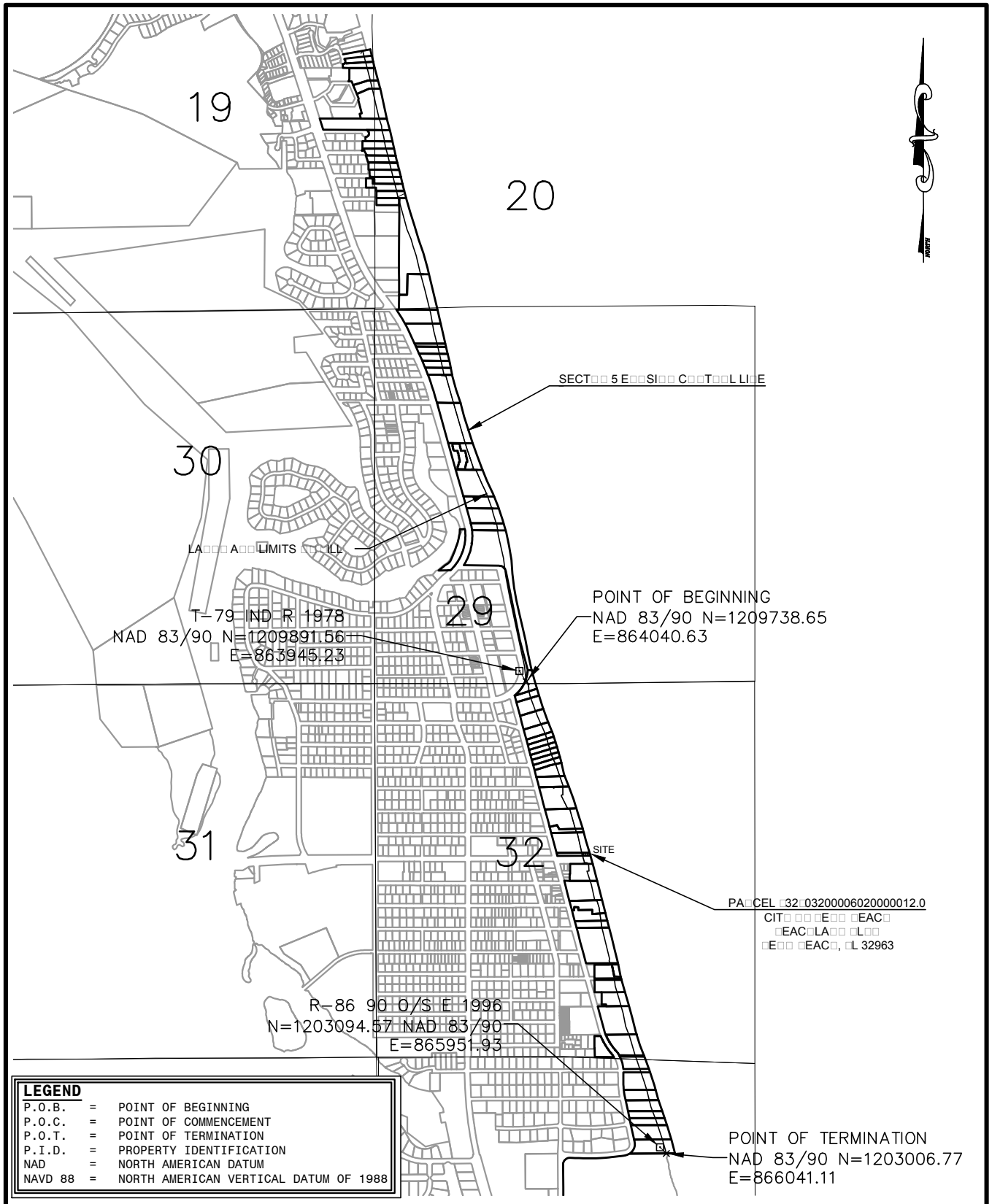
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB3130-P1493, lou Thu, 16 May 2019 - 11:19am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

Morgan & Eklund Inc.

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PHONE: (954) 421-6882
FAX: (954) 421-0425

LB #4298

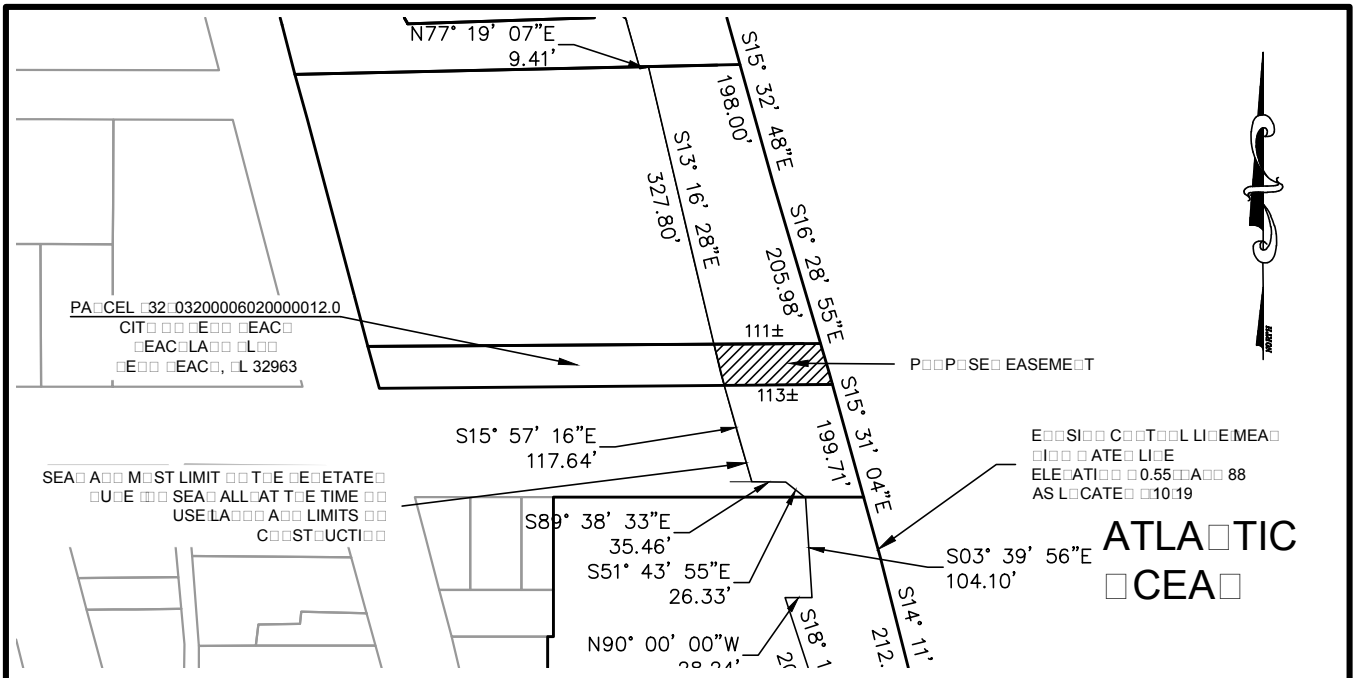
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200006020000012.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK	PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A	N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, CITY OF VB-CRV, lou Thu, 16 May 2019 - 11:19am

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □□ T□E CIT□ □□ □E□□ □EAC□, I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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LB #4298

SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200006020000012.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

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LFP	JRM	N/A / N/A	N/A	2 OF 2

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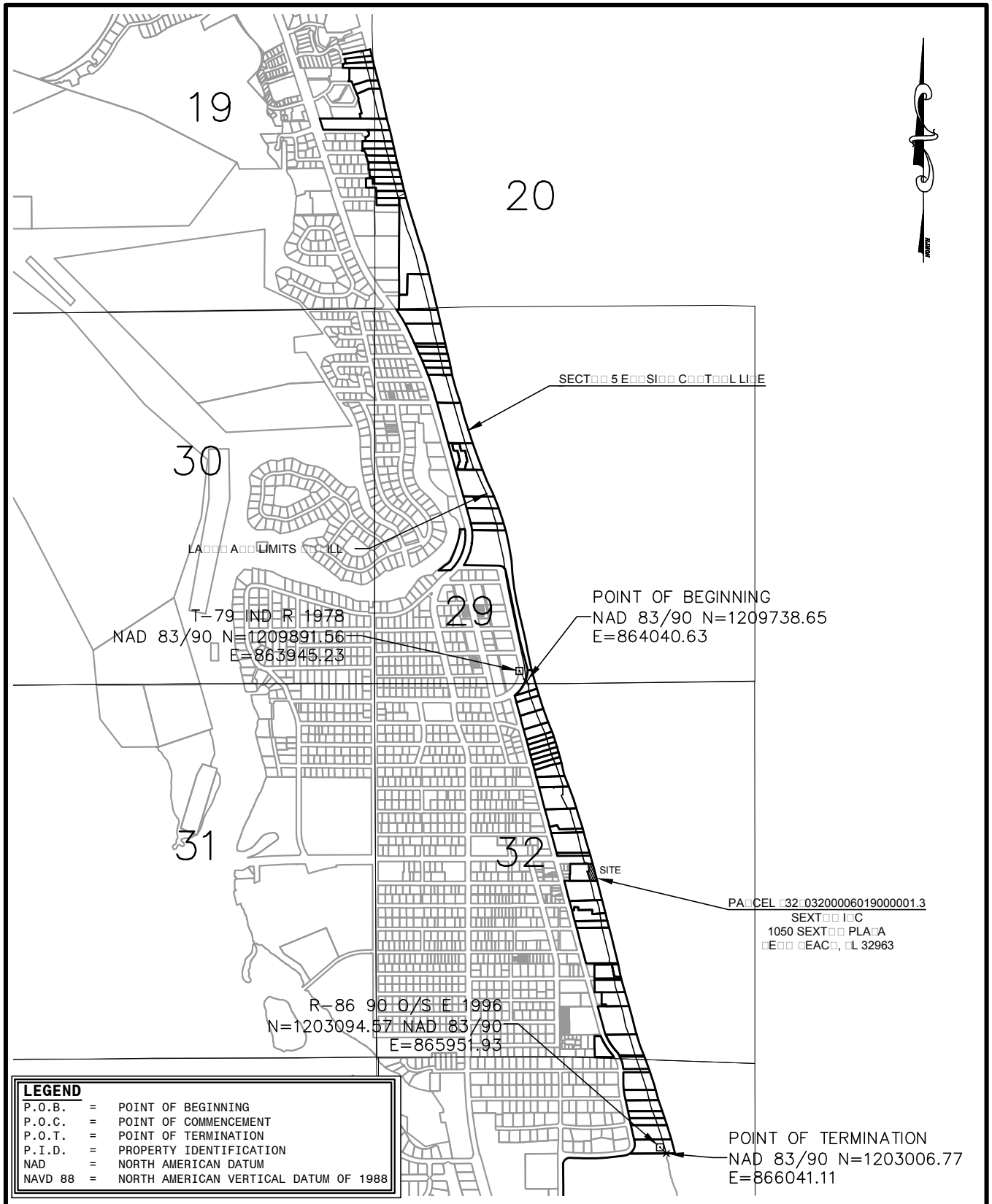
SCHEDULE A



LEGEND

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PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
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P.I.D. NO. 32403200006019000001.3

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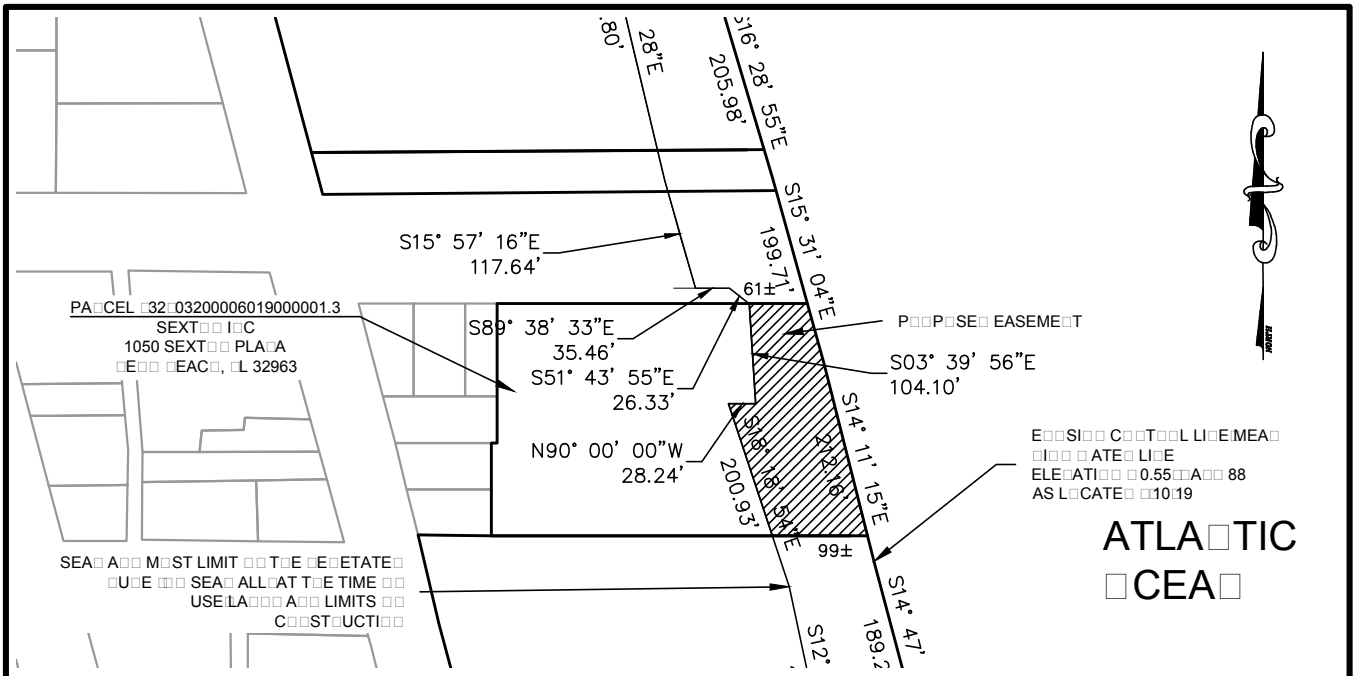

SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ OF SEXT□□ PLA□A, I□□IA□ RIVER C□U□T□, □L□□I□A, LYING EASTE□L□ OF T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E (OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□S:

C□MME□CI□□ AT T□E □EPA□TME□T OF E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T T-79 I□□ □ 1978 HAVING C□□□□I□ATES OF NOR THIN□ 1,209,891.56 □EET AND EASTI□□ 863,945.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E FO LLOW ING LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,040.63 □EET NAD 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,041.11 □EET NAD 83□90, SAI□ P□I□T BEING 125.15 □EET □ISTA□T FRO M DNR M□□UME□T R-86 90 □S E 1996 □A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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35315-11	1" = 200'	4/29/19

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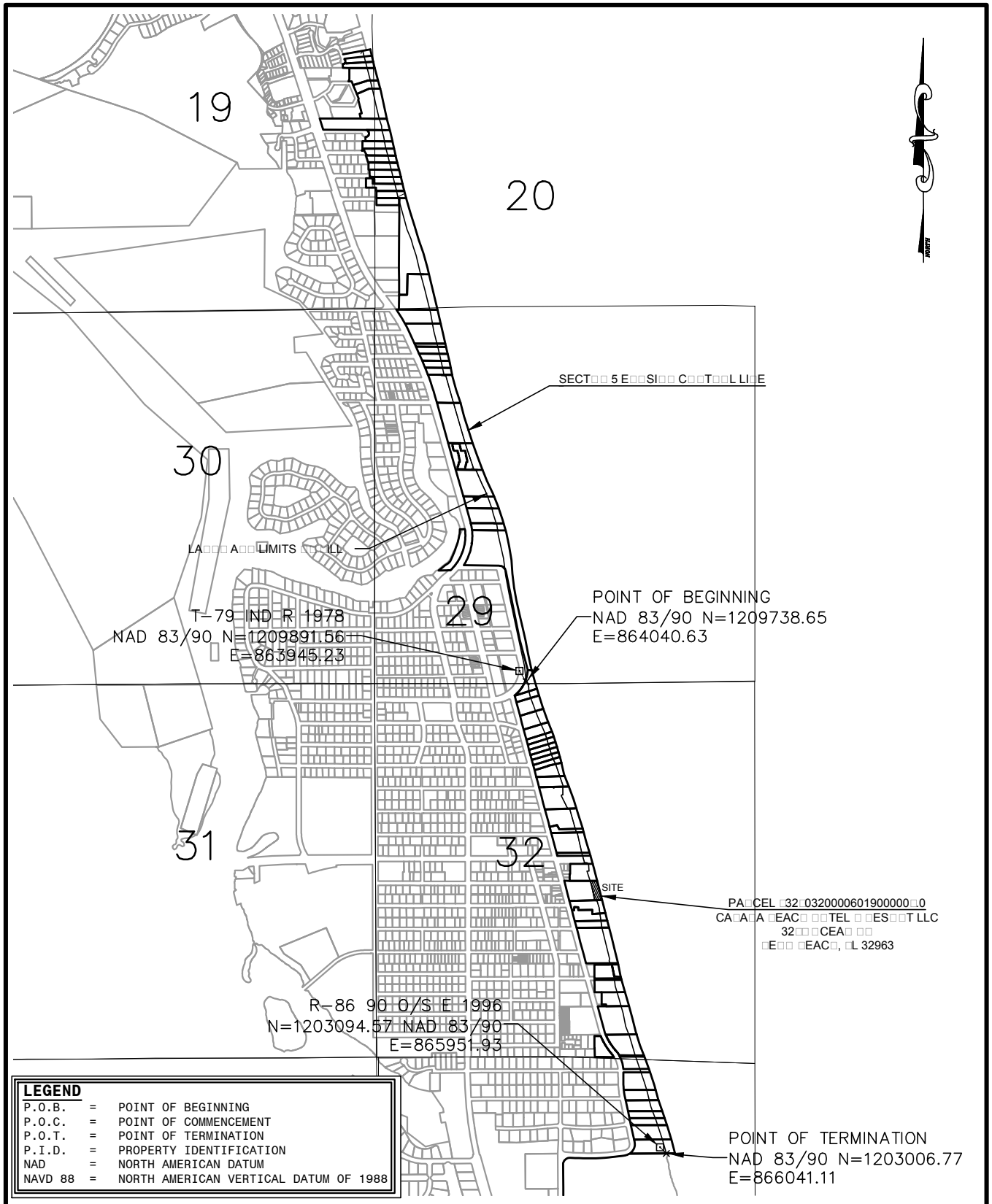
H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, SEXTON PLAZA, lou Thu, 16 May 2019 - 11:19am

SCHEDULE A



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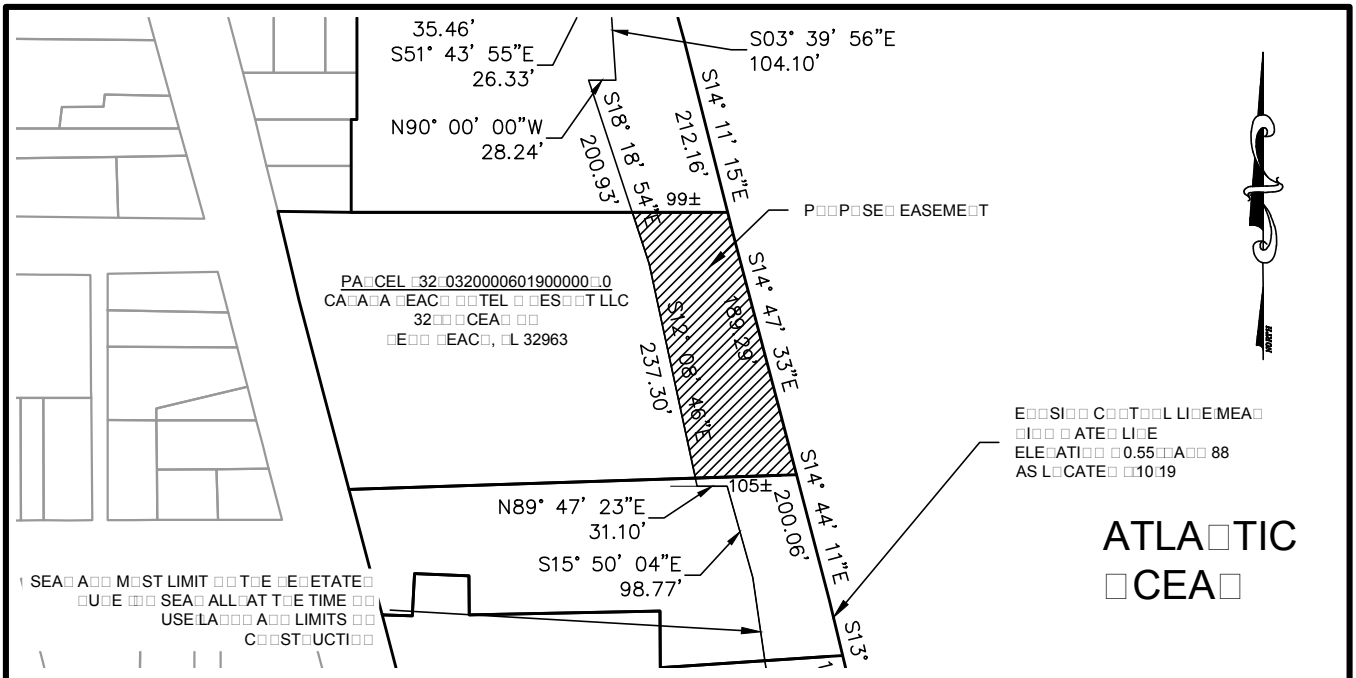
H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB1757-P147CVR, lou Thu, 16 May 2019 - 11:19am

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 1757, PA□E 1□7 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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LB #4298

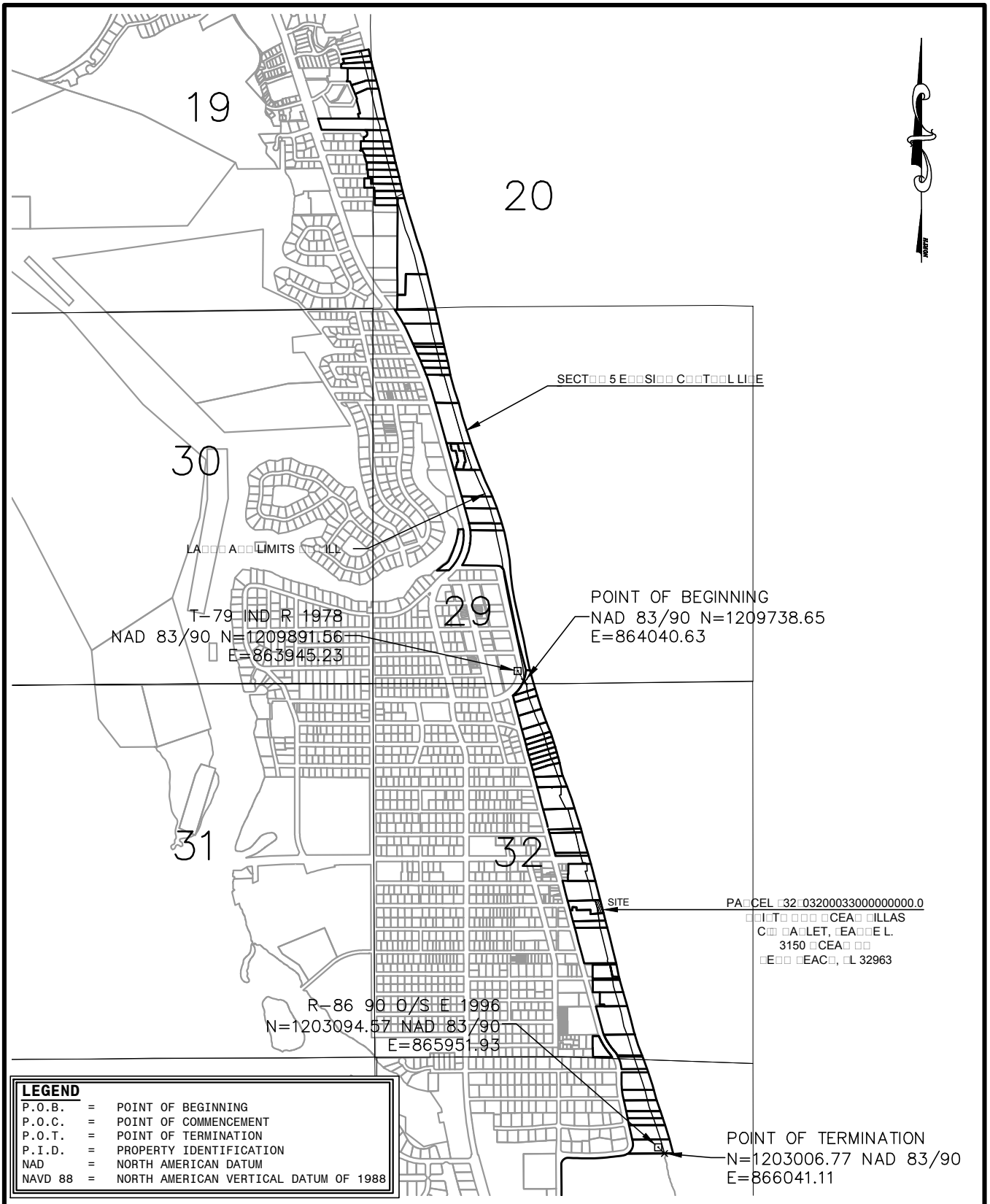
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200006019000004.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB1757-P147, lou Thu, 16 May 2019 - 11:19am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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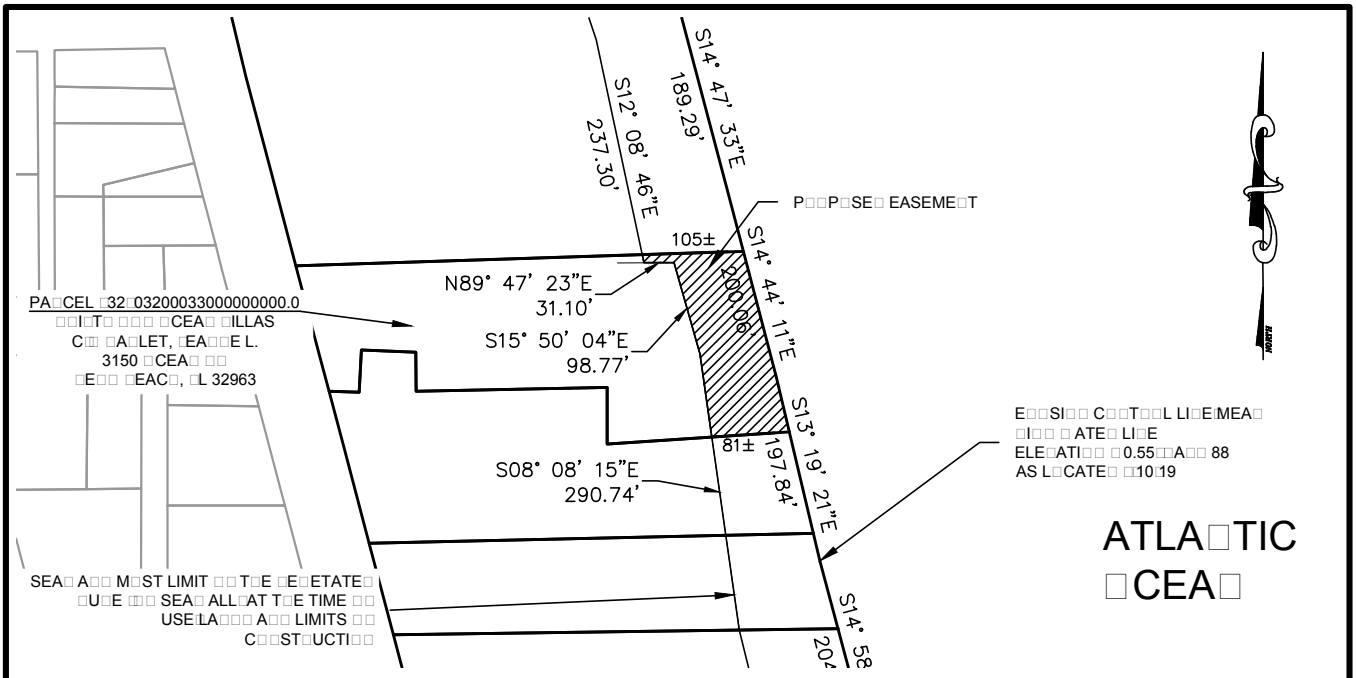
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK	PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A	N/A	N/A	1 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, DRIFTWOOD-CVR, Chris Wed, 22 May 2019 - 4:04pm

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □□ □□I□T□ □□□□ □CEA□ □ILLAS C□□□□, I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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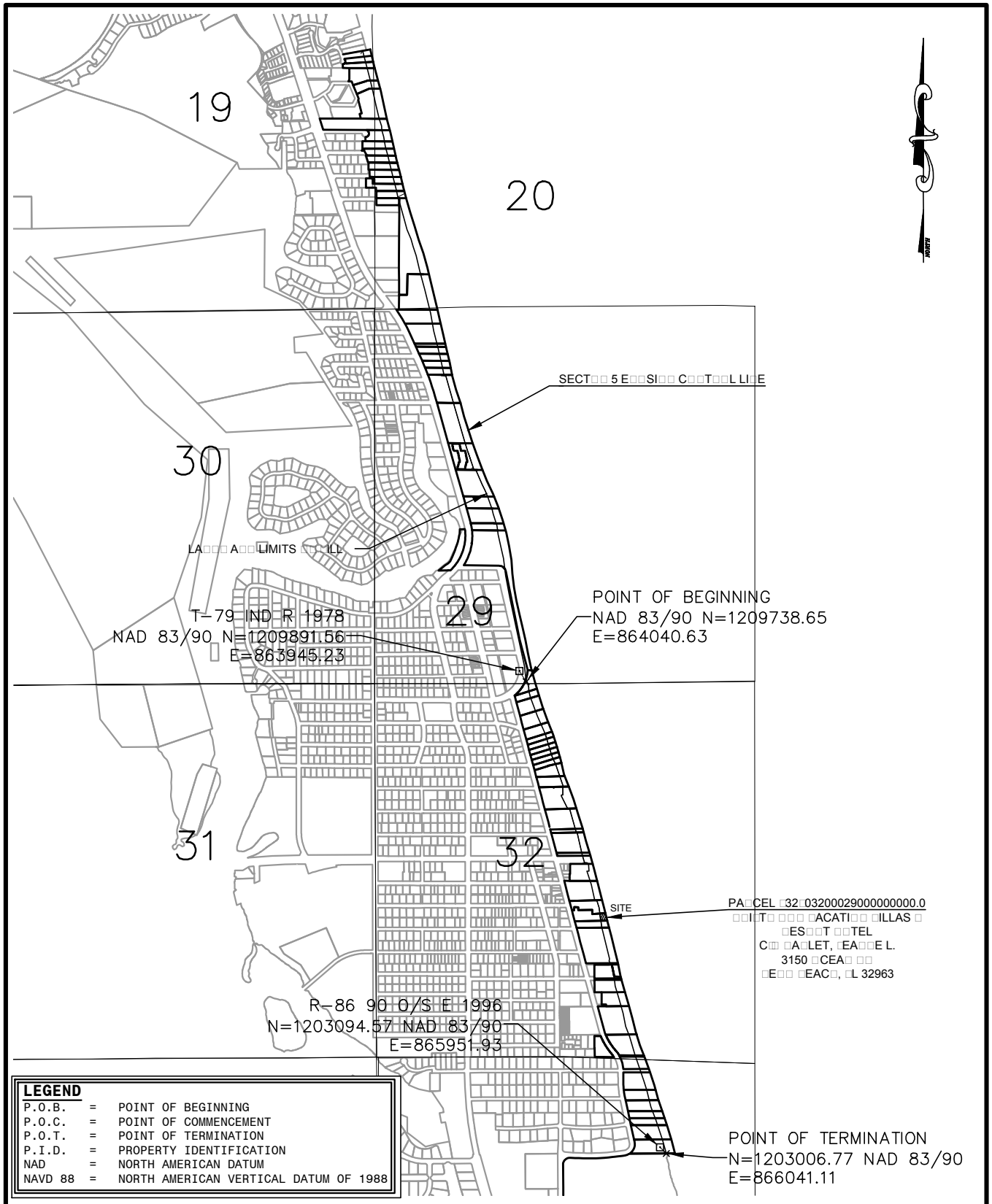
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200033000000000.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, DRIFTWOOD, Chris Wed, 22 May 2019 - 4:05pm

SCHEDULE A



LEGEND

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PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
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LFP	JRM	N/A	N/A	N/A	1 OF 2

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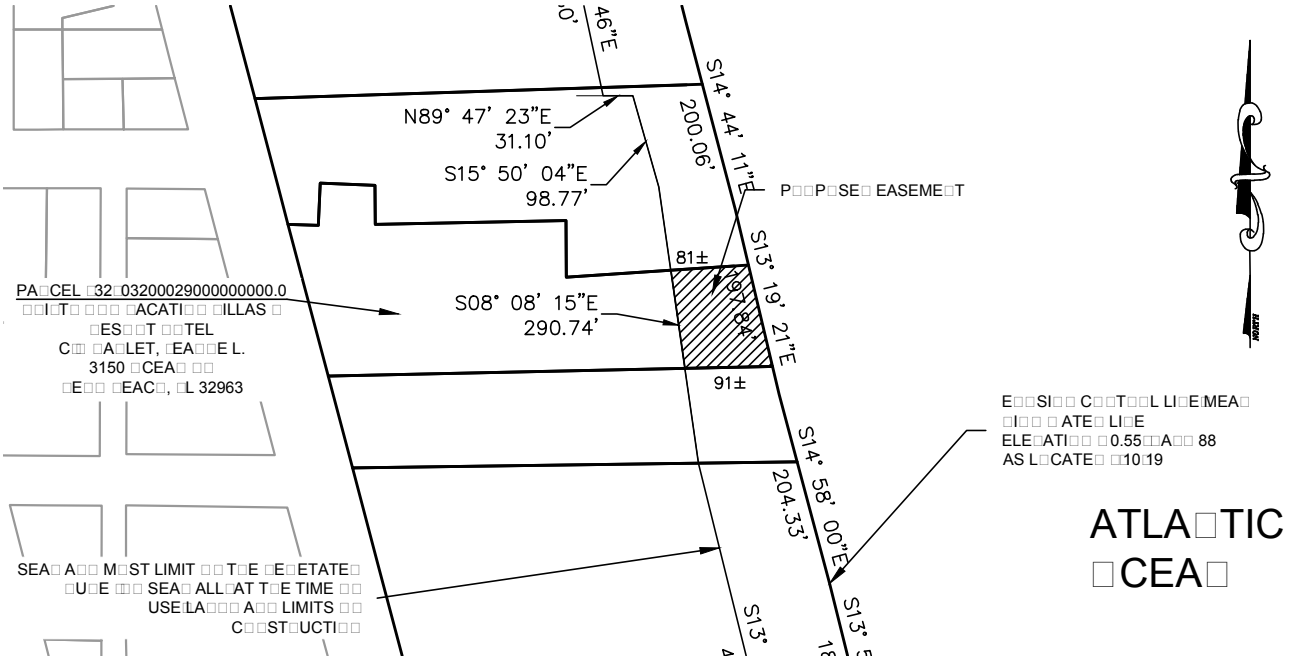
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □□ □□I□T□ □□□□ □ACATI□□ □ILLAS □ □ES□□T □□TEL C□□□□, I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT □□T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

Morgan & Eklund Inc.
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LB #4298

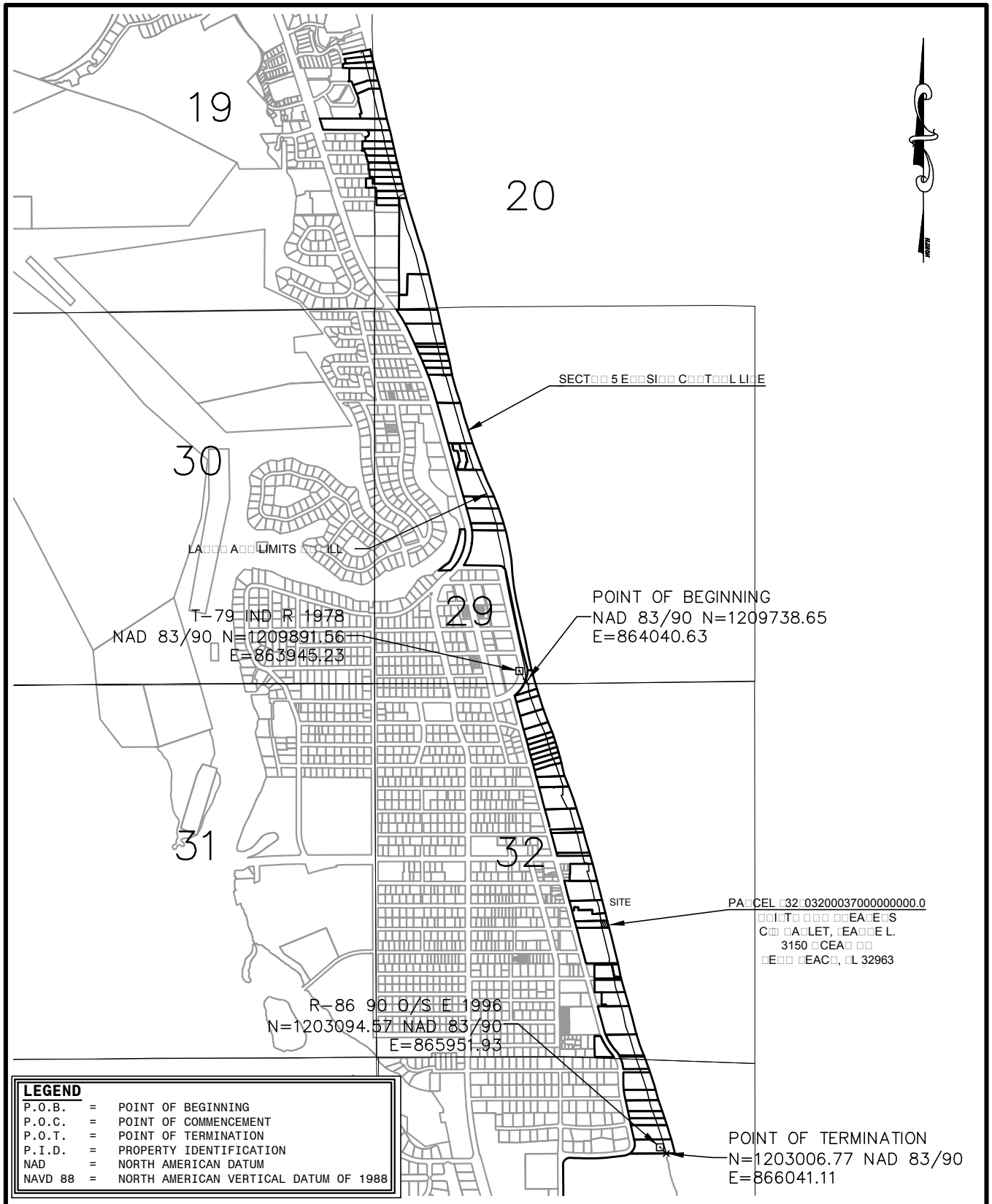
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200029000000000.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, DRIFTWOOD2, Chris Wed, 22 May 2019 - 4:08pm

SCHEDULE A



LEGEND		
P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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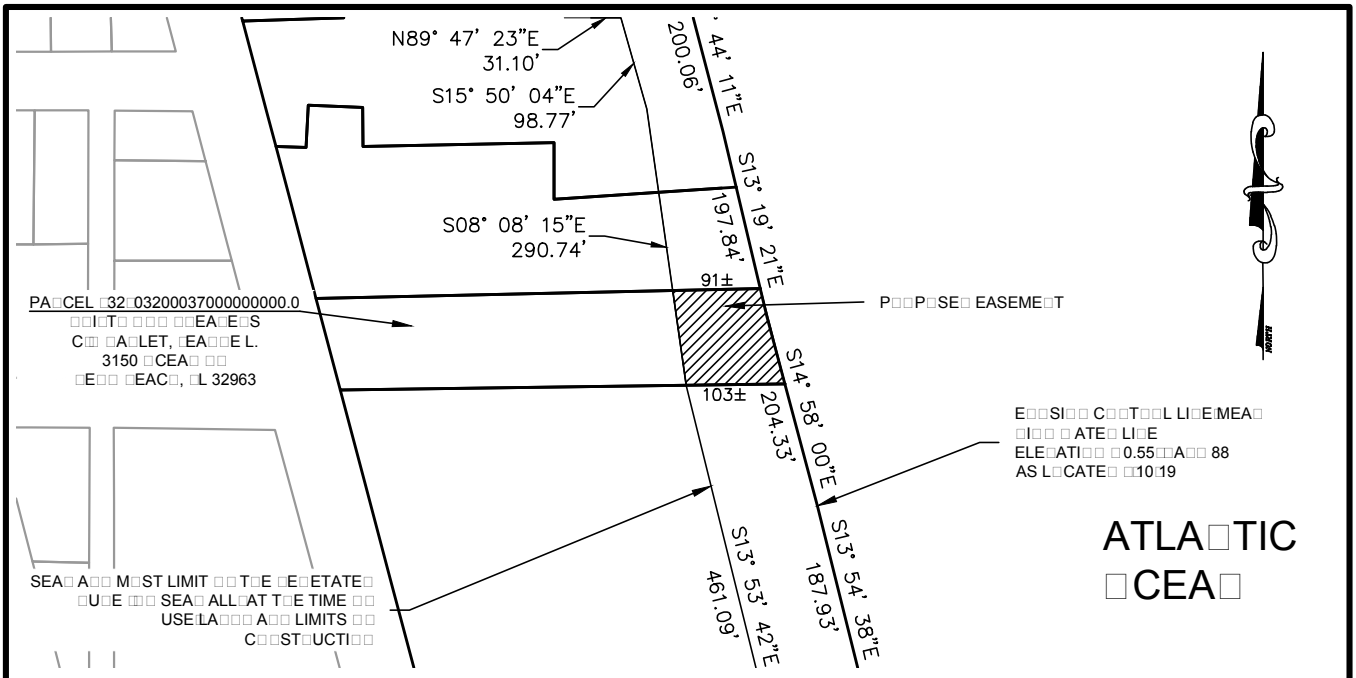
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200037000000000.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK	PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A	N/A	N/A	1 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, DRIFTWOOD-CVR3, Chris Wed, 22 May 2019 - 4:10pm

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

THAT PORTION OF LANDS DESCRIBED IN OFFICIAL RECORDS BOOK, PAGE, OF THE PUBLIC RECORDS OF INDIAN RIVER COUNTY, FLORIDA, LYING EASTERLY OF THE SEAWARD MOST LIMIT OF THE ESTATE DUE SEAWARD ALL AT THE TIME OF USE AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE EXPERIMENTAL PROTECTION ZONE MONUMENT T-79 IN 1978 AT THE COORDINATES OF NORTHING 1,209,891.56 FEET AND EASTING 863,905.23 FEET AT A 83/90 AS BEING ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF BEGINNING AT THE SEAWARD MOST LIMIT OF THE ESTATE DUE SAID POINT HAVING COORDINATES OF NORTHING 1,209,738.65 FEET AND EASTING 86,0.63 FEET AT 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTING 866,01.11 FEET AT A 83/90, SAID POINT BEING 125.15 FEET DISTANT FROM MONUMENT R-86 90 DS E 1996 AT COORDINATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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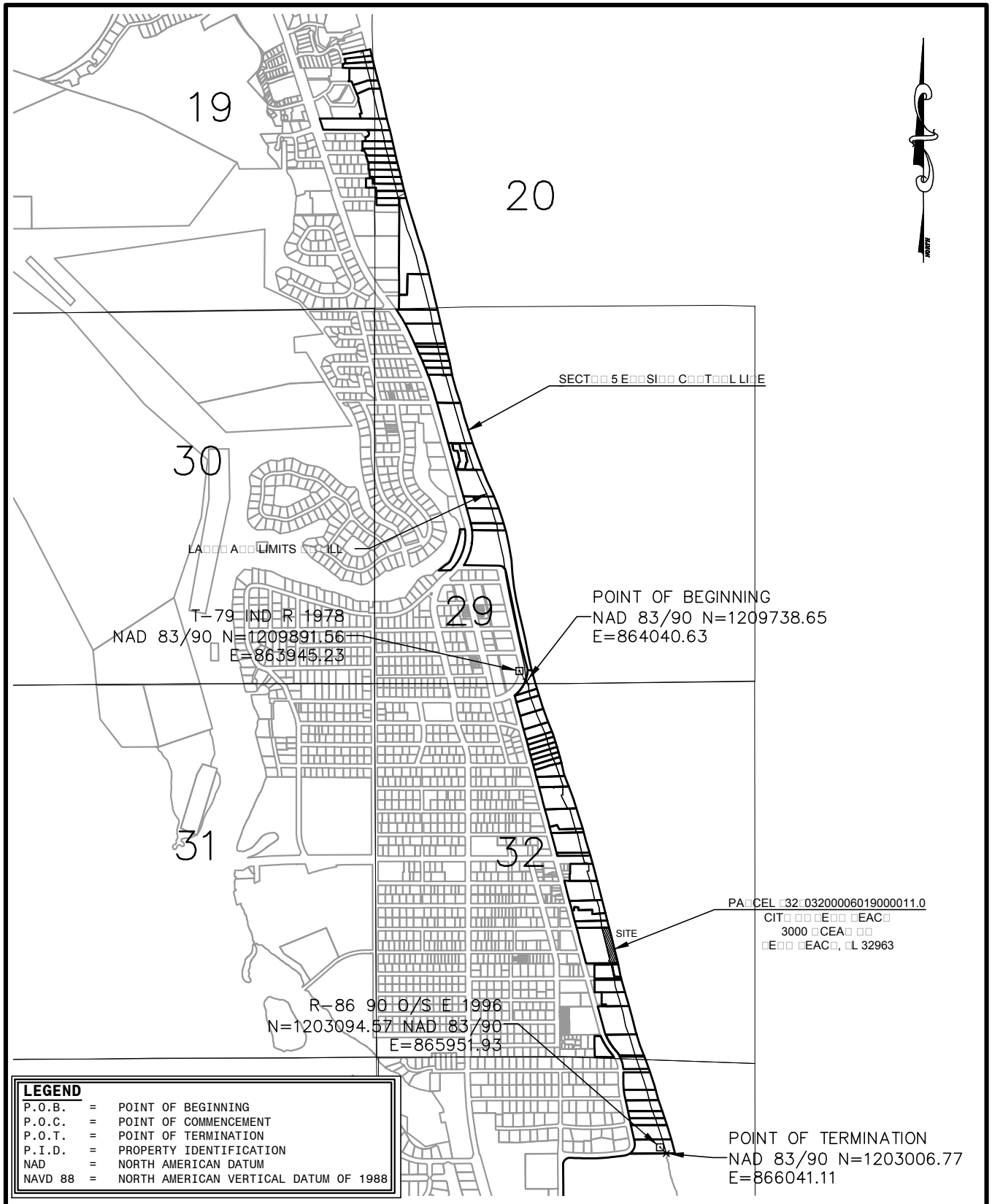
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200037000000000.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, DRIFTWOOD3, Chris Wed, 22 May 2019 - 4:11pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
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P.I.D. NO. 32403200006019000011.0

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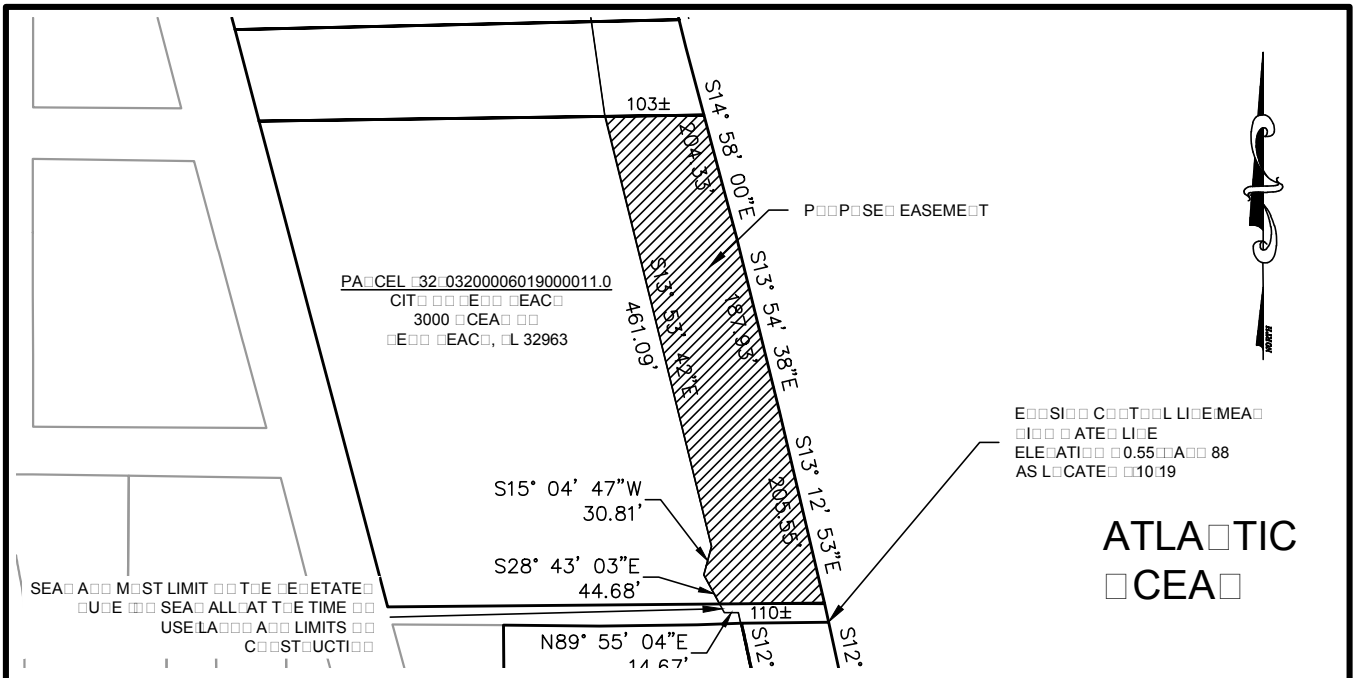
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK	PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A	N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, HUMISTON-CVR, lou Thu, 16 May 2019 - 11:20am

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □□ T□E CIT□ □□ □E□□ □EAC□, □UMIST□□ PA□□, I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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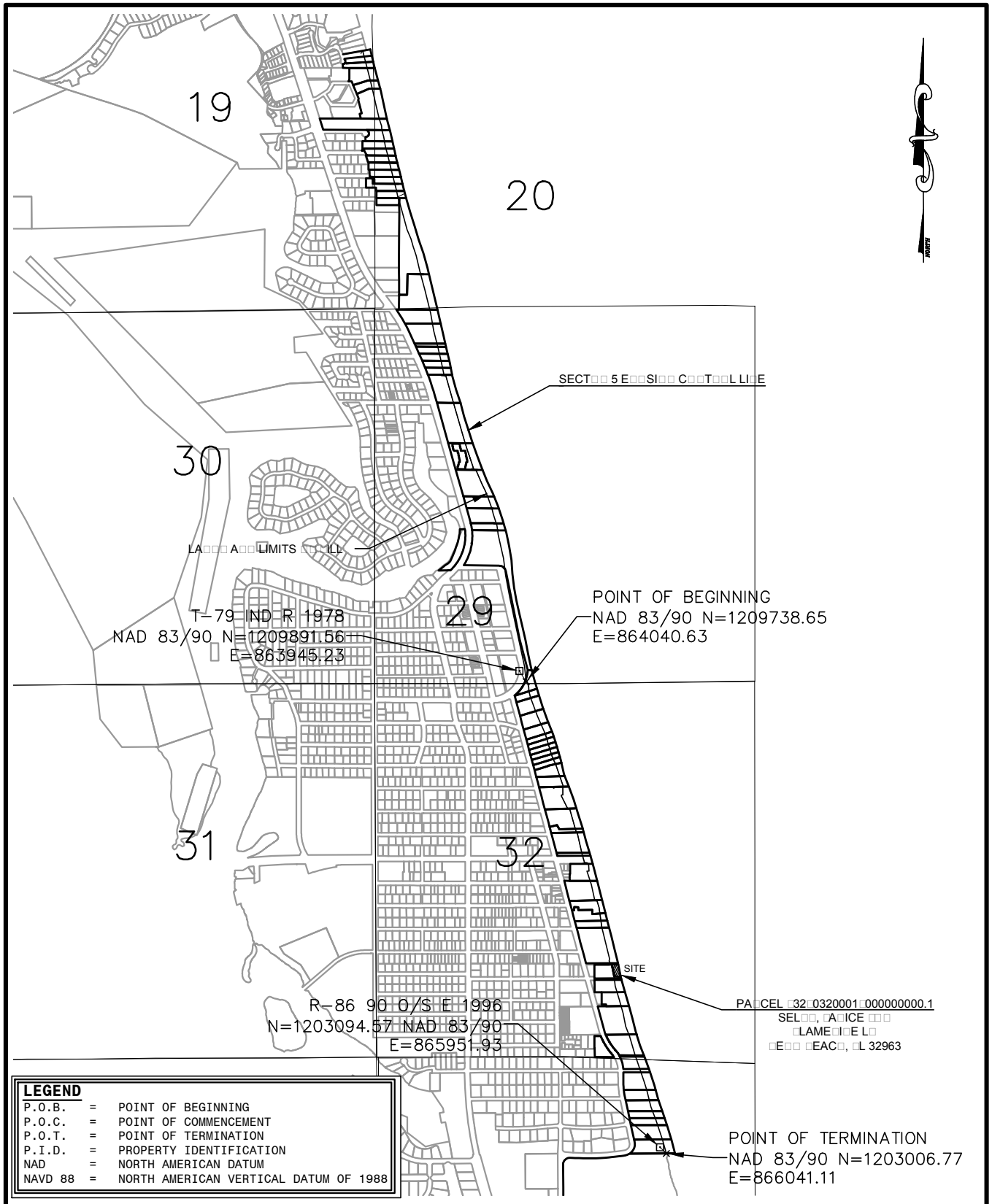
H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, HUMISTON, lou Thu, 16 May 2019 - 11:20am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

Morgan & Eklund Inc.

PROFESSIONAL SURVEY CONSULTANTS

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PHONE: (954) 421-6882
FAX: (954) 421-0425

LB #4298

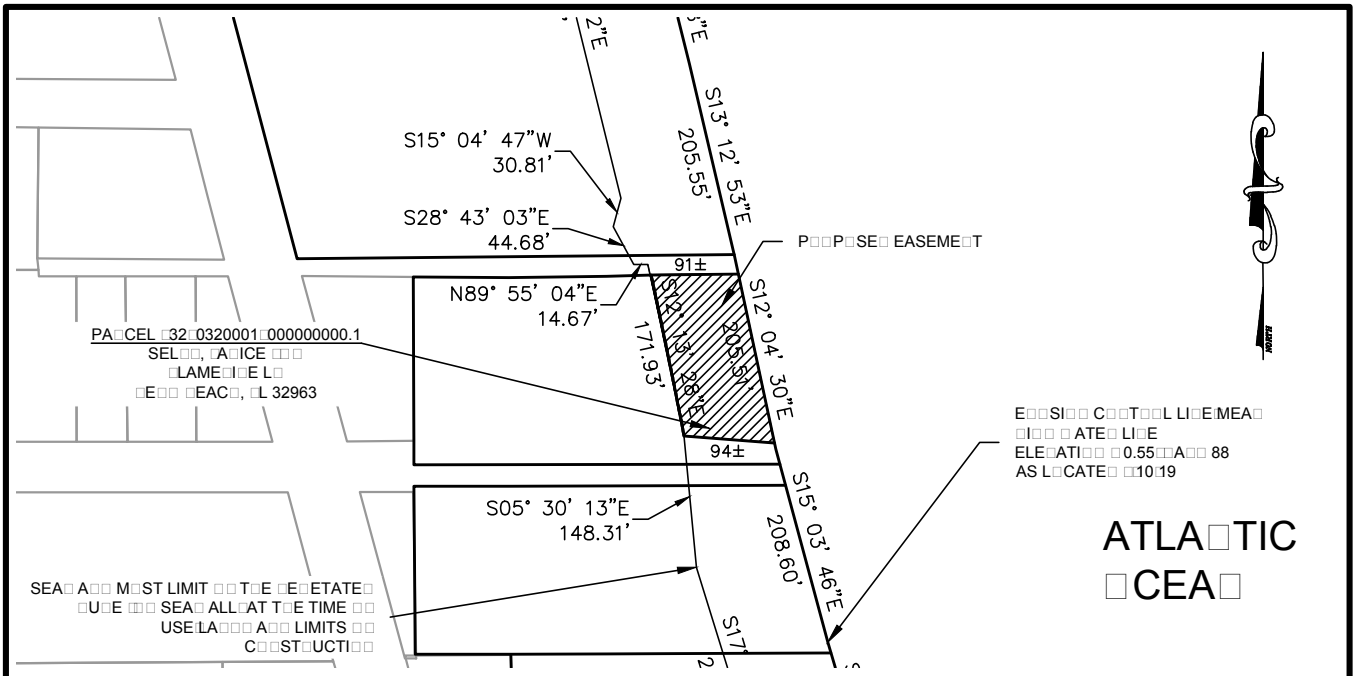
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200014000000000.1

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK	PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A	N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB1055P2208-CVR, lou Thu, 16 May 2019 - 11:20am

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 1055, PA□E 2208 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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LB #4298

SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200014000000000.1

COMMISSION NO.	SCALE	DATE
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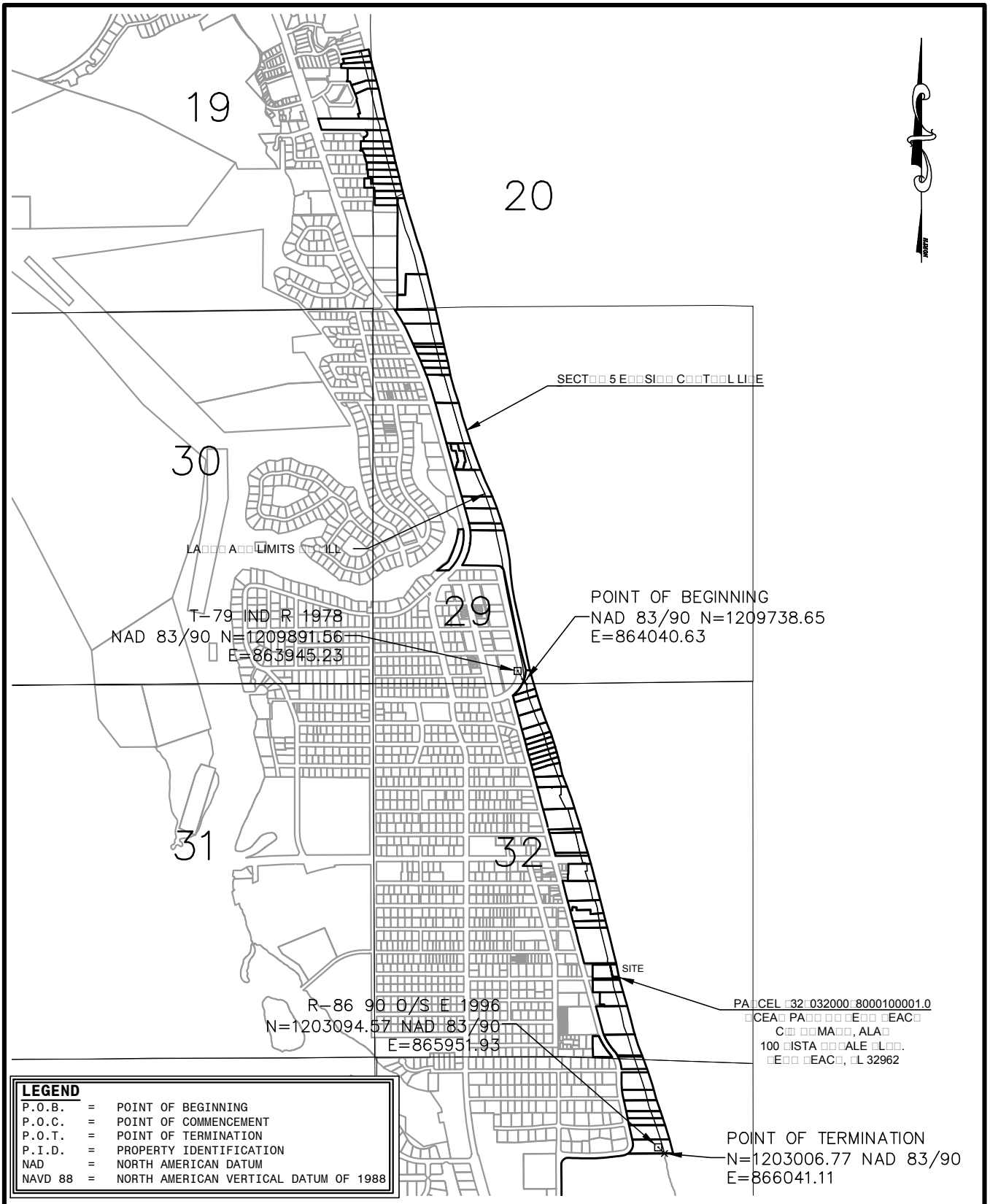
LFP	JRM	N/A / N/A	N/A	2 OF 2

SCHEDULE A



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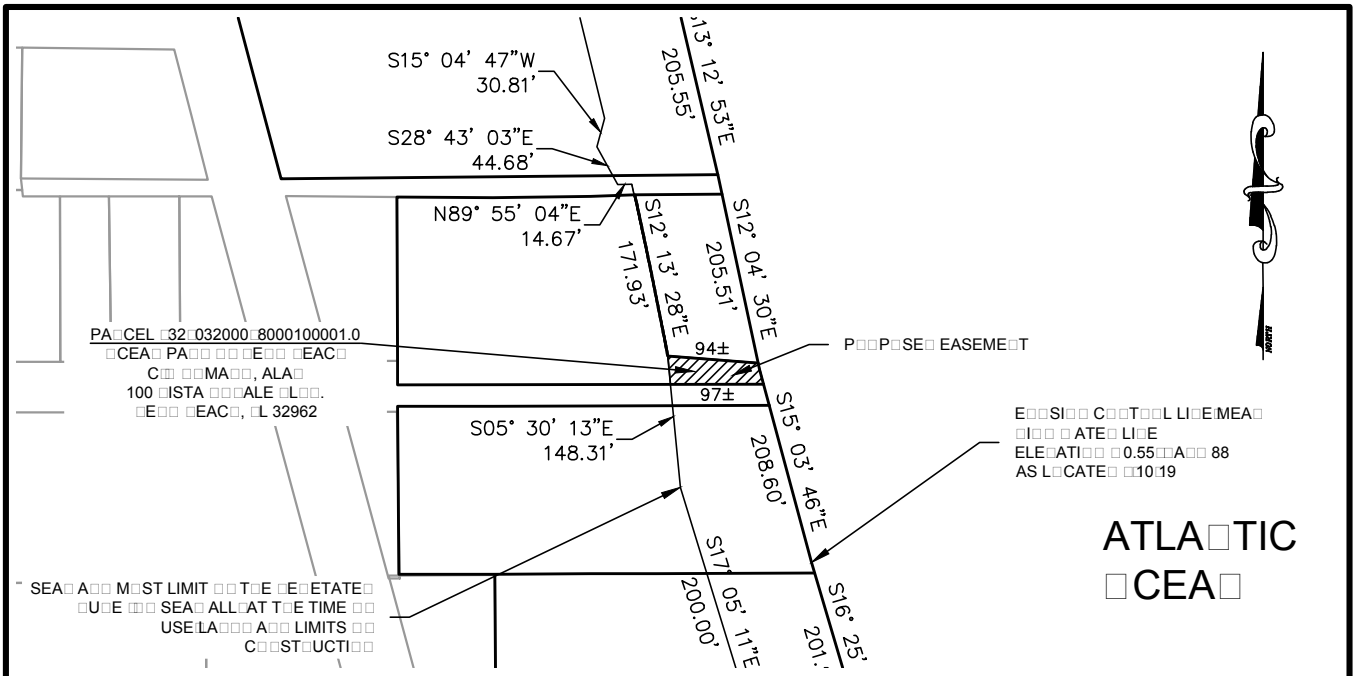
SCHEDULE A



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C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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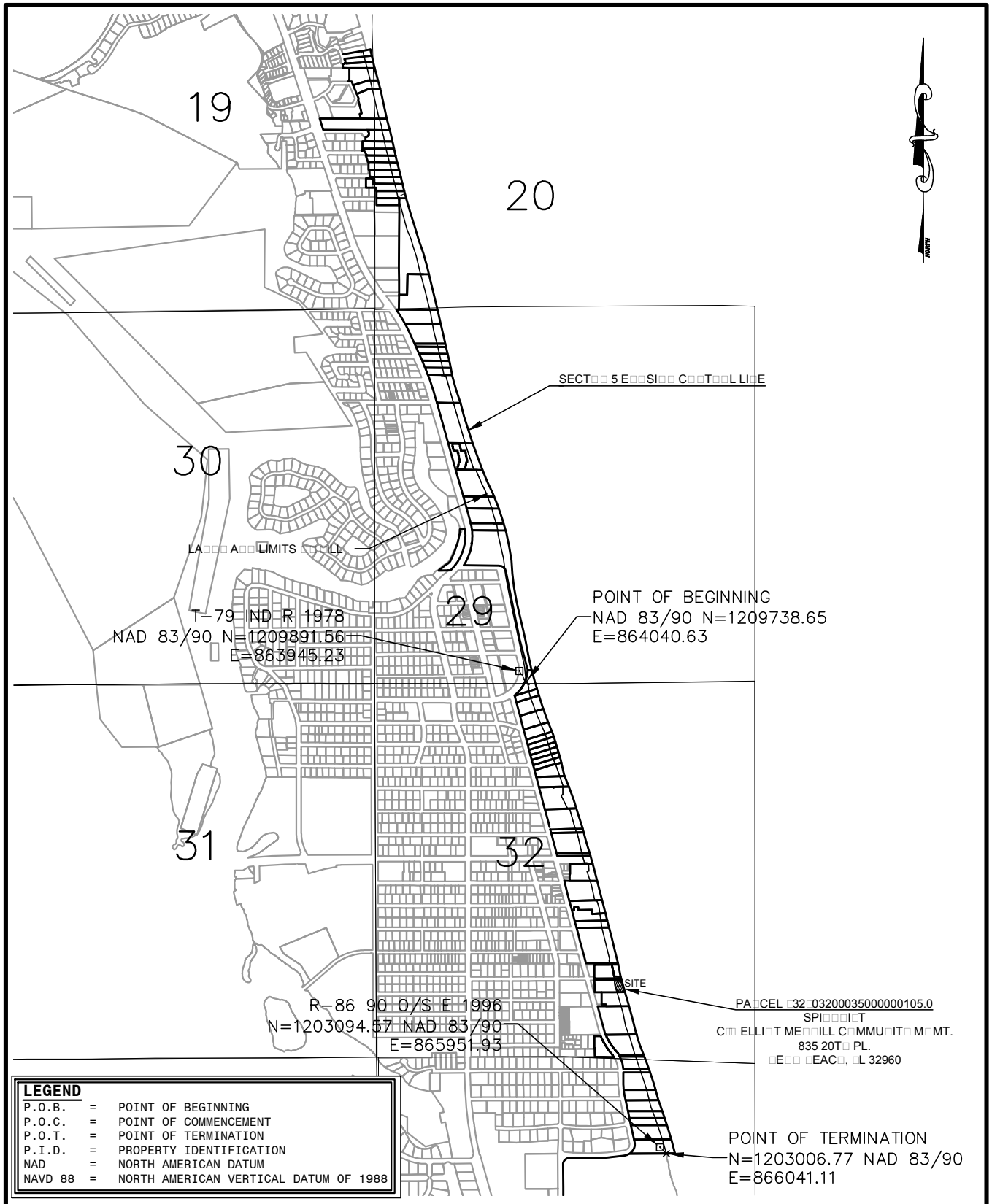
SCHEDULE A



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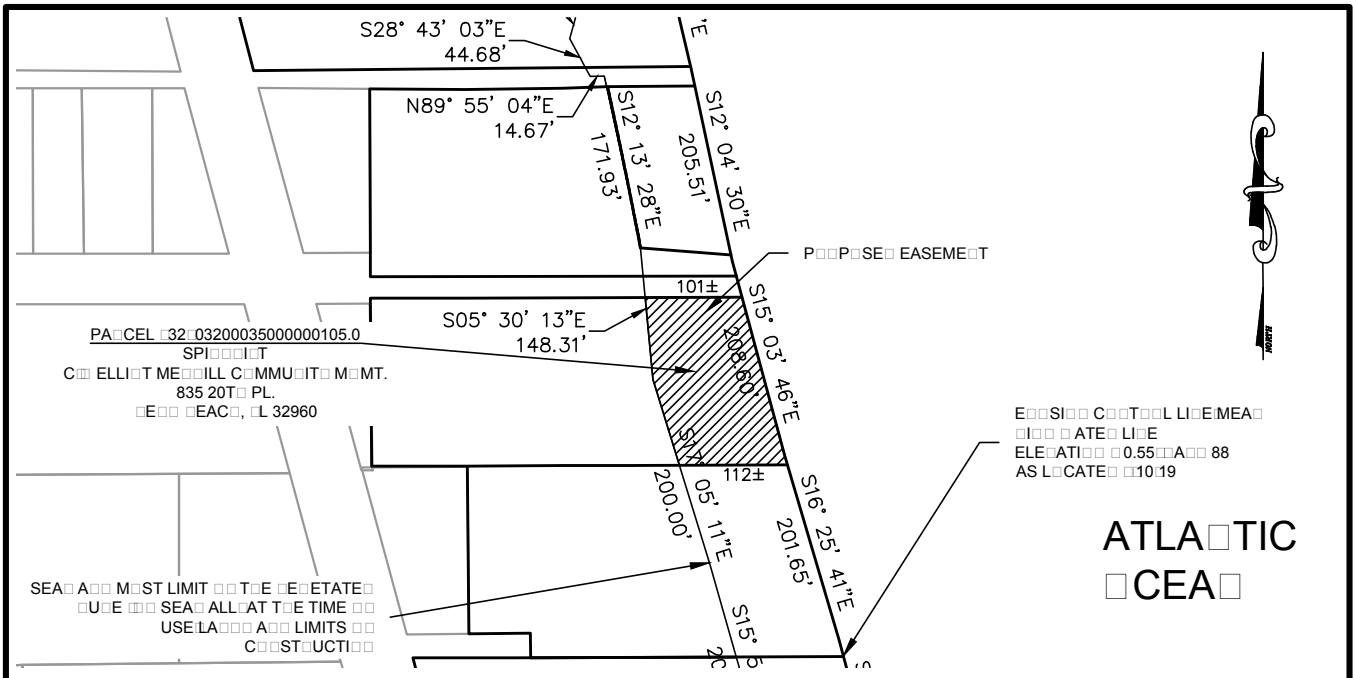
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 1593, PA□E □97 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

Morgan & Eklund Inc.
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LB #4298

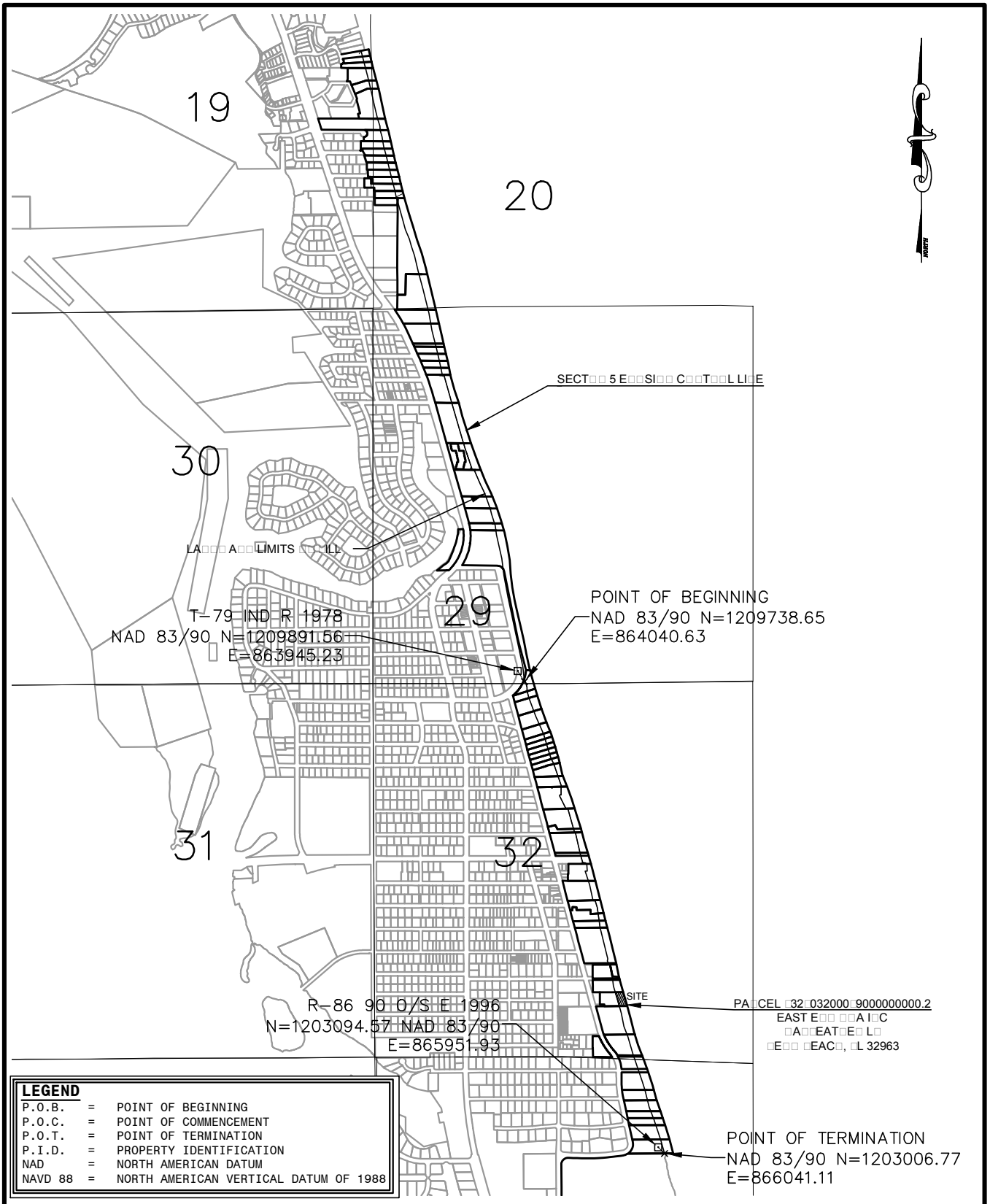
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200035000000105.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB1593P497, Chris Wed, 22 May 2019 - 4:18pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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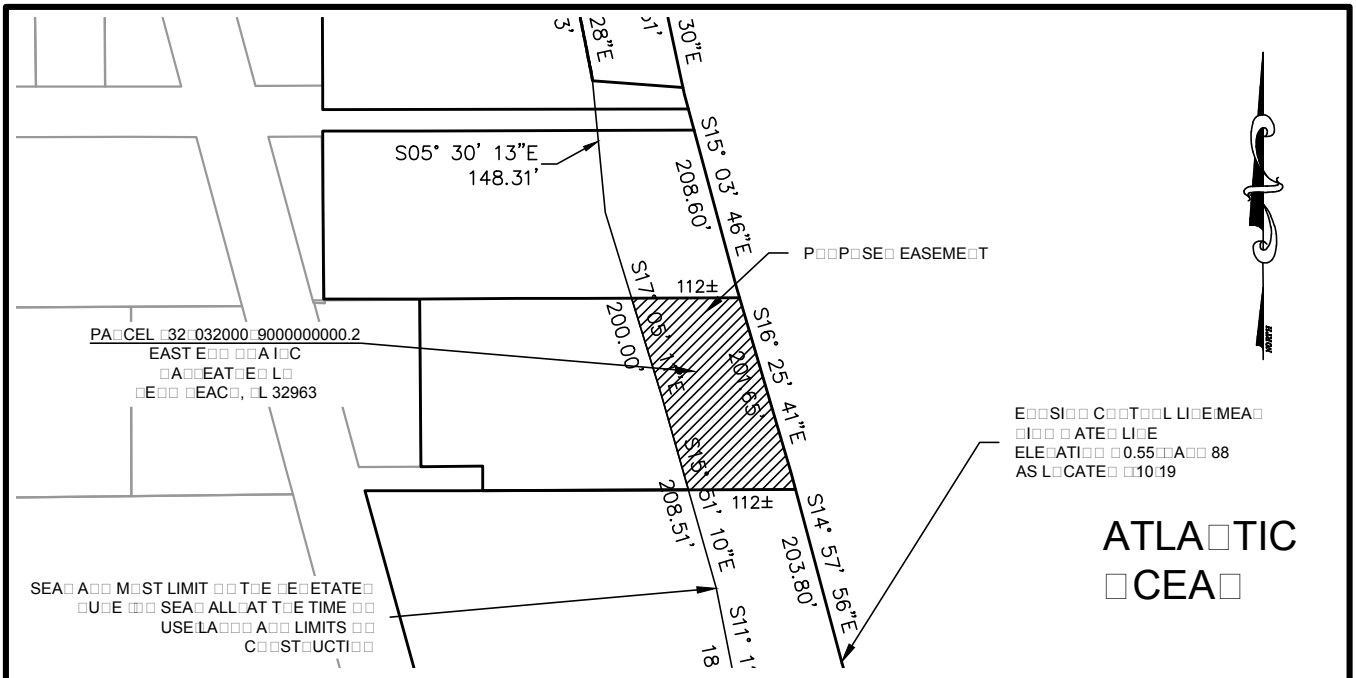
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200049000000000.2

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, PB26P80-CVR, lou Thu, 16 May 2019 - 11:20am

SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ PLAT □□□□ 26, PA□E 80 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200049000000000.2

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

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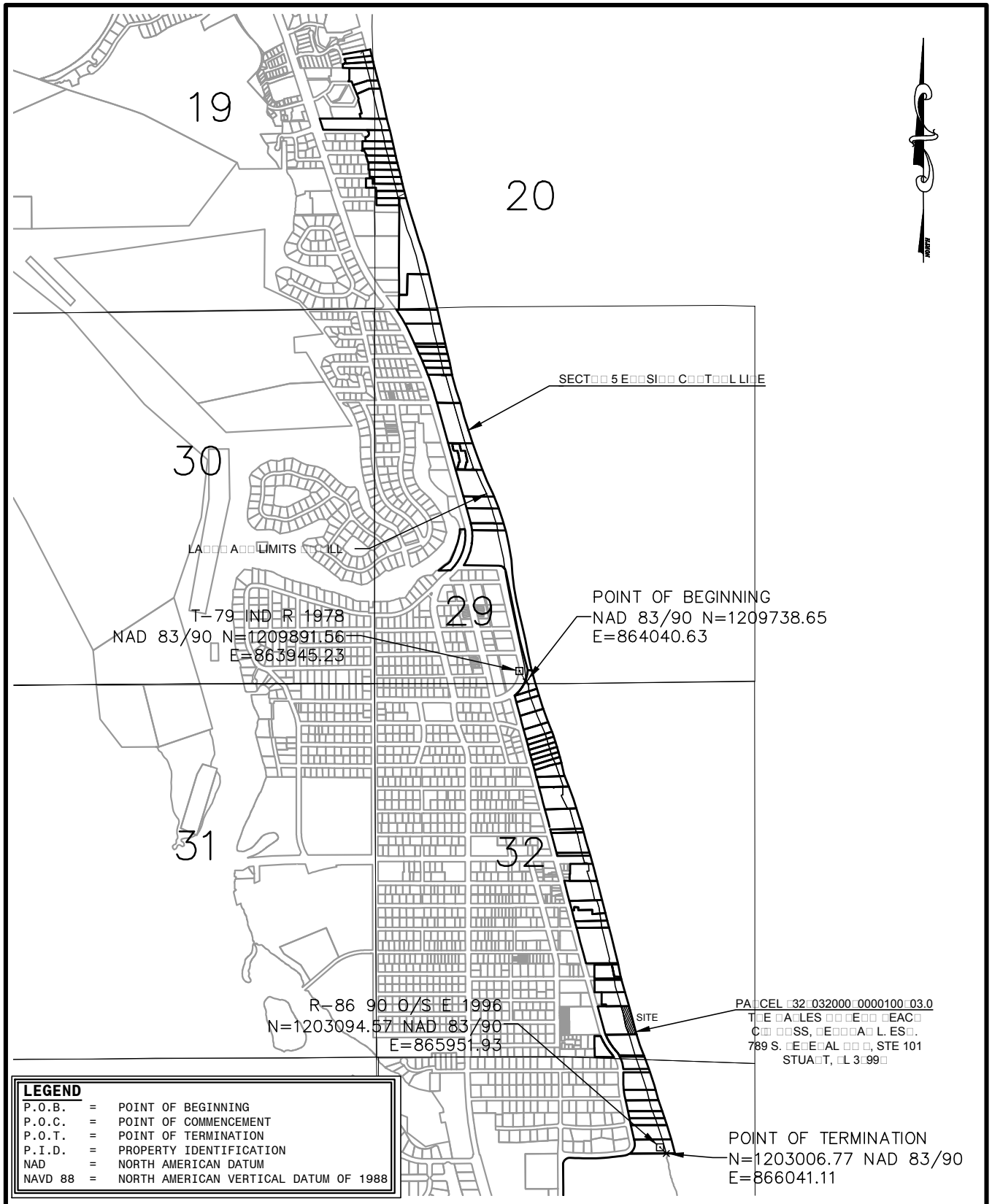
SCHEDULE A



LEGEND

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PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
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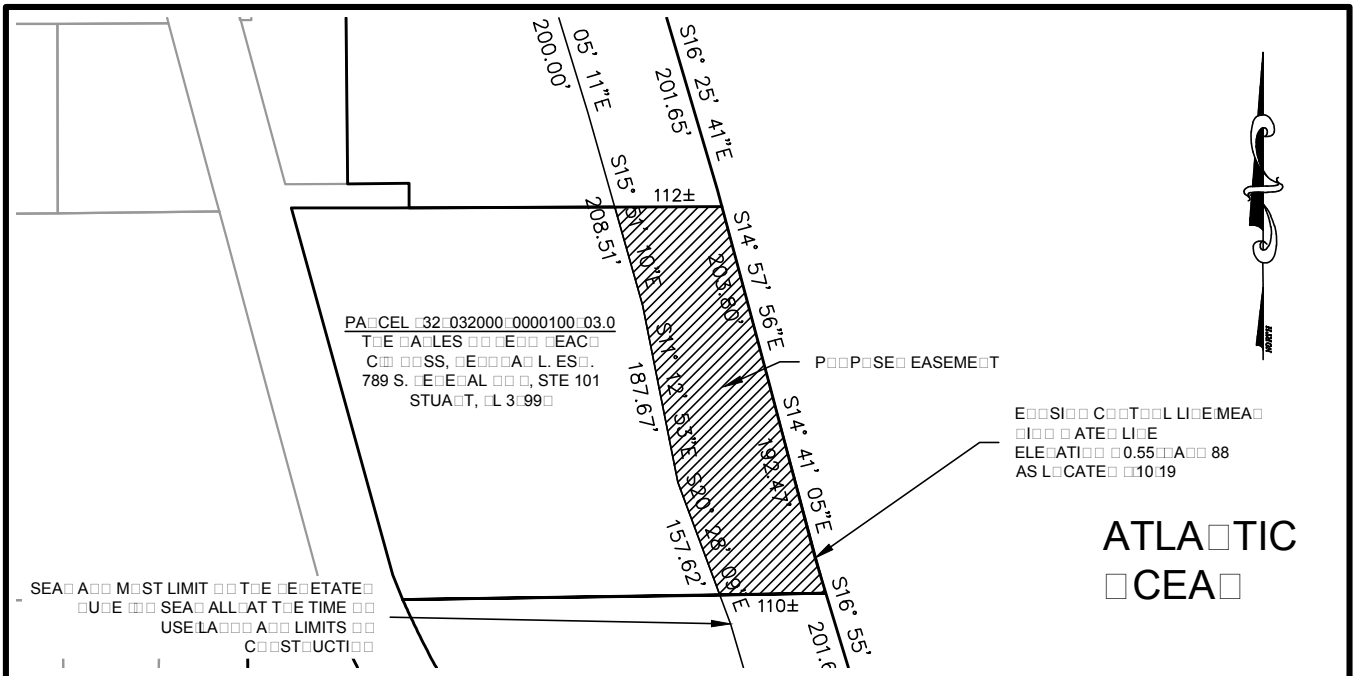
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 273□, PA□E 1178 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

Morgan & Eklund Inc.
PROFESSIONAL SURVEY CONSULTANTS
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LB #4298

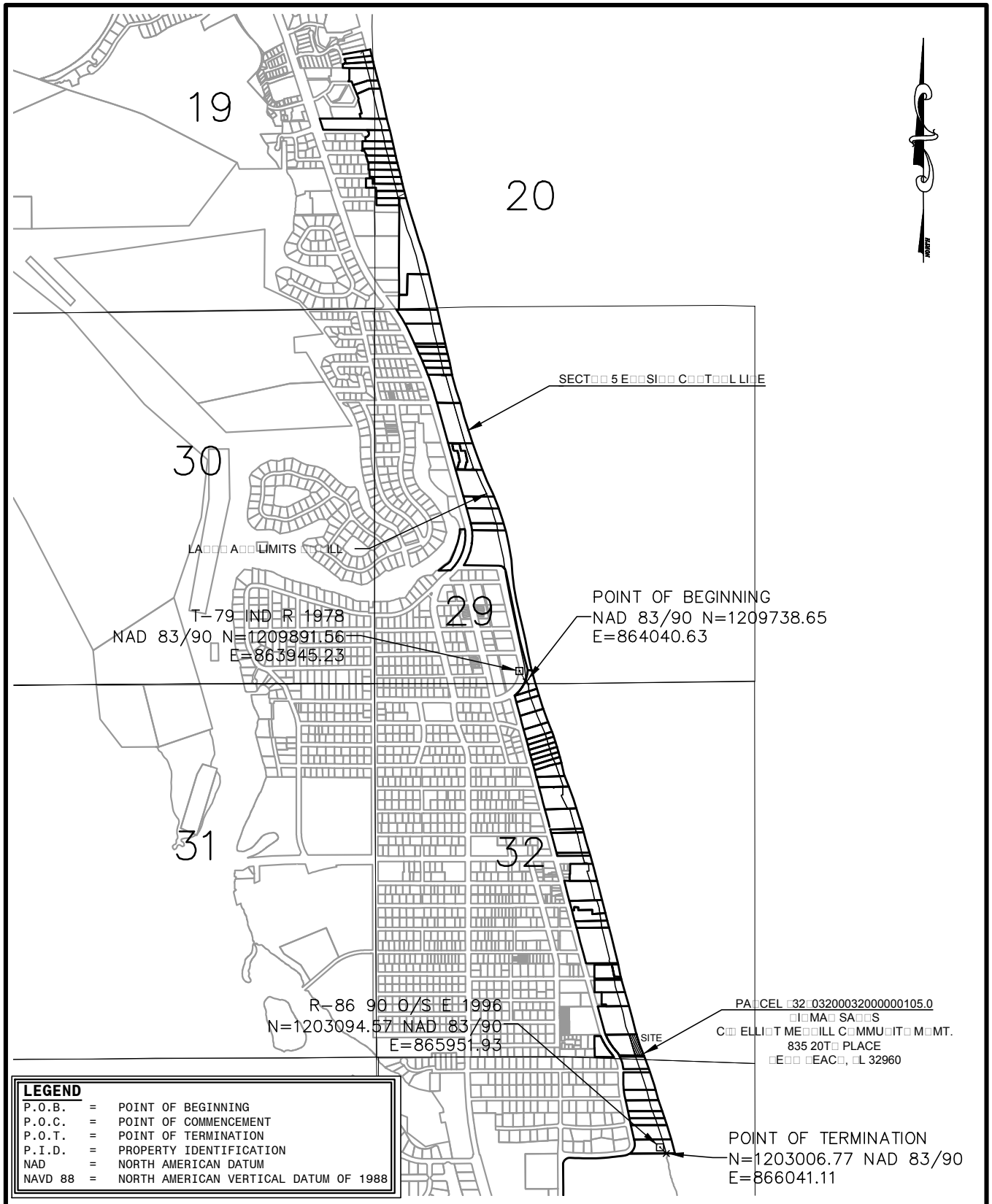
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200040000100403.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2734P1178, Chris Wed, 22 May 2019 - 4:22pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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LB #4298

SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200032000000105.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2311P192-CVR, Chris Wed, 22 May 2019 - 4:26pm

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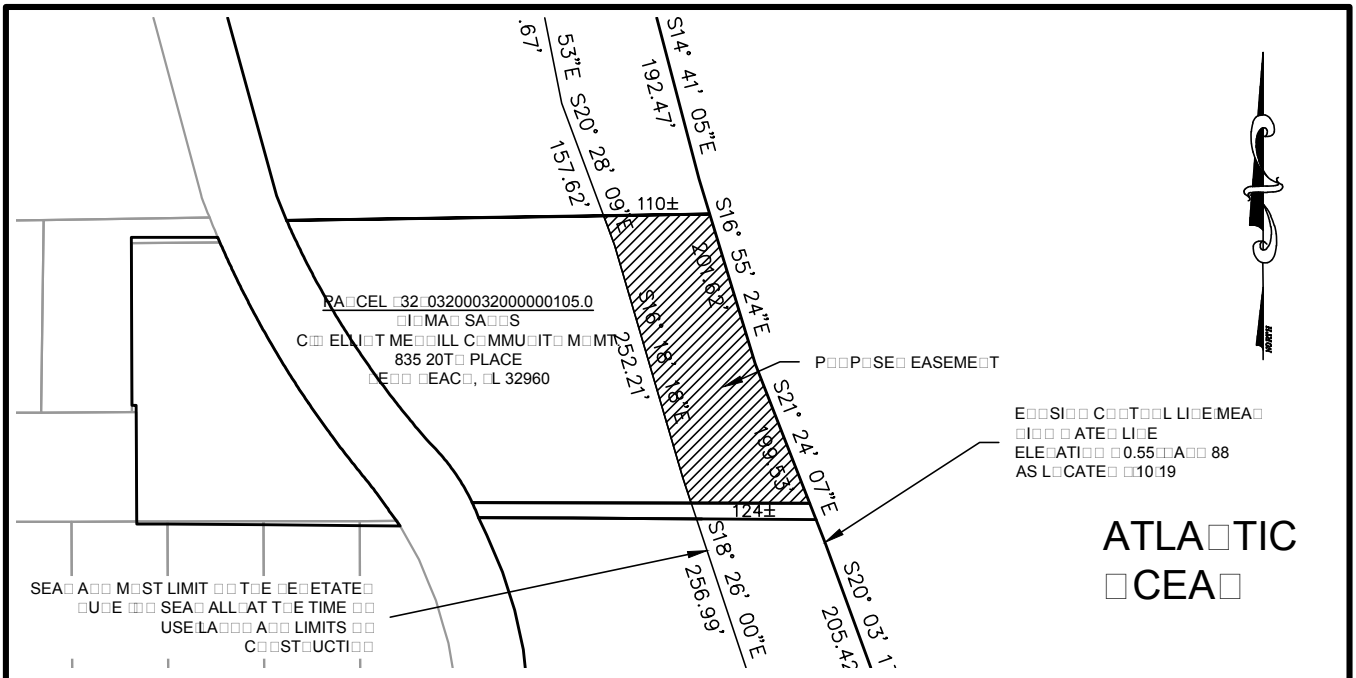

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 2311, PA□E 192 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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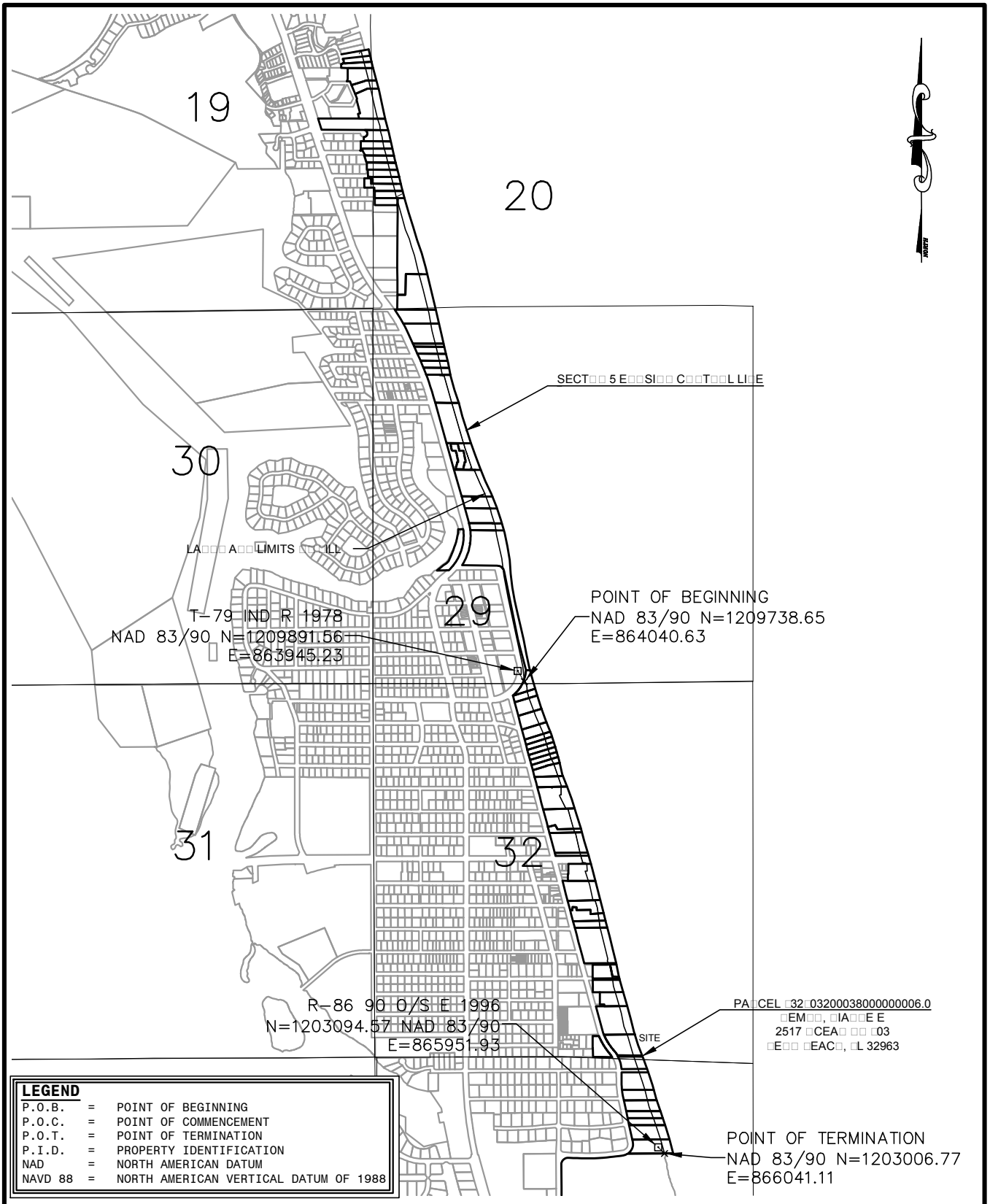
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200032000000105.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskpro\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2311P192, Chris Wed, 22 May 2019 - 4:27pm

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
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SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200038000000006.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

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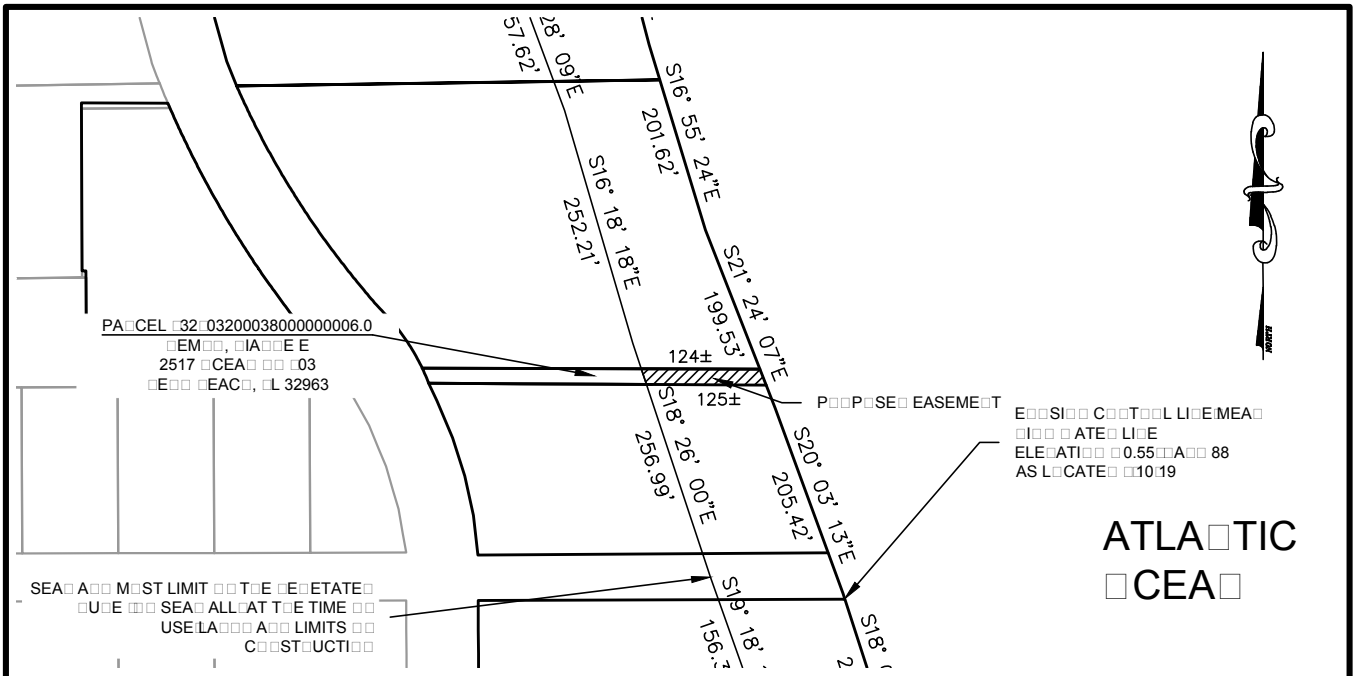
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 3121, PA□E 2□57 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

Morgan & Eklund Inc.
PROFESSIONAL SURVEY CONSULTANTS
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FAX: (954) 421-0425
LB #4298

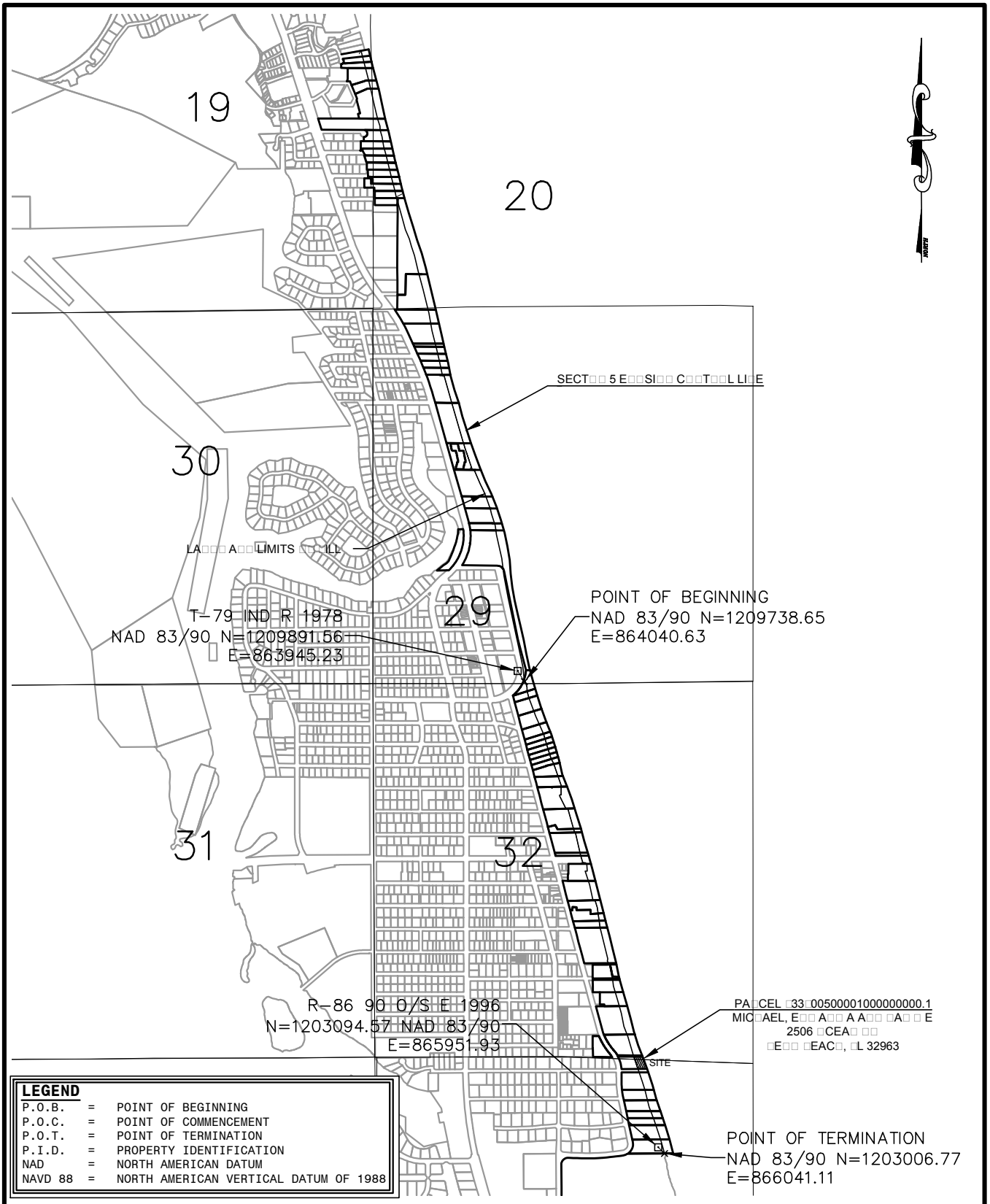
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 32403200038000000006.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB3121P2457, lou Thu, 16 May 2019 - 11:21am

SCHEDULE A



LEGEND		
P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500001000000000.1

COMMISSION NO.	SCALE	DATE
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	1 OF 2

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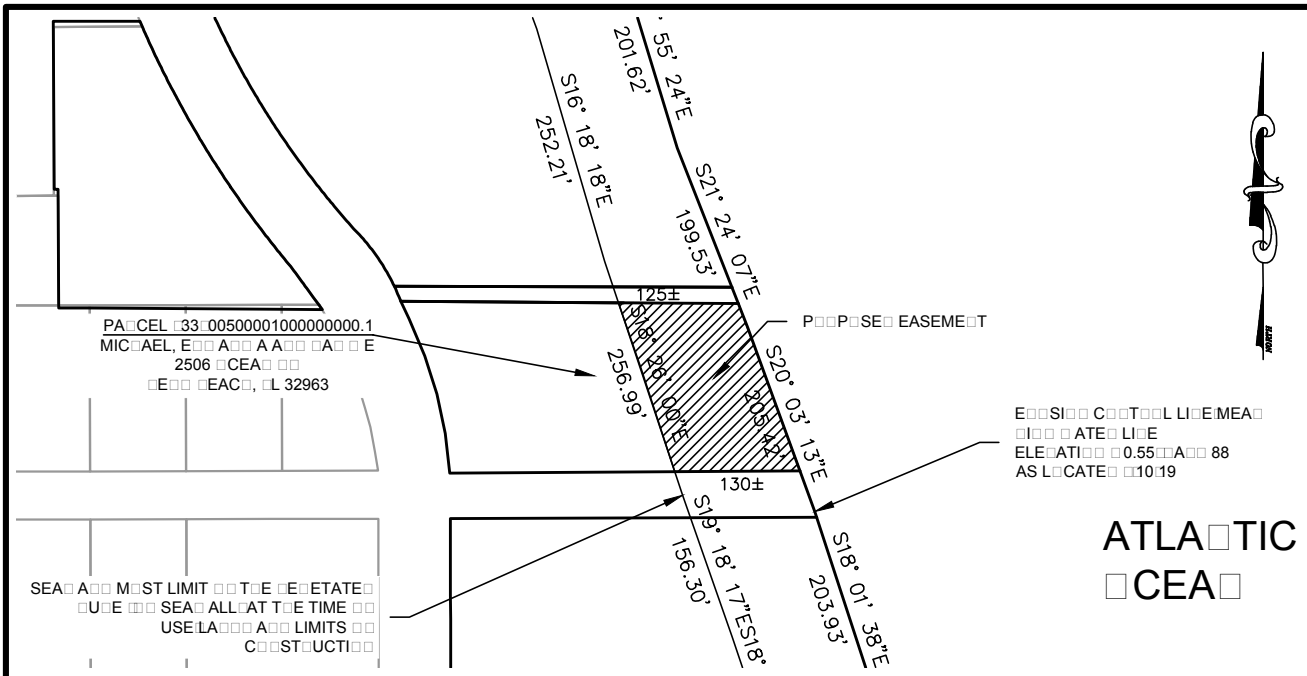
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 1330, PA□E 1009 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500001000000000.1

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

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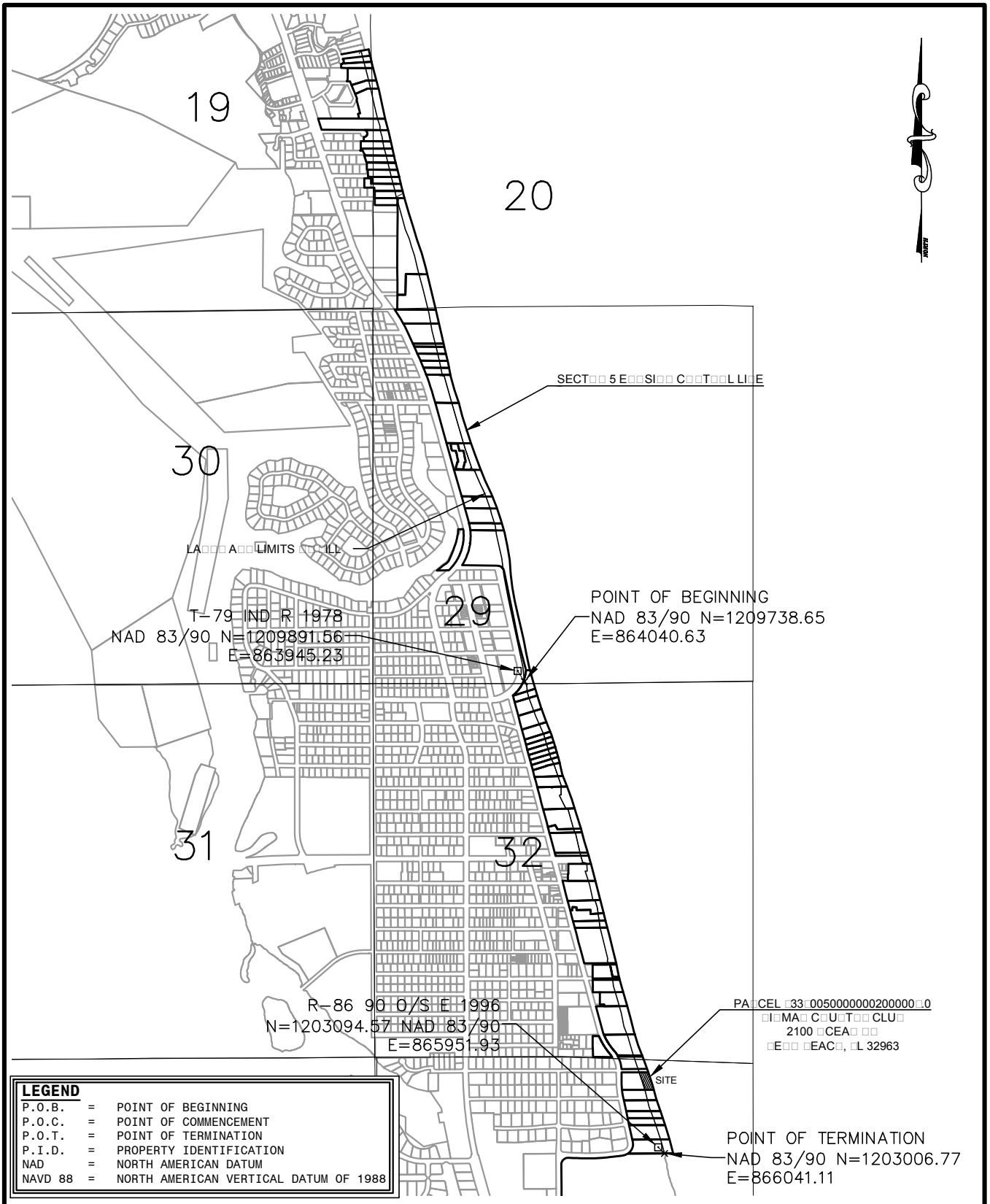
SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500000002000004.0

COMMISSION NO.	SCALE	DATE
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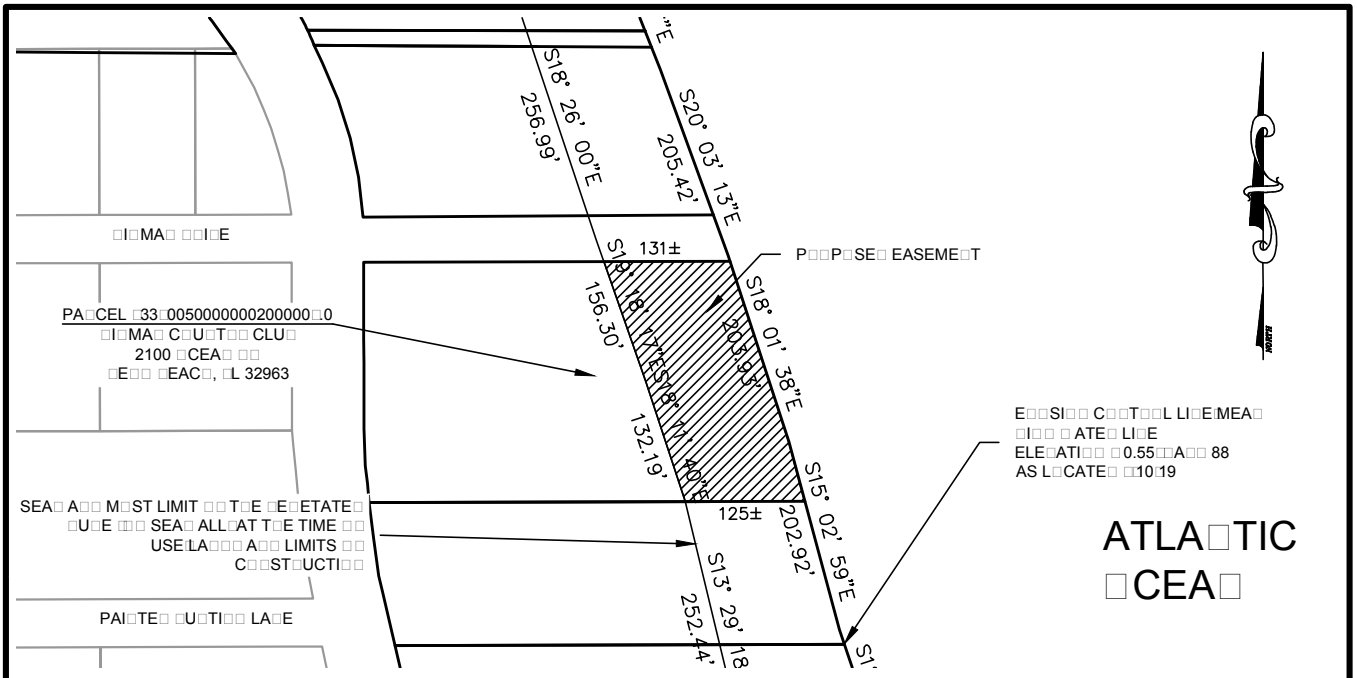

SCHEDULE A

DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ OF LA□□S □I□MA□ C□U□T□□ CLU□, I□□IA□ RIVER C□U□T□, □L□□I□A, LYING S□UT□E□L□ OF □I□MA□ □□I□E, □□□T□E□L□ □□ PAI□TE□ □U□TI□□ LA□E, A□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT OF T□E □E□ETATE□ □U□E (OR SEA□ ALL) AT T□E TIME OF USE AND B EING M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T OF E□□I□□□ME□TAL P□□TECTI□□ (□□EP) M□□UME□T T-79 I□□ □ 1978 HAVING C□□□□I□ATES OF NOR THIN□ 1,209,891.56 □EET AND EASTI□□ 863,945.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST ZON E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E FO LLOW ING LI□E, SAI□ P□I□T HAVING C□□□□I□ATES OF NOR THING 1,209,738.65 □EET AND EASTI□□ 864,040.63 □EET NAD 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,041.11 □EET NAD 83□90, SAI□ P□I□T BEING 125.15 □EET □ISTA□T FRO M DNR M□□UME□T R-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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FAX: (954) 421-0425
LB #4298

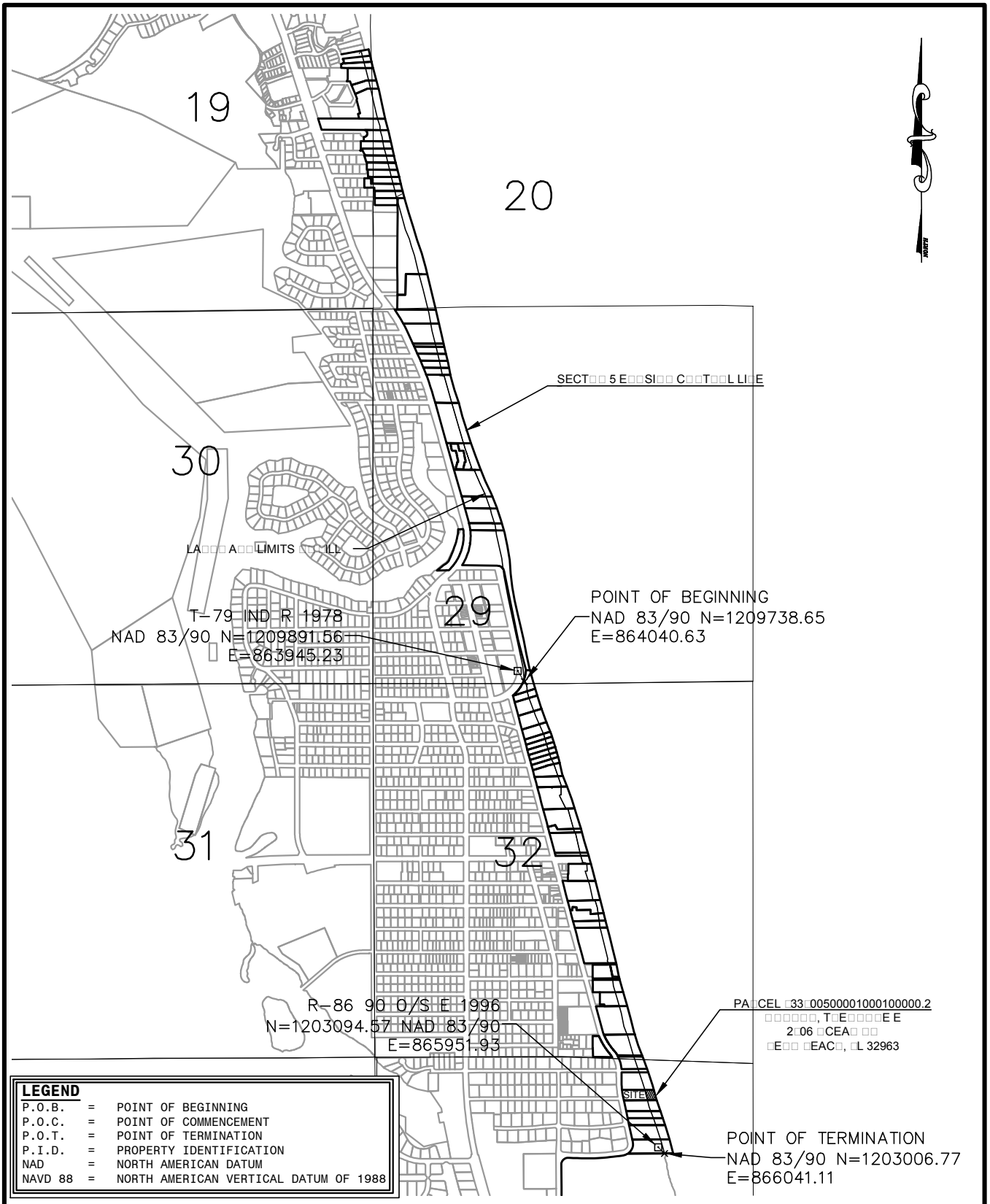
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500000002000004.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, RIOMAR CC, lou Thu, 16 May 2019 - 11:21am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500001000100000.2

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LFP	JRM	N/A / N/A	N/A	1 OF 2

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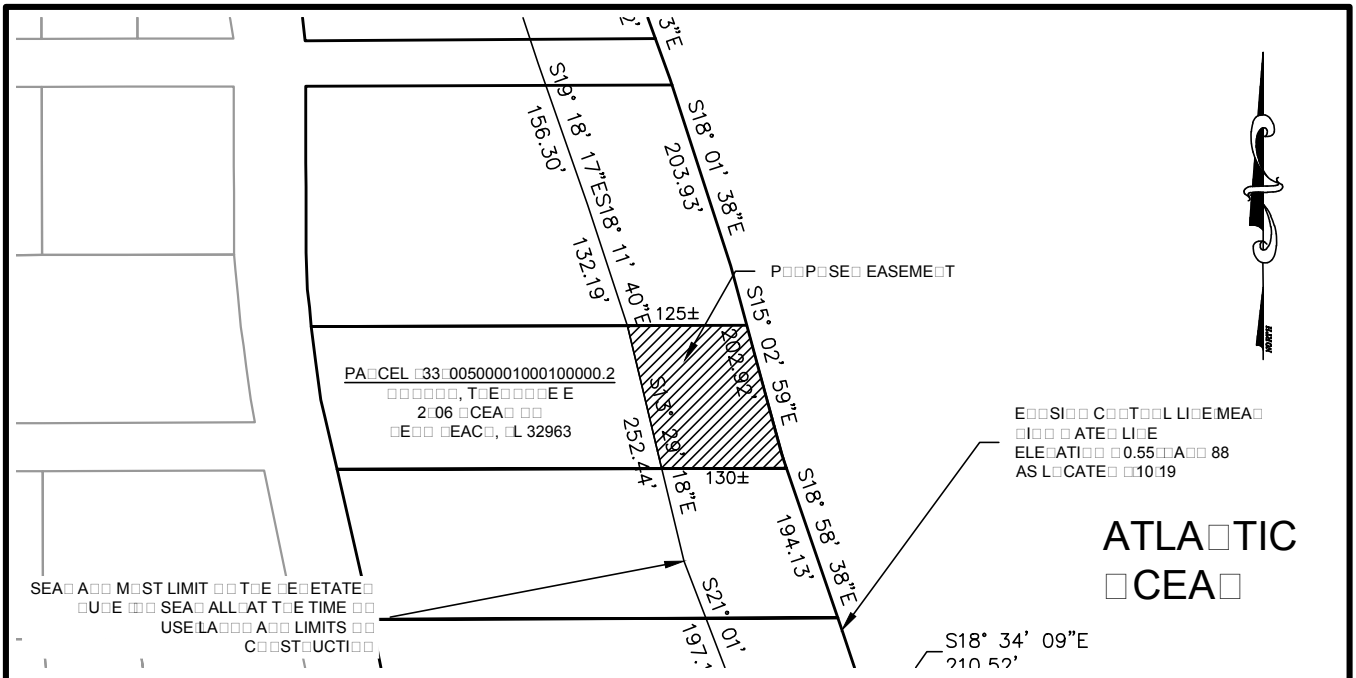
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 1975, PA□E 1159 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500001000100000.2

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

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LFP	JRM	N/A / N/A	N/A	2 OF 2

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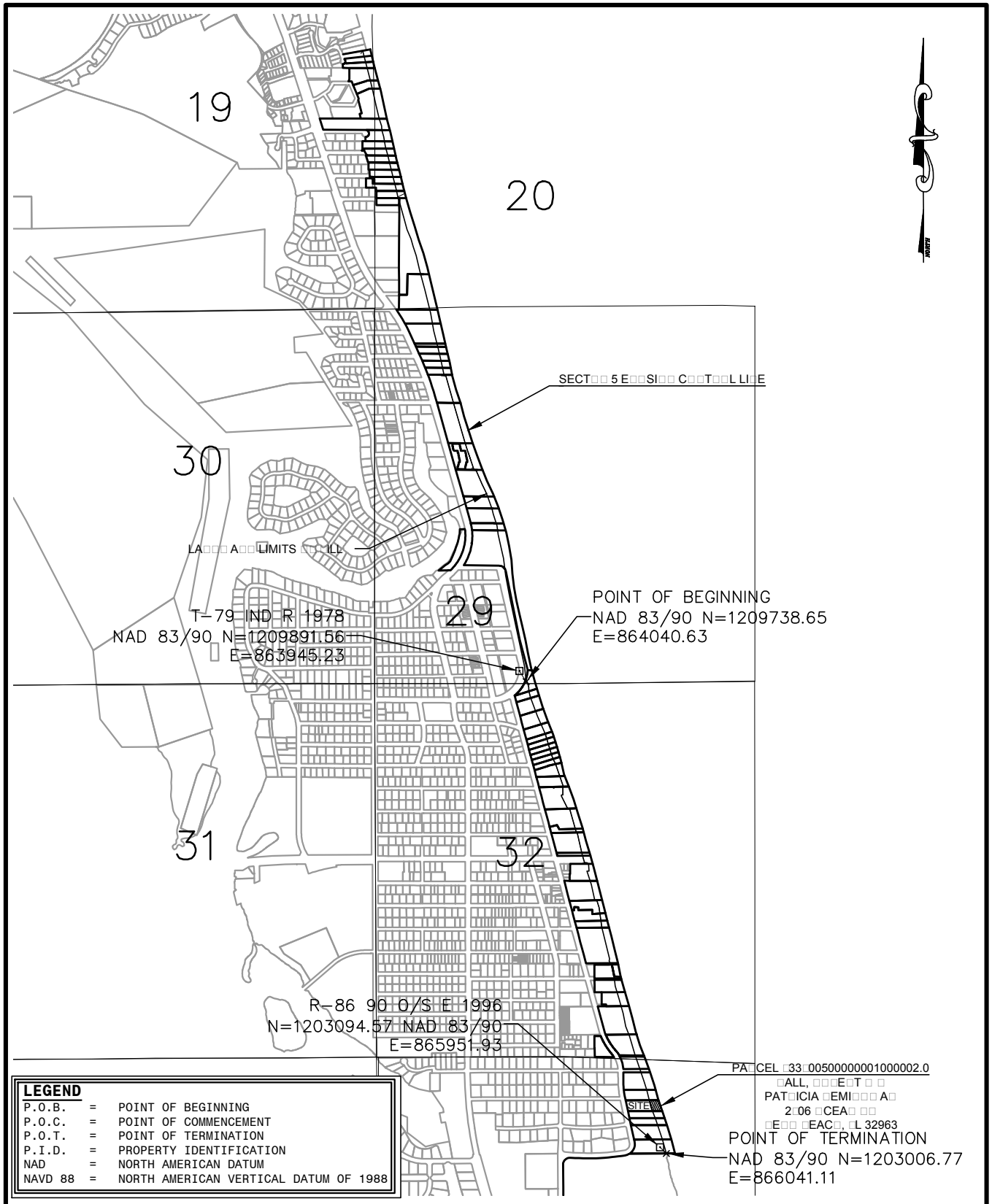
SCHEDULE A



LEGEND

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INDIAN RIVER COUNTY, FLORIDA
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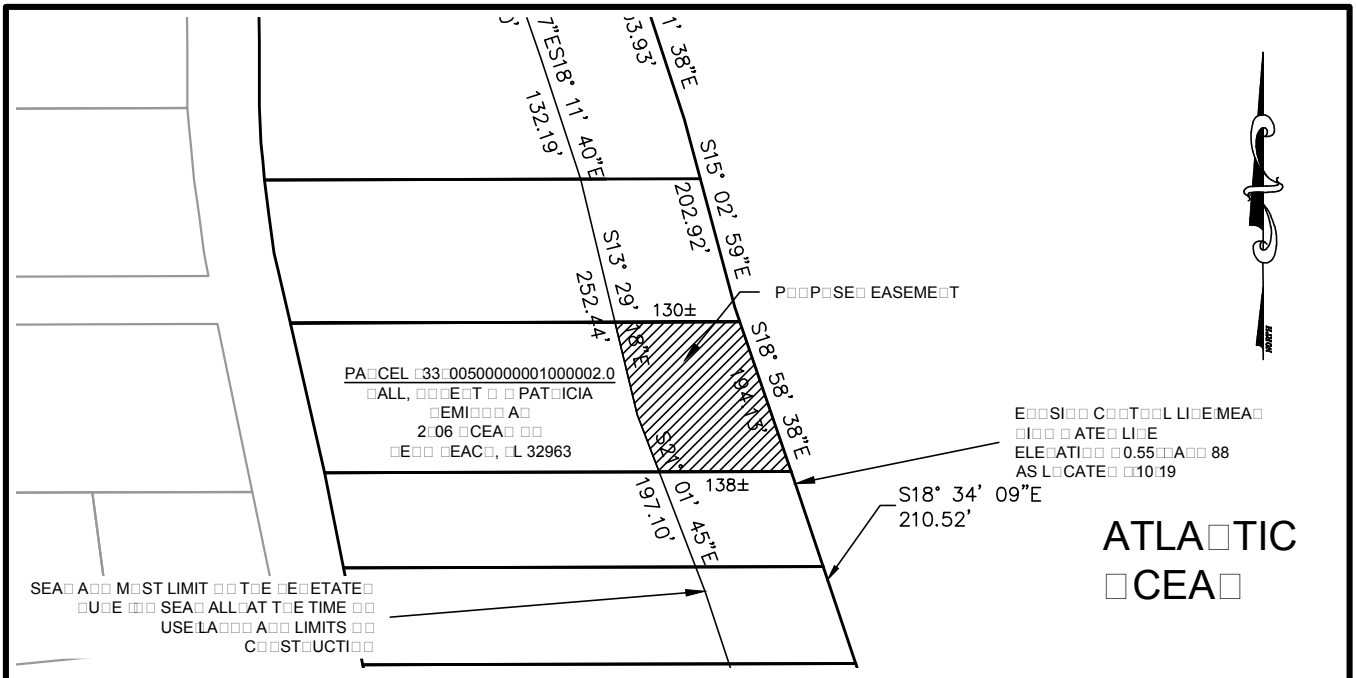
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 2□□8, PA□E 2216 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

Morgan & Eklund Inc.
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PHONE: (954) 421-6882
FAX: (954) 421-0425
LB #4298

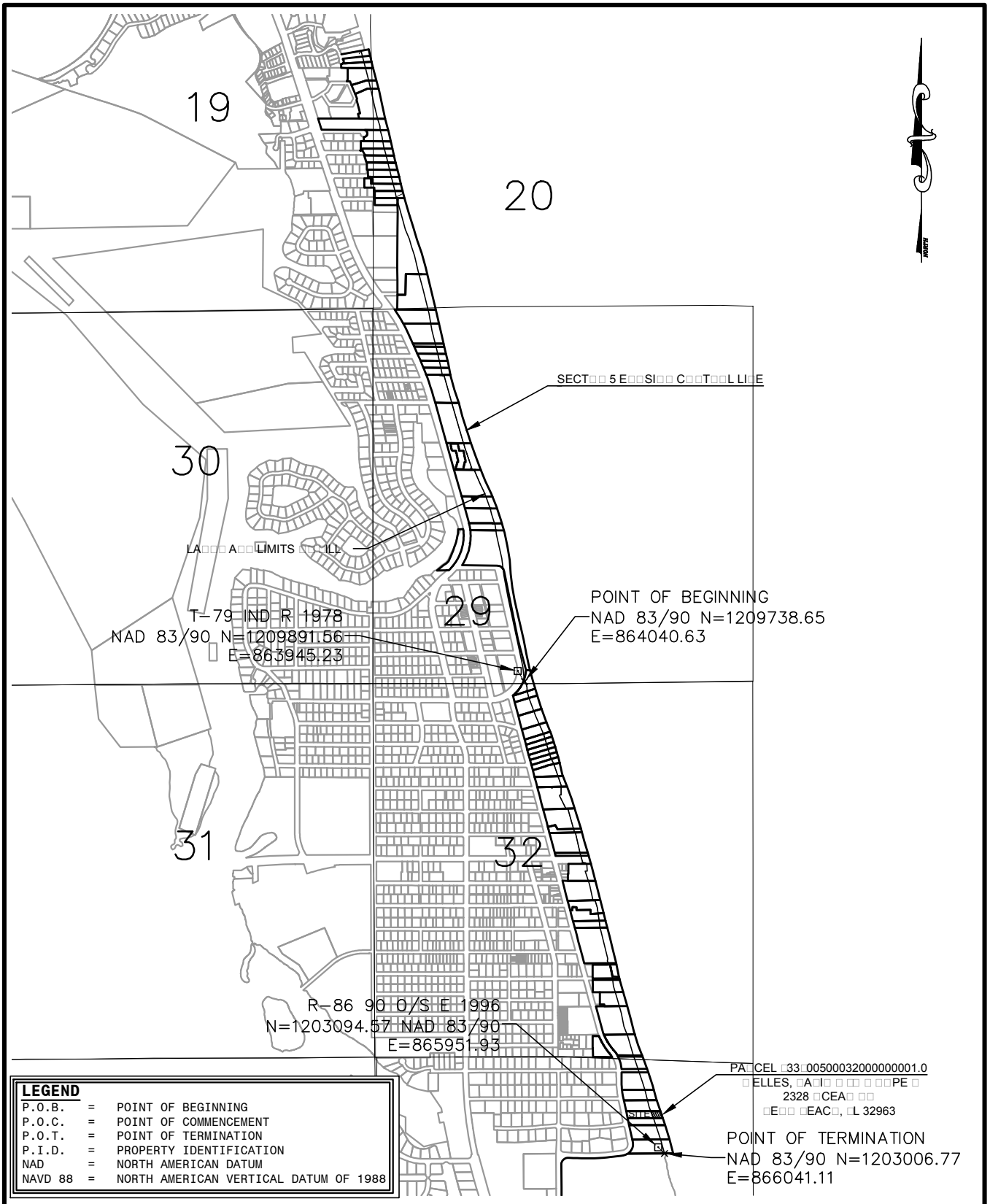
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500000001000002.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2448P2216, lou Thu, 16 May 2019 - 11:22am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500032000000001.0

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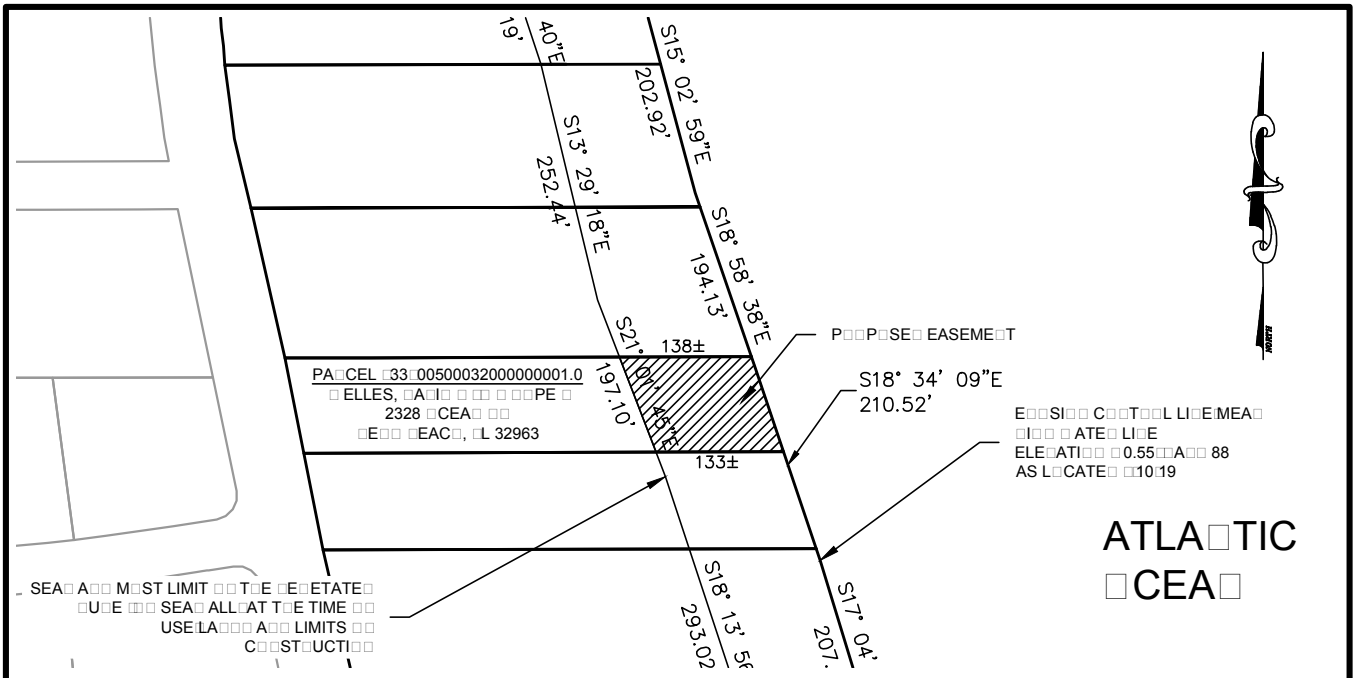
35315-11	1" = 2000'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK	PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A	N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2794P1035-CVR, lou Thu, 16 May 2019 - 11:22am

SCHEDULE A



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T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 279□, PA□E 1035 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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INDIAN RIVER COUNTY, FLORIDA
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COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

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LFP	JRM	N/A / N/A	N/A	2 OF 2

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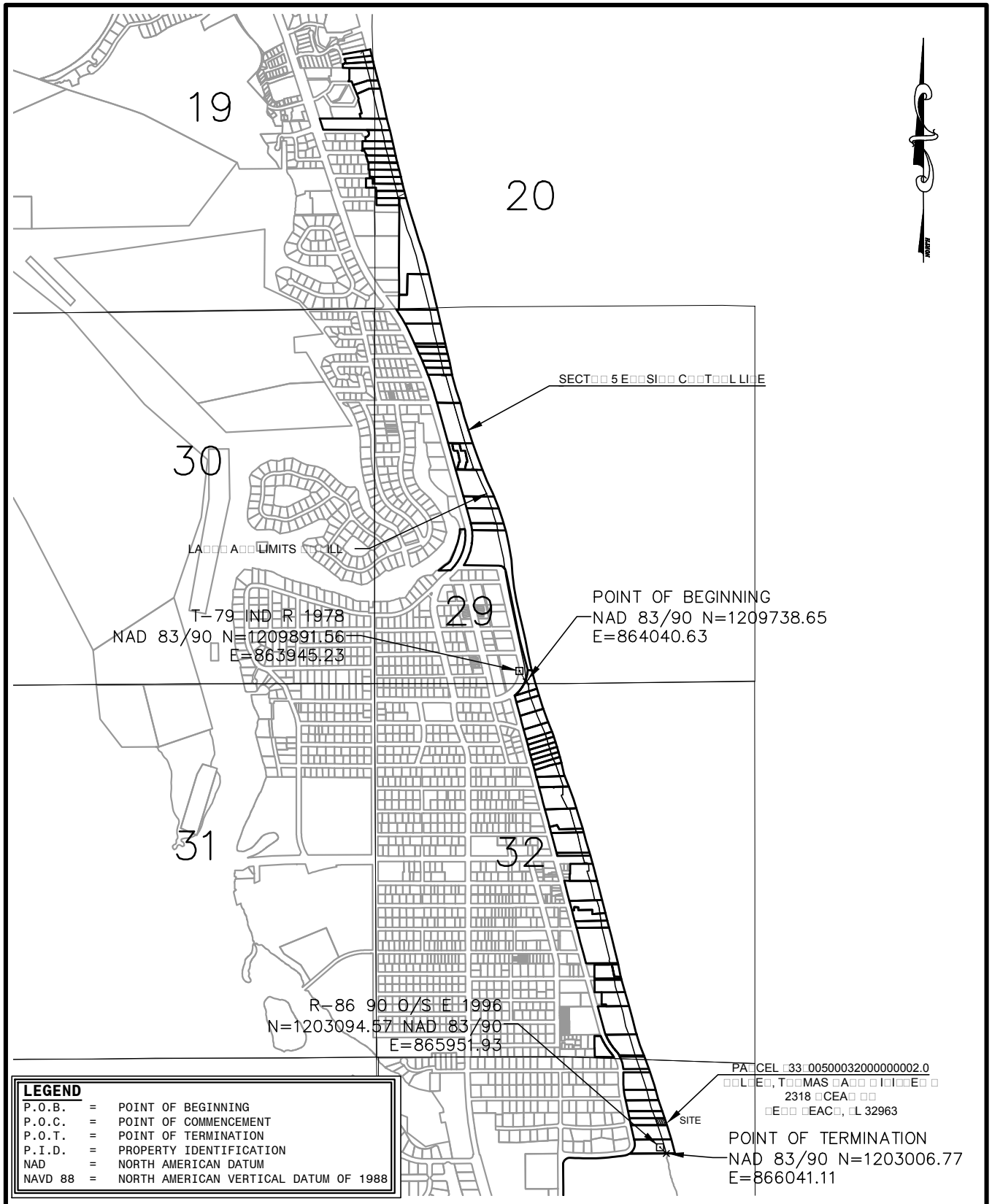
SCHEDULE A



LEGEND		
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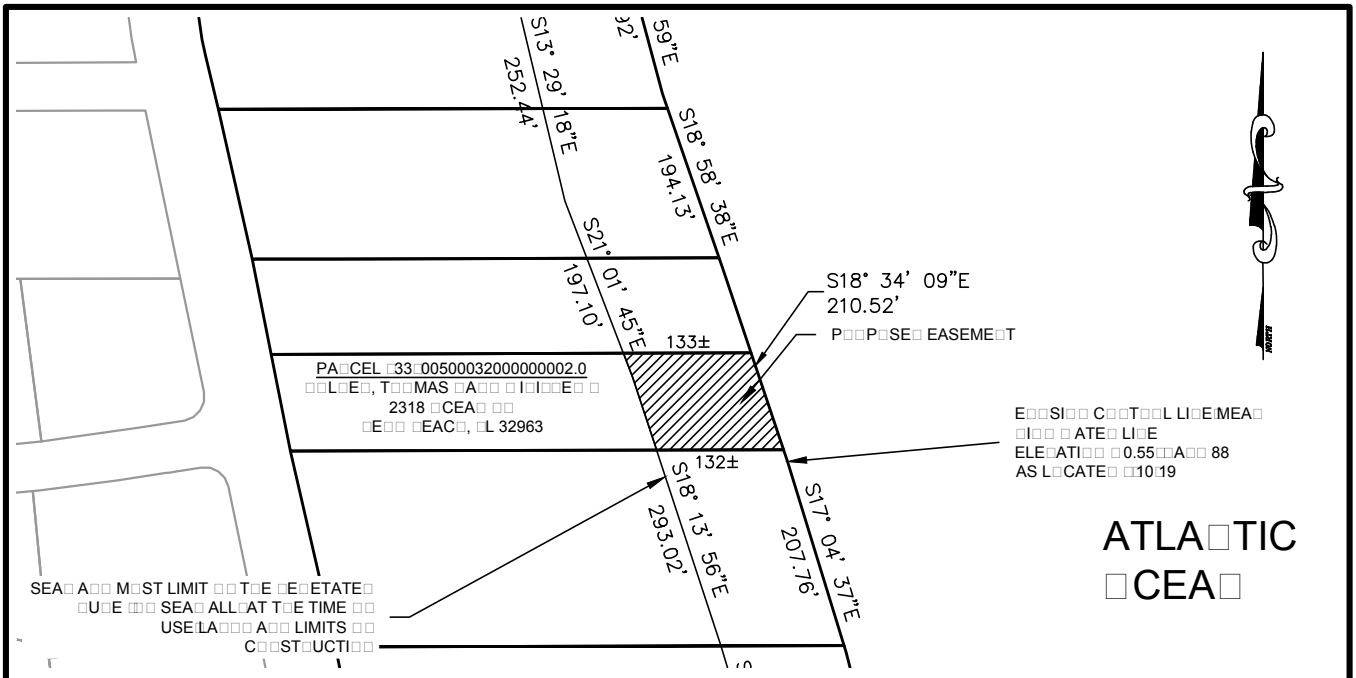
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 2□20, PA□E 192□ □ □ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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LB #4298

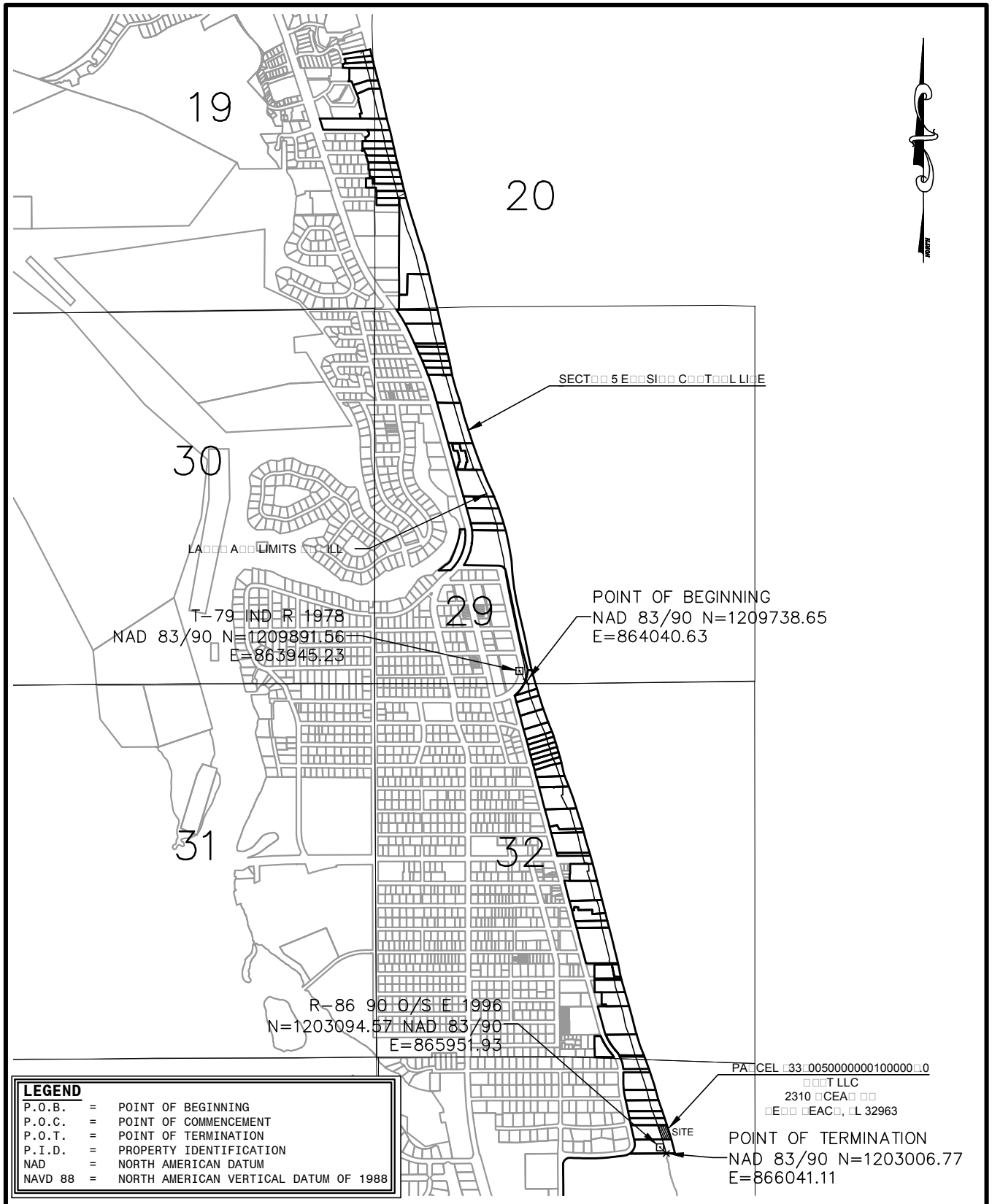
SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500032000000002.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2420P1924, lou Thu, 16 May 2019 - 11:22am

SCHEDULE A



LEGEND

P.O.B.	=	POINT OF BEGINNING
P.O.C.	=	POINT OF COMMENCEMENT
P.O.T.	=	POINT OF TERMINATION
P.I.D.	=	PROPERTY IDENTIFICATION
NAD	=	NORTH AMERICAN DATUM
NAVD 88	=	NORTH AMERICAN VERTICAL DATUM OF 1988

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INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500000001000004.0

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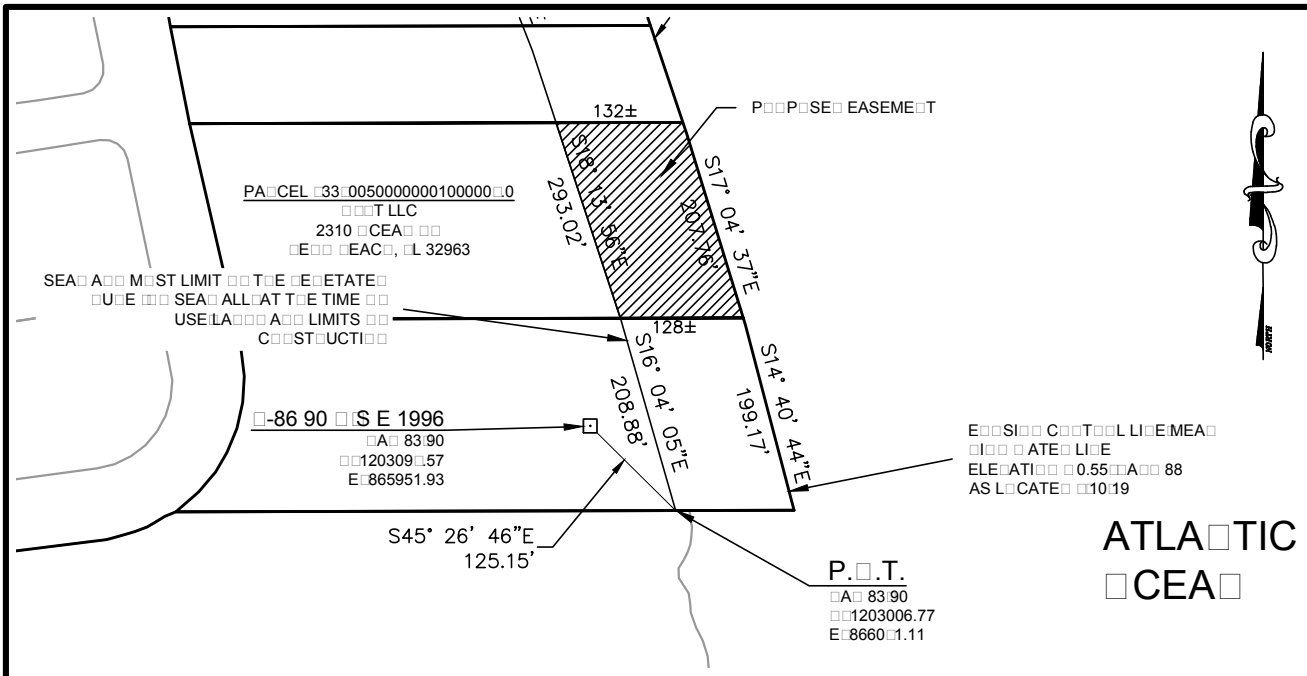
LFP	JRM	N/A	N/A	N/A	1 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2934P2020-CVR, lou Thu, 16 May 2019 - 11:22am

SCHEDULE A



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C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

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INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500000001000004.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

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LFP	JRM	N/A / N/A	N/A	2 OF 2

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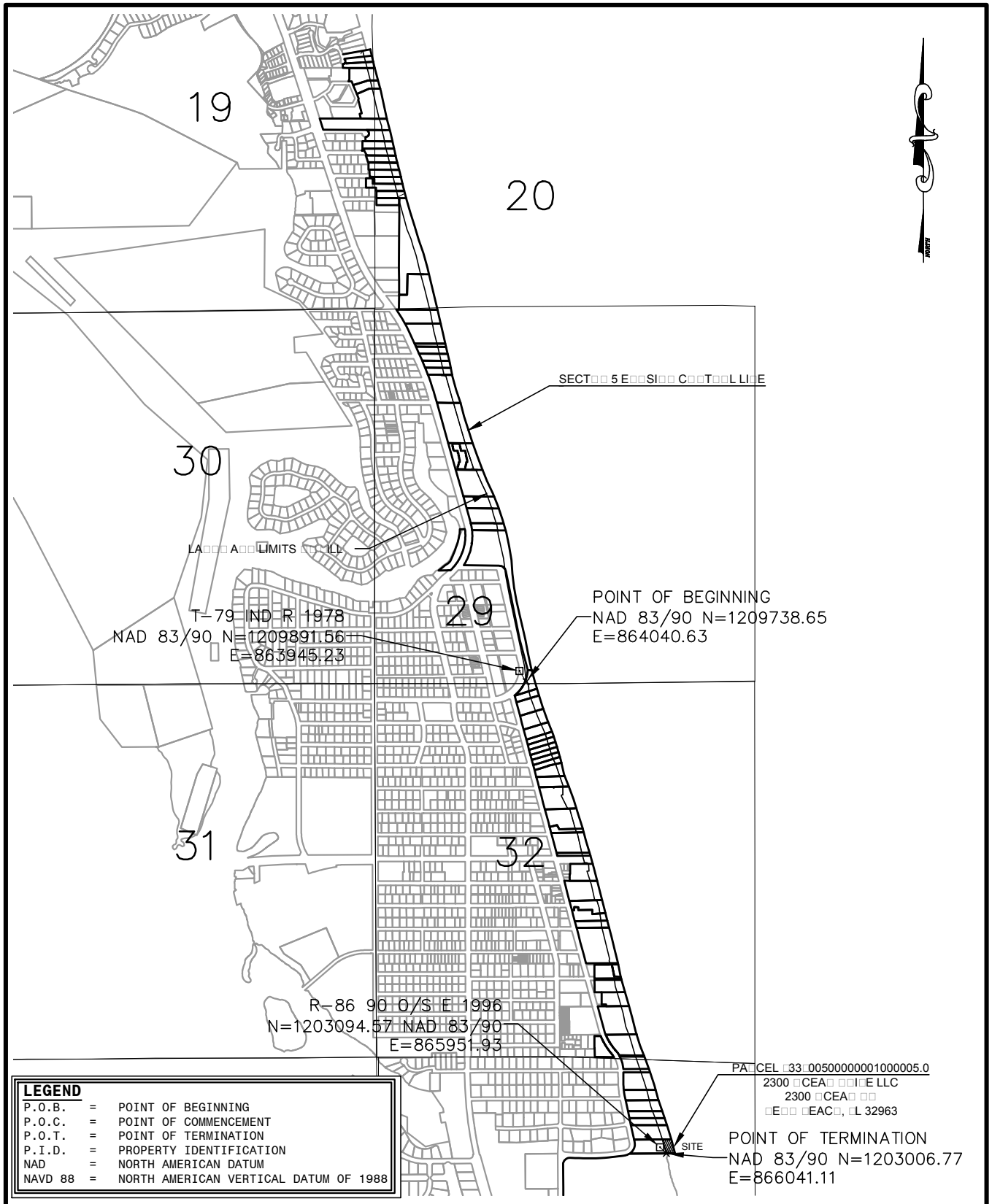
SCHEDULE A



LEGEND

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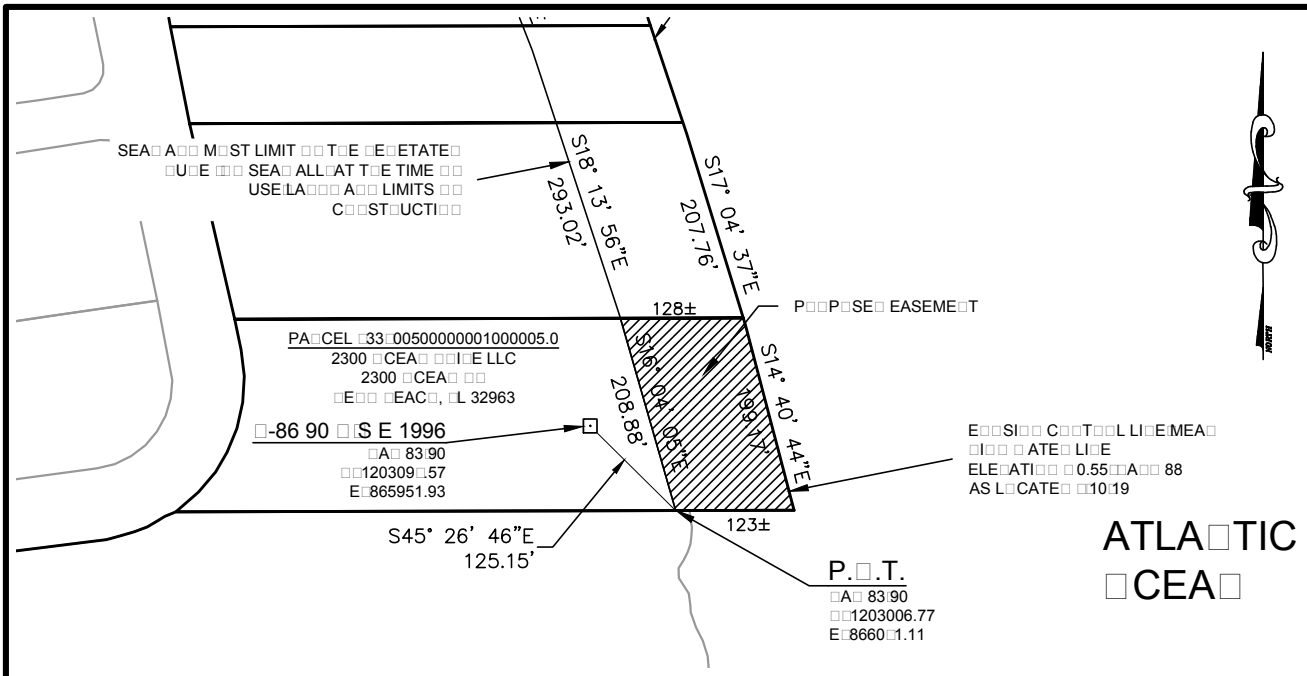
SCHEDULE A



DESCRIPTION OF PROPOSED CONSTRUCTION EASEMENT:

T□AT P□□TI□□ □□ LA□□S □ESC□I□E□ A□□ □EC□□□E□ I□ □□□ICIAL □EC□□□ □□□□ 2815, PA□E 2353 □□ T□E PU□LIC □EC□□□S □□ I□□IA□ □I□E□ C□U□T□, □L□□I□A, L□I□□ EASTE□L□ □□ T□E SEA□ A□□ M□ST LIMIT □□ T□E □E□ETATE□ □U□E □□□ SEA□ ALL□AT T□E TIME □□ USE A□□ □EI□□ M□□E PA□TICULA□L□ □ESC□I□E□ AS □□LL□□ S:

C□MME□CI□□ AT T□E □EPA□TME□T □□ E□□I□□□ME□TAL P□□TECTI□□ □□□EP□M□□UME□T T-79 I□□ □ 1978 □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,891.56 □EET A□□ EASTI□□ 863,9□5.23 □EET □A□ 83□90 AS □E□E□E□CE□ T□ T□E □L□□I□A STATE PLA□E C□□□□I□ATE S□STEM, EAST □□□E, NORTH AMERICAN DATUM OF 1983, ADJUSTMENT OF 1990 (NAD 83/90), PROCEED S 31° 57' 34" E A DISTANCE OF 180.23 FEET TO THE POINT OF □E□I□□I□□ □□ T□E □□LL□□ I□□ LI□E, SAI□ P□I□T □A□I□□ C□□□□I□ATES □□ □□□T□I□□ 1,209,738.65 □EET A□□ EASTI□□ 86□,0□0.63 □EET □A□ 83/90; THENCE N 74° 41' 19" E A DISTANCE OF 15.21 FEET TO A POINT; THENCE S 15° 56' 44" E A DISTANCE OF 85.85 FEET TO A POINT; THENCE S 00° 25' 40" W A DISTANCE OF 52.51 FEET TO A POINT; THENCE S 14° 31' 07" E A DISTANCE OF 101.60 FEET TO A POINT; THENCE S 20° 01' 54" E A DISTANCE OF 278.61 FEET TO A POINT; THENCE S 24° 02' 38" E A DISTANCE OF 277.90 FEET TO A POINT; THENCE S 16° 33' 00" E A DISTANCE OF 260.17 FEET TO A POINT; THENCE S 17° 39' 36" E A DISTANCE OF 97.23 FEET TO A POINT; THENCE S 26° 52' 40" E A DISTANCE OF 99.03 FEET TO A POINT; THENCE S 19° 01' 21" E A DISTANCE OF 338.87 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 6.09 FEET TO A POINT; THENCE S 00° 33' 56" W A DISTANCE OF 119.56 FEET TO A POINT; THENCE S 89° 43' 13" W A DISTANCE OF 21.56 FEET TO A POINT; THENCE S 04° 20' 51" E A DISTANCE OF 18.04 FEET TO A POINT; THENCE S 26° 18' 18" E A DISTANCE OF 201.20 FEET TO A POINT; THENCE N 89° 03' 11" E A DISTANCE OF 26.20 FEET TO A POINT; THENCE S 16° 11' 07" E A DISTANCE OF 246.51 FEET TO A POINT; THENCE S 15° 30' 14" E A DISTANCE OF 106.70 FEET TO A POINT; THENCE N 77° 19' 07" E A DISTANCE OF 9.41 FEET TO A POINT; THENCE S 13° 16' 28" E A DISTANCE OF 327.80 FEET TO A POINT; THENCE S 15° 57' 16" E A DISTANCE OF 117.64 FEET TO A POINT; THENCE S 89° 38' 33" E A DISTANCE OF 35.46 FEET TO A POINT; THENCE S 51° 43' 55" E A DISTANCE OF 26.33 FEET TO A POINT; THENCE S 03° 39' 56" E A DISTANCE OF 104.10 FEET TO A POINT; THENCE N 90° 00' 00" W A DISTANCE OF 28.24 FEET TO A POINT; THENCE S 18° 18' 54" E A DISTANCE OF 200.93 FEET TO A POINT; THENCE S 12° 08' 46" E A DISTANCE OF 237.30 FEET TO A POINT; THENCE N 89° 47' 23" E A DISTANCE OF 31.10 FEET TO A POINT; THENCE S 15° 50' 04" E A DISTANCE OF 98.77 FEET TO A POINT; THENCE S 08° 08' 15" E A DISTANCE OF 290.74 FEET TO A POINT; THENCE S 13° 53' 42" E A DISTANCE OF 461.09 FEET TO A POINT; THENCE S 15° 04' 47" W A DISTANCE OF 30.81 FEET TO A POINT; THENCE S 28° 43' 03" E A DISTANCE OF 44.68 FEET TO A POINT; THENCE N 89° 55' 04" E A DISTANCE OF 14.67 FEET TO A POINT; THENCE S 12° 13' 28" E A DISTANCE OF 171.93 FEET TO A POINT; THENCE S 05° 30' 13" E A DISTANCE OF 148.31 FEET TO A POINT; THENCE S 17° 05' 11" E A DISTANCE OF 200.00 FEET TO A POINT; THENCE S 15° 51' 10" E A DISTANCE OF 208.51 FEET TO A POINT; THENCE S 11° 12' 53" E A DISTANCE OF 187.67 FEET TO A POINT; THENCE S 20° 28' 09" E A DISTANCE OF 157.62 FEET TO A POINT; THENCE S 16° 18' 18" E A DISTANCE OF 252.21 FEET TO A POINT; THENCE S 18° 26' 00" E A DISTANCE OF 256.99 FEET TO A POINT; THENCE S 19° 18' 17" E A DISTANCE OF 156.30 FEET TO A POINT; THENCE S 18° 11' 40" E A DISTANCE OF 132.19 FEET TO A POINT; THENCE S 13° 29' 18" E A DISTANCE OF 252.44 FEET TO A POINT; THENCE S 21° 01' 45" E A DISTANCE OF 197.10 FEET TO A POINT; THENCE S 18° 13' 56" E A DISTANCE OF 293.02 FEET TO A POINT; THENCE S 16° 04' 05" E A DISTANCE OF 208.88 FEET TO THE POINT OF TERMINATION, HAVING COORDINATES OF NORTHING 1,203,006.77 FEET AND EASTI□□ 866,0□1.11 □EET □A□ 83□90, SAI□ P□I□T □EI□□ 125.15 □EET □ISTA□T □□□M □□□ M□□UME□T □-86 90 □□S E 1996 □□A□I□□ C□□□□I□ATES OF NORTHING 1,203,094.57 FEET AND EASTING OF 865951.93 FEET) ALONG A LINE BEARING OF S 45° 26' 46" E.

Morgan & Eklund Inc.
PROFESSIONAL SURVEY CONSULTANTS
4909 US HIGHWAY #1
VERO BEACH, FL 32967
PHONE: (772) 388-5364
FAX: (772) 388-3165
1612 NW 2ND AVENUE
SUITE 3
BOCA RATON, FL 33432
PHONE: (954) 421-6882
FAX: (954) 421-0425
LB #4298

SKETCH OF LEGAL DESCRIPTION
PROPOSED SECTOR 5 CONSTRUCTION EASEMENT
INDIAN RIVER COUNTY, FLORIDA
P.I.D. NO. 33400500000001000005.0

COMMISSION NO.	SCALE	DATE
35315-11	1" = 200'	4/29/19

DRAWN BY	CHECKED BY	FIELD BOOK / PAGE NO.	DATE OF SURVEY	SHEET
LFP	JRM	N/A / N/A	N/A	2 OF 2

H:\Sdskproj\35315-8\dwg\35315-8-SECTOR-5-32-32-40&5-33-40.dwg, ORB2815P2353, lou Thu, 16 May 2019 - 11:22am

APPENDIX C

SEDIMENT QUALITY CONTROL/QUALITY ASSURANCE PLAN

SEDIMENT QUALITY CONTROL/QUALITY ASSURANCE PLAN
FOR BEACH OR DUNE RESTORATION USING AN UPLAND SAND SOURCE

FDEP Permit No. 0363427-001-JC

Indian River County, FL

Sector 5 Beach and Dune Restoration Project

August 30, 2018

APPROVED
Permit No: 0363427-001-JC
Beaches Inlets and Ports Program

A. INTRODUCTION

Pursuant to Fla. Admin. Code r. 62B-41.008 (1) (k) 4.b., permit applications for inlet excavation, beach restoration, or nourishment shall include a quality control/assurance plan that will ensure that the sediment from the borrow areas to be used in the project will meet the standard in Fla. Admin. Code r. 62B-41.007(2)(j). To protect the environmental functions of Florida's beaches, only 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.

The Permittee has conducted geotechnical investigations that provide adequate data concerning the character of the sediment and the quantities available within the spatial limits of the upland sand source(s). The Permittee has provided an analysis of the existing or native sediment and the sediment within the permitted upland sand source(s), including the methods of mining and post-mining processing, that demonstrates its compatibility with the naturally occurring beach sediment in accordance with Fla. Admin. Code r. 62B-41.007(2)(j). The sediment analysis and beach volume calculations were performed using established industry standards, and are certified by a Professional Engineer or a Professional Geologist registered in the State of Florida.

Based upon this information, the Department of Environmental Protection (Department) has determined that use of the sediment from the upland sand source(s) will maintain the general character and functionality of the sediment occurring on the beach and in the adjacent dune and coastal system. Furthermore, this information provides sufficient quality control/quality assurance (QC/QA) that the sediment from the upland sand source(s) will comply with the requirements of Fla. Admin. Code r. 62B-41.007(2)(j); hence, additional QC/QA procedures beyond those described in this permit are not required for these sediment parameters during construction.

This plan outlines the responsibilities of each stakeholder in the project as they relate to the placement of beach compatible material on the beach. These responsibilities are in response to the possibility that non-beach compatible sediments may exist within the upland sand source(s) and could be unintentionally placed on the beach. The QC Plan specifies the minimum construction management, inspection and reporting requirements placed on the Contractor and enforced by the Permittee, to ensure that the sediment from the upland sand source(s) to be used in the project meet the compliance specifications. The QA Plan specifies the minimum construction oversight, inspection and reporting requirements to be undertaken by the Permittee or the Permittee's On-Site Representative to observe, sample, and test the placed sediments to verify the sediments are in compliance.

B. SEDIMENT QUALITY SPECIFICATIONS

The sediment from the upland sand source(s) is similar in grain size distribution and Munsell color to the material in the existing coastal system at the beach placement site. The Department and the Permittee acknowledge that it is possible that discrete occurrences of non-beach compatible sediments may exist within the permitted upland sand source(s) that do not comply with the limiting parameters of Fla. Admin. Code r. 62B-41.007(2)(j) 1. – 5., or vary in Munsell color from the composite value. Furthermore, the Department may consider more restrictive values for the sediment parameters to ensure that the sediment from the upland sand source(s) is similar in grain size distribution and color to the sediment in the existing coastal system at the beach placement site. Therefore, fill material compliance specifications for the sediment from the upland sand source(s) proposed for this project are provided in Table 1.

The compliance specifications take into account the variability of sediment on the native or existing beach, and are values which may reasonably be attained given what is known about the upland sand source(s). Beach fill material which falls outside of these limits will be considered unacceptable and subject to remediation, as described in Section E.

Table 1- Sediment Compliance Specifications

Sediment Parameter	Parameter Definition	Compliance Value
Median Grain Size	50% larger/smaller by weight*	**0.30 mm - 0.55 mm**
Mean Grain Size	Calculated by moment method*	**0.33 mm - 0.55 mm**
Max. Silt Content	passing #230 sieve	**2%**
Max. Gravel Content	retained above #4 sieve	**2%**
Munsell Color	moist Hue	**10YR, 2.5Y, or 5Y**
	moist Value	**≥ 7**
	moist Chroma	**≤ 2**
The beach fill material shall not contain coarse gravel or rocks, construction debris, toxic material, or other foreign matter.		

*Determined using the sieves listed in Section D.7.b.

C. QUALITY CONTROL PLAN

The contract documents shall incorporate the following technical requirements, or equivalent language that addresses the sediment quality monitoring on the beach, and, if necessary, remedial actions. The Permittee will seek to enforce these contract requirements during the execution of work. For each construction event, the Contractor shall submit a Quality Control Plan for review and acceptance by the Permittee. This Plan shall comply with the quality control measures set forth in this permit, and address sediment quality assurance by including: (1) the specific sampling frequency and testing methodology to be provided by the Contractor, (2) the name, address and point of contact for the Licensed Testing Laboratory to be used for the required collection of samples and laboratory testing, and (3) how the Contractor intends to assess compliance with the Sediments Compliance Specifications as shown in Table 1.

The characteristics of the in-situ materials in the upland sand source(s) are indicated by geotechnical data. The Contractor should be aware that it is possible for in-situ material of differing characteristics to be present and that the mining process may correspondingly require revisions during construction to produce beach compatible sand consistent with the Sediment Compliance Specifications in Table 1.

1. **Assessment at Upland Sand Source.** The material shall be observed by the Contractor while the material is being loaded into the trucks for transport to the Construction Access/Staging Area. Both the Contractor and the Permittee will have benchmark samples labeled with the permit number, "Benchmark Sample", date collected, site name and information on where the sample was attained. The benchmark sample shall be material that has been deemed beach compatible in accordance with the Sediment Compliance Specifications in Table 1 and shall serve as the minimum requirement for the material being placed on the beach. If any material appears to be non-compliant, it shall be set aside for testing and/or further processing and not transported to the beach.

a. **For conventional hydraulic excavation and stockpiling.** The Contractor will collect a sediment sample at not less than 1 sample for each 3,000 cubic yards of stockpiled material no less than 6 inches below the surface to visually assess grain size, silt content, gravel content, and Munsell color, against the benchmark sample. The sample shall be a minimum of 1 U.S. pint (approximately 200 grams). Each sample will be archived with the date, time, and location of the sample. This assessment will consist of handling the fill material to ensure that it is predominantly sand and to evaluate if the physical characteristics of the material meets the Sediment Compliance Specifications in Table 1. If deemed that the material may not be in compliance, the sample shall be tested at a Licensed Testing Laboratory using the criteria outlined in Section D.7.b. Sediment testing results shall be provided to the Permittee and Project Engineer prior to any portion of the 3,000 cubic yards of material

represented by that sample being transported to the Construction Access/Staging Area. Sediment testing results shall reference a specific stockpile name and GPS location within the mine. The results of daily inspections, regardless of the quality of the sediment, will be appended to or notated on the Contractor's Daily Report. All samples will be stored for at least 120 days after project completion and shall be made available to the Permittee upon request.

b. **For material requiring special handling and material processing.** If special handling and material processing are necessary to produce beach compatible material consistent with the Sediment Compliance Specifications in Table 1, then sampling and laboratory testing of the processed sand shall be conducted at the upland mine(s) from the stockpiled material before the material is transported to the Construction Access/Staging Areas. The Contractor will collect not less than 1 representative sample from every 3,000 cubic yards of material in the stockpile no less than 6 inches below the surface from the middle of the stockpile. The sample shall be a minimum of 1 U.S. pint (approximately 200 grams). Each sample will be archived with the stockpile name, date, time, and GPS location of the sample. The samples shall be tested at a Licensed Testing Laboratory using the criteria outlined in Section D.7.b. Sediment testing results shall be provided to the Permittee and Project Engineer prior to any portion of the 3,000 cubic yards of material represented by that sample being transported to the Construction Access/Staging Area. The laboratory testing results will be appended to or notated on the Contractor's Daily Report. All samples will be stored for at least 120 days after project completion and shall be made available to the Permittee upon request.

If a sample does not meet the Sediment Compliance Specifications in Table 1, then the 3,000 cubic yards of material represented by that sample shall not be transported to the Construction Access/Staging Area. The material may undergo further processing to meet the Sediment Compliance Specifications with additional laboratory testing to verify the additional processing produces material that meets the Sediment Compliance Specifications, or the material shall be set aside and not used.

2. **Beach Observation**. The Contractor will continuously visually monitor the sediment being placed on the beach to assess grain size, silt content, gravel content, and Munsell color. This assessment will consist of handling the fill material to ensure that it is predominantly sand and to note the physical characteristics, and assure the material meets the Sediment Compliance Specifications in Table 1. If deemed necessary, quantitative assessments of the sand will be conducted for grain size, silt content, gravel content and Munsell color using the methods outlined in section D.7.b. If noncompliant sediment is placed on the beach, the Contractor will immediately cease placement until any stockpiled material at the beach construction staging area can be verified as beach compatible. The Contractor will notify the Permittee, providing the time, location, and description of the noncompliant sediment. The noncompliant sediment will be subject to remediation, as described in Section E. The Contractor will take the appropriate actions to remediate the noncompliant material to achieve and document compliance with the Sediment Compliance Specifications. The Contractor, in cooperation with the Permittee or Project Engineer, will utilize the sampling records at the upland source(s) to determine where the material originated from to avoid additional placement of noncompliant sediment.

D. QUALITY ASSURANCE PLAN

The Permittee will seek to enforce the construction contract and Department permits related to sediment quality. In order to do so, the following steps shall be followed:

1. **Construction Observation and Sampling for Visual Assessment.** Construction observation by the Permittee's On-Site Representative will be performed on a daily basis during periods of active construction. The Permittee's On-Site Representative will collect a sediment sample to visually assess grain size, silt content, gravel content, and Munsell color. The observation will include handling the fill material to ensure that it is predominantly sand and to evaluate if the physical characteristics of the material meets the Sediment Compliance Specifications in Table 1. If the Permittee or Project Engineer determines that the beach fill material does not comply with the Sediment Compliance Specifications, the Permittee or Project Engineer will immediately instruct the Contractor to cease placement and take the necessary actions to avoid further placement of noncompliant sediment. If deemed necessary, quantitative assessments of the sand will be conducted for grain size, silt content, gravel content, and Munsell color using the methods outlined in section D.7.b. If noncompliant sediment is placed on the beach, the Permittee or Project Engineer will document the time, location, and description of the noncompliant sediment. The noncompliant sediment will be subject to remediation, as described in Section E. The Permittee or Project Engineer, in cooperation with the

Contractor, will utilize the sampling records at the upland source(s) to determine where the material originated from to avoid additional placement of noncompliant sediment.

2. **On-Site Representative.** The Permittee will provide on-site observation by individuals with training or experience in beach nourishment and construction inspection and testing, and who are knowledgeable of the project design and permit conditions. The Project Engineer will actively coordinate with the Permittee's On-Site Representative, who may be an employee or sub-contractor of the Permittee or the Project Engineer. Communications will take place between the Project Engineer and the Permittee's On-Site Representative on a daily basis during periods of active construction.

3. **Pre-Construction Meeting.** The project QC/QA Plan will be discussed as a matter of importance at the pre-construction meeting. The Contractor will be required to acknowledge the goals and intent of the above described QC/QA Plan, in writing, prior to commencement of construction.

4. **Contractor's Daily Reports.** The Permittee's On-Site Representative or Project Engineer will review the Contractor's Daily Reports which will characterize the nature of the sediments encountered at the upland sand source and placed along the project shoreline with specific reference to sand color and the occurrence of rock, rubble, gravel, silt or debris.

5. **On Call.** The Project Engineer will be continuously on call during the period of construction for the purpose of making decisions regarding issues that involve QC/QA Plan compliance.

6. **Addendums.** Any addendum or change order to the Contract between the Permittee and the Contractor will be evaluated to determine whether or not the change in scope will potentially affect the QC/QA Plan.

7. **Post-Construction Sampling for Laboratory Testing.** To assure that the fill material placed on the beach was adequately assessed by the borrow area investigation and design, the Project Engineer or Permittee's On-Site Representative will conduct assessments of the sediment as follows:

a. Post-construction sampling and testing of the fill material will be conducted to verify that the sediment placed on the beach meets the expected criteria/characteristics provided during the geotechnical investigation and borrow area design process. Upon completion of sections of constructed beach, two (2) duplicate sand samples will be collected at each FDEP Reference Monument profile line to assess the grain size, silt content, gravel content, and Munsell color for compliance. The collected sediment samples shall be a minimum of 1 U.S. pint (at least 200 grams) each and obtained from the bottom of a test hole a minimum of 12 inches deep within the limits of the constructed berm. If the constructed section was filled only at the dune, then the sediment sample will be obtained from the dune. The samples will be visually assessed for grain size, silt content, gravel content, and Munsell color. The observation will include handling the fill material to ensure that it is predominantly sand, and to further note the physical characteristics. The existence of any layering or rocks within the test hole will be noted. One sample will be sent for testing at a Licensed Testing Laboratory while the other sample will be archived by the Permittee for 120 days after project completion. All samples and laboratory test results will be labeled with the Project name, FDEP Reference Monument profile line, date sample was obtained, and "Construction Fill Sample."

b. Samples collected for laboratory testing will be evaluated for visual attributes (Munsell color), sieved in accordance with the applicable sections of ASTM D422-63 (Standard Test Method for Particle-Size Analysis of Soils), ASTM D1140 (Standard Test Method for Amount of Material in Soils Finer than No. 200 Sieve), and ASTM D2487 (Classification of Soils for Engineering Purposes), and analyzed for carbonate content. The samples will be sieved using the following U.S. Standard Sieve Numbers: 3/4", 5/8", 7/16", 5/16", 3.5, 4, 5, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, and 230.

c. Laboratory testing results will include a cumulative grain size distribution table and curve for each sample tested. A summary table of the sediment samples and test results for the sediment compliance parameters shall accompany the complete set of laboratory testing results. The column headings will include: Sample Number; Mean Grain Size (mm, calculated by moment method); Median Grain Size (mm); Sorting Value (phi); Silt Content (% passing #230 sieve); Gravel Content (% retained above #4 sieve); Carbonate Content (%); Munsell

Color Value; and a column stating whether each sample MET or FAILED the compliance values found in Table 1. The sediment testing results will be certified by a Professional Engineer or Professional Geologist registered in the State of Florida. A statement of how the placed fill material compares to the sediment analysis from the sand search investigation shall be included in the sediment testing results report. The Permittee will submit post-construction sediment testing results and analysis report to the Department within 90 days following beach construction.

d. In the event that a section of beach contains fill material that is not in compliance with the Sediment Compliance Specifications, then the Department will be notified. Notification will indicate the volume, aerial extent and location of any unacceptable beach areas and remediation planned.

E. REMEDIATION

1. **Compliance Area.** If a sample does not meet the compliance requirement to not contain coarse gravel or rocks, construction debris, toxic material, or other foreign matter, the Permittee shall determine the aerial extent of the noncompliant beach fill material and remediate regardless of the extent of the noncompliant material. If a sample is noncompliant for the grain size, silt content, gravel content, or Munsell color, and the aerial extent exceeds 10,000 square feet of beach berm or 100 linear feet of dune for dune-only projects, the Permittee shall remediate.

2. **Notification.** If an area of newly constructed beach or dune does not meet the Sediment Compliance Specifications, then the Department (JCPCompliance@dep.state.fl.us) will be notified. Notification will indicate the aerial extent and location of any areas of noncompliant beach fill material and remediation planned. As outlined in Section E.4 below, the Permittee will immediately undertake remediation actions without additional approvals from the Department. The results of any remediation will be reported to the Department following completion of the remediation activities and shall indicate the volume of noncompliant fill material removed and replaced.

3. **Sampling to determine extent.** In order to determine if an area greater than 10,000 square feet of beach berm or 100 linear feet of dune for dune-only projects is noncompliant, the following procedure will be performed by the Permittee's On-site Representative or Project Engineer:

a. Upon determination that the first sediment sample is noncompliant, at minimum, five (5) additional sediment samples will be collected at a maximum 25-foot spacing in all directions and assessed. If the additional samples are also noncompliant, then additional samples will be collected at a 25-foot spacing in all directions until the aerial extent is identified.
b. The samples will be visually assessed to evaluate compliance with the Sediment Compliance Specifications. If deemed necessary by the Project Engineer, quantitative assessments of the sand will be conducted for grain size, silt content, gravel content, and Munsell color using the methods outlined in Section D.7.b. Samples will be archived by the Permittee.
c. A site map will be prepared depicting the location of all samples and the boundaries of all areas of noncompliant fill.
d. The total square footage will be determined.
e. The site map and analysis will be included in the Contractor's Daily Report.

4. **Actions.** The Permittee or Project Permittee's Engineer shall have the authority to determine whether the material placed on the beach is compliant or noncompliant. If placement of noncompliant material occurs, the Contractor will be directed by the Permittee or Project Engineer on the necessary corrective actions. Should a situation arise during construction that cannot be corrected by the remediation methods described within this QC/QA Plan, the Department will be notified. The remediation actions for each sediment parameter are as follows:

a. Mean grain size: blending the noncompliant fill material with compliant fill material within the adjacent construction berm or dune sufficiently to meet the compliance value, or removing the noncompliant fill material and replacing it with compliant fill material.
b. Silt content: blending the noncompliant fill material with compliant fill material within the adjacent construction berm or dune sufficiently to meet the compliance value, or removing the noncompliant fill material and replacing it with compliant fill material.

c. Gravel content: blending the noncompliant fill material with compliant fill material within the adjacent construction berm or dune sufficiently to meet the compliance value, or removing the noncompliant fill material and replacing it with compliant fill material.
d. Munsell color: blending the noncompliant fill material with compliant fill material within the adjacent construction berm or dune sufficiently to meet the compliance value or removing the noncompliant fill material and replacing it with compliant fill material.
e. Coarse gravel or rocks: screening and removing the noncompliant fill material and replacing it with compliant fill material.
f. Construction debris, toxic material, or other foreign matter: removing the noncompliant fill material and replacing it with compliant fill material.

All noncompliant fill material removed from the beach will be transported to an appropriate upland disposal facility located landward of the Coastal Construction Control Line or returned to the upland mine.

5. **Post-Remediation Testing.** Re-sampling shall be conducted following any remediation actions in accordance with the following protocols:

a. Within the boundaries of the remediation actions, samples will be taken at maximum of 25-foot spacing.
b. The samples will be visually assessed to evaluate compliance with the Sediment Compliance Specifications. If deemed necessary by the Project Engineer, quantitative assessments of the sand will be conducted for grain size, silt content, gravel content, and Munsell color using the methods outlined in Section D.7.b. Samples will be archived by the Permittee.
c. A site map will be prepared depicting the location of all samples and the boundaries of all areas of remediation actions.

6. **Reporting.** A post-remediation report containing the site map, sediment analysis, and volume of noncompliant fill material removed and replaced will be submitted to the Department within 7 days following completion of remediation activities.

All reports or notices relating to this permit shall be emailed or sent to the Department at:
FDEP Division of Water Resource Management
JCP Compliance Officer
Mail Station 3544
2600 Blair Stone Road
Tallahassee, Florida 32399
phone: (850) 414-7716
e-mail: JCPCompliance@dep.state.fl.us

End of Plan

FDEP Version dated April 26, 2010

APPROVED

Permit No: 0363427-001-JC

Beaches Inlets and Ports Program

APPENDIX D

ENVIRONMENTAL PERMITS

FLORIDA DEPARTMENT OF
Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Noah Valenstein
Secretary

CONSOLIDATED JOINT COASTAL PERMIT AND SOVEREIGN SUBMERGED LANDS AUTHORIZATION

PERMITTEE:
Indian River County
1801 27th Street, Building
A Vero Beach, FL 32960

AGENT:
Thomas P. Pierro, PE, D.CE
APTIM
9143 Philips Highway, Suite 400
Jacksonville, FL, 32256

PERMIT INFORMATION:
Permit Number: 0363427-001-JC

Project Name: Indian River County Sector 5 Beach and Dune Restoration Project.

County: Indian River County.

Issuance Date: 1 February 2019

Expiration Date: 1 February 2034

REGULATORY AUTHORIZATION:

This permit is issued under the authority of Chapter 161 and Part IV of Chapter 373, Florida Statutes (F.S.), and Title 62, Florida Administrative Code (F.A.C.). Pursuant to Operating Agreements executed between the Department of Environmental Protection (Department) and the water management districts, as referenced in Chapter 62-113, F.A.C., the Department is responsible for reviewing and taking final agency action on this activity.

PROJECT DESCRIPTION:

The project is to restore 3.1 miles (4.99 kilometers) of beach and dune in Indian River County by placing approximately 155,000 cubic yards (118,500 cubic meters) of sand using upland sources. Following restoration, the project will also include periodic beach nourishment as needed.

The design template includes multiple shoreline segments with dune only or a combination of dune and berm sand placement along the project shoreline. The dune crest elevation consists of a flat dune crest extending from the existing grade at +15.0 feet NAVD at the Departments Reference Monuments R-70 to R-82, then transitions from +15.0 to +14.0 NAVD between R-82 and R-83, continues at +14.0 feet NAVD between R-83 and R-84 then transitions from +14.0 to +13.0 between R-84 to R-85, then

continues at +13.0 feet NAVD between R-85 and R-86, matching an existing backshore structure. The landward dune crest will tie into existing grade or structure, at a slope no steeper than 1V:5H (Vertical: Horizontal). The dune crest width varies along the project area from 11 to 25 feet, and averages 18 feet wide. From the seaward edge of the dune crest, the template is sloped seaward at 1V:3H to +8.0 NAVD. The berm extends seawards from the +8.0 intersections with the dune slope averaging 17 feet wide. The seaward berm slope is 1V:8H until intersecting with the existing profile near mean high water +0.6 feet NAVD. The toe of fill varies along the project area and extended slightly seaward on some sections of the template. Sand placement in the project template between R-85 and R-86 will be a dune only. Salt-tolerant native dune vegetation will be planted on the restored dunes.

The project area is to be restored and nourished with sand trucked from the Stewart Materials Fort Pierce mine. Three construction access points/staging areas have been identified for the project.

PROJECT LOCATION:

The beach restoration and nourishment site is located along approximately 3.1 miles (4.99 kilometers) of Vero Beach, Indian River Shores, and unincorporated Indian River County coastline between the Department Reference Monuments R-70 and R-86, in Indian River County, Sections 19, 20, 29, 32, Townships 32 South, Range 40 East, and Section 5, Township 33 South, Range 40 East; Atlantic Ocean, Class III Florida Waters.

The upland sand source is the Stewart Materials Fort Pierce mine. The upland staging and access areas are located at Tracking Station Park (R-72.7 to 73.2), Jaycee Park and Conn Beach (R-77.0 to R-79.1) and Humiston Park (R-82.8 to 83.4).

PROPRIETARY AUTHORIZATION:

This activity also requires a proprietary authorization, as the activity is located on sovereign submerged lands held in trust by the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees), pursuant to Article X, Section 11 of the Florida Constitution, and Sections 253.002 and 253.77, F.S. The activity is not exempt from the need to obtain a proprietary authorization. The Board of Trustees delegated, to the Department, the responsibility to review and take final action on this request for proprietary authorization in accordance with Section 18-21.0051, F.A.C., and the Operating Agreements executed between the Department and the water management districts, as referenced in Chapter 62-113, F.A.C. This proprietary authorization has been reviewed in accordance with Chapter 253, F.S., Chapter 18-21 and Section 62-330.075, F.A.C., and the policies of the Board of Trustees.

The Department has also determined that the beach restoration activity qualifies for a Letter of Consent to use sovereign, submerged lands, as long as the work performed is located within the boundaries as described herein and is consistent with the terms and

conditions herein. Therefore, consent is hereby granted pursuant to Chapter 253.77, F.S., to perform the activity on the specified sovereign submerged lands.

COASTAL ZONE MANAGEMENT:

This permit constitutes a finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act.

WATER QUALITY CERTIFICATION:

This permit constitutes certification of compliance with state water quality standards pursuant to Section 401 of the Clean Water Act, 33 U.S.C. 1341.

OTHER PERMITS:

Authorization from the Department does not relieve you from the responsibility of obtaining other permits (Federal, State, or local) that may be required for the project. When the Department received your permit application, a copy was sent to the U.S. Army Corps of Engineers (Corps) for review. The Corps will issue their authorization directly to you, or contact you if additional information is needed. If you have not heard from the Corps within 30 days from the date that your application was received by the Department, contact the nearest Corps regulatory office for status and further information. Failure to obtain Corps authorization prior to construction could subject you to federal enforcement action by that agency.

AGENCY ACTION:

The above-named Permittee is hereby authorized to construct the work that is outlined in the Project Description and Project Location of this permit and as shown on the approved permit drawings, plans and other documents attached hereto. This agency action is based on the information submitted to the Department as part of the permit application, and adherence with the final details of that proposal shall be a requirement of the permit. This permit and authorization to use sovereign submerged lands are subject to the General Conditions, General Consent Conditions and Specific Conditions, which are a binding part of this permit and authorization. Both the Permittee and their Contractor are responsible for reading and understanding this permit (including the permit conditions and the approved permit drawings) prior to commencing the authorized activities, and for ensuring that the work is conducted in conformance with all the terms, conditions and drawings

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GENERAL CONDITIONS:

1. All activities authorized by this permit shall be implemented as set forth in the project description, permit drawings, plans and specifications approved as a part of this permit, and all conditions and requirements of this permit. The Permittee

shall notify the Department in writing of any anticipated deviation from the permit prior to implementation so that the Department can determine whether a modification of the permit is required pursuant to Rule 62B-49.008, F.A.C.

2. If, for any reason, the Permittee does not comply with any condition or limitation specified in this permit, the Permittee shall immediately provide the Department and the appropriate District office of the Department with a written report containing the following information: a description of and cause of noncompliance; and the period of noncompliance, including dates and times; and, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

3. This permit does not eliminate the necessity to obtain any other applicable licenses or permits that may be required by federal, state, local or special district laws and regulations. This permit is not a waiver or approval of any other Department permit or authorization that may be required for other aspects of the total project that are not addressed in this permit.

4. Pursuant to Sections 253.77 and 373.422, F.S., prior to conducting any works or other activities on state-owned submerged lands, or other lands of the state, title to which is vested in the Board of Trustees, the Permittee must receive all necessary approvals and authorizations under Chapters 253 and 258, F.S. Written authorization that requires formal execution by the Board of Trustees shall not be considered received until it has been fully executed.

5. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be considered specifically approved unless a specific condition of this permit or a formal determination under Section 373.421(2), F.S., provides otherwise.

6. This permit does not convey to the Permittee or create in the Permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the Permittee. The issuance of this permit does not convey any vested rights or any exclusive privileges.

7. This permit or a copy thereof, complete with all conditions, attachments, plans and specifications, modifications, and time extensions shall be kept at the work site of the permitted activity. The Permittee shall require the contractor to review the complete permit prior to commencement of the activity authorized by this permit.

8. The Permittee, by accepting this permit, specifically agrees to allow authorized Department personnel with proper identification and at reasonable times, access to the premises where the permitted activity is located or conducted for the purpose of ascertaining compliance with the terms of the permit and with the rules of the Department and to have access to and copy any records that must be kept under conditions of the permit; to inspect the facility, equipment, practices, or operations regulated or required under this permit; and to sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

9. At least 48 hours prior to commencement of activity authorized by this permit, the Permittee shall electronically submit to the Department, by email at JCPCompliance@dep.state.fl.us, and the appropriate District office of the Department a written notice of commencement of construction indicating the actual start date and the expected completion date and an affirmative statement that the Permittee and the contractor, if one is to be used, have read the general and specific conditions of the permit and understand them.

10. If any prehistoric or historic artifacts, such as pottery or ceramics, stone tools or metal implements, shipwreck remains or anchors, dugout canoes or other physical remains that could be associated with Native American cultures, or early Colonial or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the immediate vicinity of such discoveries. The Permittee, or other designee, shall contact the Florida Department of State, Division of Historical Resources, Compliance and Review Section at (850)245- 6333 or (800)847-7278, as well as the appropriate permitting agency office. Project activities shall not resume without verbal and/or written authorization from the Division of Historical Resources. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, F.S.

11. Within 30 days after completion of construction or completion of a subsequent maintenance event authorized by this permit, the Permittee shall electronically submit to the Department, by email at JCPCompliance@dep.state.fl.us, and the appropriate District office of the Department a written statement of completion and certification by a registered professional engineer. This certification shall state that all locations and elevations specified by the permit have been verified; the activities authorized by the permit have been performed in compliance with the plans and specifications approved as a part of the permit, and all conditions of the permit; or shall describe any deviations from the plans and specifications, and all conditions of the permit. When the completed activity differs substantially from the permitted plans, any substantial deviations shall be noted and explained

on as-built drawings electronically submitted to the Department, by email at JCPCompliance@dep.state.fl.us.

GENERAL CONSENT CONDITIONS:

1. Authorizations are valid only for the specified activity or use. Any unauthorized deviation from the specified activity or use and the conditions for undertaking that activity or use shall constitute a violation. Violation of the authorization shall result in suspension or revocation of the grantee's use of the sovereignty submerged land unless cured to the satisfaction of the Board.

2. Authorizations convey no title to sovereignty submerged land or water column, nor do they constitute recognition or acknowledgment of any other person's title to such land or water.

3. Authorizations may be modified, suspended or revoked in accordance with their terms or the remedies provided in Sections 253.04 and 258.46, F.S., or Chapter 18-14, F.A.C.

4. Structures or activities shall be constructed and used to avoid or minimize adverse impacts to sovereignty submerged lands and resources.

5. Construction, use or operation of the structure or activity shall not adversely affect any species that is endangered, threatened or of special concern, as listed in Rules 68A- 27.003, 68A-27.004 and 68A-27.005, F.A.C.

6. Structures or activities shall not unreasonably interfere with riparian rights. When a court of competent jurisdiction determines that riparian rights have been unlawfully affected, the structure or activity shall be modified in accordance with the court's decision.

7. Structures or activities shall not create a navigational hazard.

8. Structures shall be maintained in a functional condition and shall be repaired or removed if they become dilapidated to such an extent that they are no longer functional. This shall not be construed to prohibit the repair or replacement subject to the provisions of Rule18-21.005, F.A.C., within one year, of a structure damaged in a discrete event such as a storm, flood, accident or fire.

9. Structures or activities shall be constructed, operated and maintained solely for water dependent purposes, or for non-water dependent activities authorized under paragraph 18-21.004(1)(f), F.A.C., or any other applicable law.

SPECIFIC CONDITIONS - ADMINISTRATIVE:

1. Pursuant to Chapter 161.141, F.S., prior to construction of the beach restoration, the Board of Trustees must establish the line of mean high water for any area affected by this project that does not already have an Erosion Control Line (ECL). This is required to establish the boundary line between sovereignty lands of the state bordering on the Atlantic Ocean and the upland properties. No work shall commence until the Erosion Control Line has been established to the satisfaction of the Department and recorded in the public records of the county in which the project is located.

2. All reports or notices relating to this permit shall be electronically submitted to the Department's JCP Compliance Officer (e-mail address: JCPCompliance@dep.state.fl.us) unless otherwise specified in the specific conditions of this permit.

SPECIFIC CONDITIONS - PRIOR TO CONSTRUCTION

3. **Notice to Proceed and Pre-Construction Submittals**. No work shall be conducted under this permit until the Permittee has received a written notice to proceed from the Department for each event. At least 30 days prior to the requested date of issuance of the notice to proceed, the Permittee shall submit a written request for a Notice to Proceed along with the following items for review and approval by the Department:

    a. An electronic copy of detailed ***final construction plans and specifications*** for all authorized activities. The plans and specifications must be consistent with the project description of this permit and the attached permit drawings, and shall also be certified by a professional engineer (P.E.), who is registered in the State of Florida. The Permittee shall point out any deviations from the Project Description of this permit (as stated above) or the approved permit drawings (attached to this permit), and any significant changes would require a permit modification. The plans and specifications shall include a description of the dredging and construction methods to be utilized and drawings and surveys that show all biological resources and work spaces (e.g., anchoring areas, pipeline corridors, staging areas, boat access corridors, etc.) to be used for this project;

    b. Documentation that the ***Erosion Control Line*** has been executed and recorded in the County Records;

    c. ***Turbidity monitoring qualifications***: The names, credentials

(demonstrating experience and qualifications) and contact information for the individuals who will conduct the turbidity monitoring. Turbidity monitors shall have prior training in water quality monitoring and experience in turbidity monitoring for coastal construction projects. The turbidity monitors shall be independent of the design engineer and the construction contractor. If turbidity levels exceed the compliance standards established in this permit, the turbidity monitor shall be required (pursuant to Specific Conditions 27 and 28) to immediately inform the JCP Compliance Officer within 24 hours.

d. A ***Scope of Work*** for the turbidity monitoring shall be provided to ensure that the right equipment is available and that monitoring protocols will be sufficient to conduct the monitoring correctly at any location, and under any conditions.

e. Prior to the second event authorized under this permit, and each subsequent event, the results of the intermediate turbidity monitoring shall be evaluated and provided to the Department. If the results indicate that the project can be built using a smaller mixing zone, this adjustment shall be made through an administrative modification to the permit prior to commencement of construction;

f. ***Draft turbidity sampling map.*** An example of the geo-referenced map that will be provided with turbidity reports, including aerial photography and the boundaries for benthic resources (pursuant to Specific Condition 28).

g. ***Biological monitoring qualifications***. Biological monitoring qualifications of firms and their staff shall be submitted to the JCP Compliance Officer for review and approval. If additional monitoring team(s) are subcontracted, or new staff are added to the monitoring team, proposed changes and qualifications shall be submitted to the JCP Compliance Officer for review at least 30 days prior to a monitoring event. The Permittee's selected biological monitoring firm is fully responsible for training of new staff members and subcontractors, as well as the QA/QC verification of their work;

h. Documentation from the U.S. Fish and Wildlife Service (FWS) that this work will be covered under a **Statewide Programmatic Biological Opinion** or a Biological Opinion (BO) issued for construction on this project site. If the BO contains conditions that are not already contained herein, the Notice to Proceed may be withheld if it is determined that

the permit requires a modification to include those additional conditions.

i. ***Fish and Wildlife Monitoring Qualification***: To ensure that individuals conducting monitoring of fish and wildlife resources have the appropriate qualification, the Permittee shall provide documentation demonstrating expertise/experience in surveying the types of resources that are present in the project. The Department and FWC will review this information for confirmation that the monitors are capable of meeting the requirements in this authorization. This documentation shall include the following:

   a. Marine Turtle Protection: Monitoring plan, including a list of the names and permit numbers for the Marine Turtle Permit Holders.

   b. Shorebird Protection: Monitoring plan, including a list of Bird Monitors with their contact information, summary of qualifications including bird identification skills, and avian survey experience, proposed locations of shorebird survey routes, and the locations of travel routes.

j. ***A Baseline Nearshore Hardbottom Survey***. A full pre-construction (baseline) survey shall be completed and submitted to the Department prior to the issuance of the Notice to Proceed. This survey shall comply with and meet the requirements of applicable Approved Biological Monitoring Plans.

4. **Pre-Construction Conference.** The Permittee shall conduct a pre-construction conference to review the specific conditions and monitoring requirements of this permit with Permittee's contractors, the engineer of record, those responsible for turbidity monitoring, those responsible for protected species monitoring, staff representatives from the Fish and Wildlife Conservation Commission (FWC) and the JCP Compliance Officer (or designated Department staff representatives) prior to each construction event. In order to ensure that appropriate representatives are available, at least twenty-one (21) days prior to the intended commencement date for the permitted construction, the Permittee is advised to contact the Department, and the other agency representatives listed below:

DEP JCP Compliance Officer
e-mail: JCPCompliance@dep.state.fl.us

FWC Imperiled Species Management Section

e-mail: marineturtle@myfwc.com

FWC Regional Biologist
See Contact list for phone numbers
- (http://myfwc.com/conservation/you-conserve/wildlife/shorebirds/contacts)

The Permittee is also advised to schedule the pre-construction conference at least a week prior to the intended commencement date. At least seven (7) days in advance of the pre- construction conference, the Permittee shall provide written notification, advising the participants of the agreed-upon date, time and location of the meeting, and also provide a meeting agenda and a teleconference number.

SPECIFIC CONDITIONS – CONSTRUCTION ACTIVITIES

5. The Permittee shall not store or stockpile tools, equipment, materials, etc., within littoral zones or elsewhere within surface waters of the state without prior written approval from the Department. Storage, stockpiling or access of equipment on, in, over or through beds of submerged aquatic vegetation, wetlands or hardbottom is prohibited unless it occurs within a work area or ingress/egress corridor that is specifically approved by this permit and is shown on the approved permit drawings. Anchoring or spudding of vessels and barges within beds of aquatic vegetation or hardbottom is also prohibited

6. The Permittee shall not conduct project operations or store project-related equipment in, on or over dunes, or otherwise impact dune vegetation, outside the approved staging, beach access and dune restoration areas designated in the permit drawings.

7. The non-shelly sand product from Stewart Material Mine in Fort Pierce, FL was reviewed and approved for use in this project. Any additional upland sand sources proposed for use under this permit shall be approved via permit modification.

8. Sediment quality will be assessed as outlined in the Sediment QA/QC plan dated 30 August 2018. Any occurrences of placement of material not in compliance with the Plan shall be handled according to the protocols set forth in the Sediment QA/QC plans. The sediment testing result shall be submitted to FDEP within 90 days following the completion of beach construction. The Sediment QA/QC plans shall include the following:

a. If during construction, the Permittee or Engineer determines that the beach fill material does not comply with the sediment compliance specifications, measures will be taken to avoid further placement of noncompliant fill, and the sediment inspection results will be reported to the Department.

b. The Permittee will submit post-construction sediment testing results and an analysis report as outlined in the Sediment QA/QC plan to the Department within 90 days following beach construction. The sediment testing results will be certified by a P.E. or P.G. from the testing laboratory. A summary table of the sediment samples and test results for the sediment compliance parameters as outlined in Table 1 of the Sediment QA/QC plan shall accompany the complete set of laboratory testing results. A statement of how the placed fill material compares to the sediment analysis and volume calculations from the geotechnical investigation shall be included in the sediment testing results report.

c. A post-remediation report containing the site map, sediment analysis, and volume of non-compliant fill material removed and replaced, or otherwise remediated, will be submitted to the Department within 7 days following completion of remediation activities.

SPECIFIC CONDITIONS – WILDLIFE

9. ***In-water Activity***. The Permittee shall adhere to the following requirements for all in- water activity:

a. The Permittee shall instruct all personnel associated with the project about the presence of marine turtles and manatees, and the need to avoid collisions with (and injury to) these protected marine species. The Permittee shall be responsible for harm to these resources and shall require their contractors to advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees or marine turtles, which are protected under the Endangered Species Act, the Marine Mammal Protection Act, the Marine Turtle Protection 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 project area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels shall follow routes of deep water whenever possible.

c. Siltation or turbidity barriers (if used) shall be made of material in which manatees and marine turtles cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers shall not impede manatee or marine turtle movement or travel.

d. The Permittee is responsible for all on-site project personnel and shall require them to observe water-related activities for the presence of marine turtles and manatee(s). All in-water operations shall be immediately shall be shut down if a marine turtle or manatee comes within 50 feet of the operation. For unanchored vessels, operators shall disengage the propeller and drift out of the potential impact zone. If drifting would jeopardize the safety of the vessel then idle speed may be used to leave the potential impact zone. Activities shall not resume until the animal(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the animal(s) has not reappeared within 50 feet of the operation. Animals shall not be herded away or harassed into leaving.

e. Any collision with (or injury to) a marine turtle or manatee shall be reported immediately to the FWC Hotline at 1-888-404-3922, and to FWC at ImperiledSpecies@myFWC.com. Any collision with (and/or injury to) a marine turtle shall also be reported immediately to the Sea Turtle Stranding and Salvage Network (STSSN) at SeaTurtleStranding@myfwc.com.

f. Temporary signs concerning manatees shall be prominently posted prior to and during all in-water project activities, at sufficient locations to be regularly and easily viewed by all personnel engaged in water-related activities. Two temporary signs, which have already been approved for this use by the FWC, shall be posted at each location. One sign shall read “Caution Boaters – Watch for Manatees”. A second sign measuring at least 8 ½" by 11", shall explain the requirements for “Idle Speed/No Wake” and the shutdown of in-water operations. All signs shall be removed by the Permittee upon completion of the project. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to ImperiledSpecies@myFWC.com.

10. Beach nourishment shall occur outside of the main part of marine turtle nesting season, starting after October 31 and completed before May 1. During the May 1 through October 31 period, no construction equipment shall be placed or stored on the beach. Temporary approvals of work to extend into marine turtle nesting season may be authorized on a case by case basis. Such authorizations

shall be in writing from the Department with FWC approval and accompanied by proof the extension is covered under a valid Biological Opinion. If such an authorization is granted all conditions below shall be followed.

11. Construction-related activities are authorized to occur on the nesting beach (seaward of existing coastal armoring structures or dune crest and all sandy beach areas such as those used for beach access during the early nesting season (March 1 through May 1) and late nesting season (November 1 through November 30) under the following conditions:

    a. Daily early morning marine turtle nest surveys shall start at the beginning of marine turtle nesting season (March 1). Daily nesting surveys shall continue through November 30, or until two weeks after the last crawl in the project area, whichever is earlier.

    b. Daily nesting surveys shall be conducted beginning ½ hour prior to sunrise, and no construction activity may commence until completion of the marine turtle survey each day.

    c. The Permittee shall ensure that marine turtle nesting surveys are conducted as required in this authorization, and only conducted by personnel with a valid FWC Marine Turtle Permit, that covers all project activities as required by Chapter 68E-1, F.A.C. If needed, contact FWC at MTP@myfwc.com for information on the authorized Marine Turtle Permit Holders in the project area.

    d. Only those nests laid in the area where sand placement will occur shall be relocated, and nest relocation shall cease after the sand placement is completed. Nests requiring relocation shall be moved no later than 9 a.m., the morning following deposition (no longer than 12 hours from the time the eggs are laid), to a nearby self-release beach site in a secure setting, where artificial lighting will not interfere with hatchling orientation. The relocation site shall be determined in conjunction with and approved by FWC prior to nest relocations. Relocated nests shall not be placed in organized groupings. Relocated nests shall be randomly staggered along the length and width of beach settings that are not expected to experience any of the following: inundation by high tides; severe erosion; previous egg loss; or illumination by artificial lighting.

    e. Nests deposited within areas where construction activities will not occur for 65 days, or nests laid in the nourished berm prior to tilling, shall be marked and left in place. The Marine Turtle Permit Holder shall install on-beach markers at the nest site and shall also install a secondary

marker at a point as far landward as possible to assure that the nest can be located should the on-beach marker be lost. No activity shall occur within the marked area, nor shall any activities occur that 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.

f. Beginning March 1, daytime surveys shall be conducted for leatherback sea turtle nests. Nighttime surveys for leatherback marine turtles shall begin when the first leatherback crawl is recorded within the project or adjacent beach area through April 30, or until completion of the project, whichever is earliest. Nightly nesting surveys shall be conducted from 9 p.m. until 6 a.m. The project area shall be surveyed at 1- hour intervals and eggs shall be relocated per the preceding requirements. Since leatherbacks require at least 1.5 hours to complete nesting, the1-hour interval will ensure that all nesting leatherbacks are encountered.

12. ***Construction Area Project Lighting*. No temporary lighting of the construction area is authorized at any time during the main portion of marine turtle nesting season (May 1 through October 31).** During early and late nesting season, direct lighting of the beach and nearshore waters shall be limited to the immediate area of active construction while meeting safety requirements as required by law. Lighting on offshore and onshore equipment shall be minimized by reducing the number of fixtures, shielding, lowering the height and appropriately placing fixtures to avoid excessive illumination of the water's surface and nesting beach. The intensity of lighting shall be reduced to the minimum standard required for general construction area safety. Shields shall be affixed to the light housing on dredge and land-based lights and be large enough to block lamp light from being transmitted outside the construction area or to the adjacent marine turtle nesting beach. (Figure 1 below).

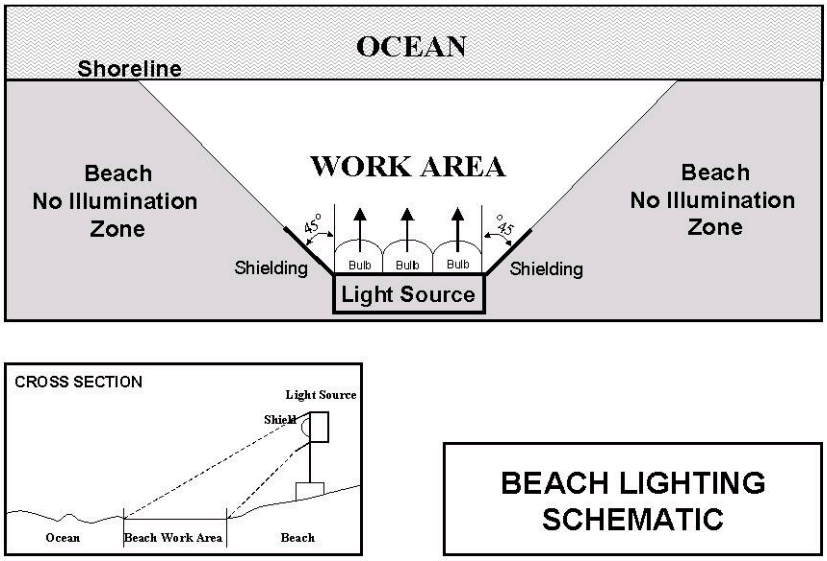


Figure 1

13. ***All Beach Related Activities.*** The Permittee shall adhere to the following requirements for all beach-related activities during marine turtle and shorebird nesting/breeding seasons (March 1 through October 31) in Indian River County.

    a. The Permittee shall require their contractor and protected species monitors to inspect all work areas that have excavations and temporary alteration of beach topography to determine which areas have deviations (such as depressions, ruts, holes and vehicle tracks) capable of trapping flightless shorebird chicks or marine turtle hatchlings each day. If so, the deviations shall be filled or leveled from the natural beach profile prior to 9:00 p.m. each day. The beach surface shall also be inspected after completion of the project, and all tracks, mounds, ridges or impressions, etc. left by construction equipment on the beach shall be smoothed and leveled.

    b. If any debris, including derelict construction or coastal armoring material, concrete and metal occurs on the beach placement site, it shall be removed from the beach to the maximum extent practicable prior to any placement of fill material. If debris removal activities will take place during protected species nesting seasons, the work shall be conducted during daylight hours only, and shall not commence until completion of daily monitoring surveys.

    c. **Equipment Storage and Placement**. Staging areas and temporary

storage for construction equipment and pipes shall be located off the beach to the maximum extent practicable during March 1 through October 31. Nighttime storage of construction equipment that is not in use shall be located off the beach. All construction pipes that are in use on the beach shall be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system, and if placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune.

d. If it is necessary to extend construction pipes past a known shorebird nesting site, then those pipes shall be placed landward of the site before birds are active in that area. No pipe or sand shall be placed seaward of a shorebird nesting site during the shorebird nesting season. If such placement is not feasible for the project, FWC's Regional Biologist shall be contacted for alternative measures. See contacts available at http://myfwc.com/conservation/you-conserve/wildlife/shorebirds/contacts.

e. **Beach Driving**. All vehicles shall be operated at speeds less than 6 mph and run at or below the high-tide line. All personnel associated with the project shall be instructed about the potential presence of onsite protected species, and the need to avoid injury and disturbance to these species. In addition, all vehicles operated on the beach shall operate in accordance with the FWC's Best Management Practices for Operating Vehicles on the Beach (http://myfwc.com/conservation/you-conserve/wildlife/beach- driving/). *Note: when flightless chicks are present within or adjacent to travel corridors, construction-related vehicles shall not be driven through the corridor unless a Bird Monitor is present.*

14. ***Dune Planting Conditions. Planting of dune vegetation is encouraged outside of marine turtle nesting season. However, planting activities may occur during the marine turtle nesting season March 1 through October 31 under the following conditions:***

a. It is the responsibility of the Permittee to ensure that the project area and access sites are surveyed for marine turtle nesting activity. All nest surveys and activities involving marine turtles shall be conducted only by persons with a valid FWC permit issued pursuant to Florida Administrative Code 68E-1. For information regarding marine turtle permit holders, contact the FWC at MTP@myfwc.com.

b. Marine turtle nest surveys shall be initiated at the beginning of the nesting season or 65 days prior to installation of plants (whichever is

later). Surveys shall continue until completion of the project or through September 15 (whichever is earliest). Surveys shall be conducted throughout the project area and all beach access sites.

c. Any nests deposited in the area shall be left in place. The marine turtle permit holder shall install an on-beach marker at any nest site and a secondary marker located at a point as far landward as possible to ensure that future location of the nest will be possible should the on-beach marker be lost. A series of stakes and survey ribbon or string shall be installed to establish an area of 3 feet radius surrounding the nest. No planting or other activity shall occur within this area nor shall any activity occur which might cause indirect impacts within this area. Nest sites shall be inspected daily to ensure nest markers have not been removed.

d. The use of heavy equipment (including vehicles such as trucks) is not authorized in marine turtle nesting habitat. A lightweight (ATV style) vehicle, with tire pressures of 10 psi or less can operate on the beach if required.

e. Any vegetation planting shall be installed by hand labor/tools only.

f. All activity shall be confined to daylight hours and shall not occur prior to the completion of all necessary marine turtle surveys and conservation activities within the project area. Nighttime storage of equipment or materials shall be off the beach.

g. In the event a nest is disturbed or uncovered during planting activity, the Permittee shall cease all work and immediately contact the marine turtle permit holder responsible for marine turtle conservation measures within the project area. If a nest(s) cannot be safely avoided during construction, all activity within the affected project area shall be delayed until complete hatching and emergence of the nest.

h. All planting related activities must avoid marked marine turtle nests including those that may be on the beach before and after the marine turtle nesting season dates (May 1 through October 31). Any impacts to nests or marine turtles that inadvertently occur shall be immediately reported the Florida Fish and Wildlife Conservation Commission (FWC) at MarineTurtle@myfwc.com, and all work shall stop until authorized to continue by the Department and FWC.

i. All irrigation lines for the dune restoration planting, if proposed, will

be temporarily installed along the landward side of the dune only and will be removed once the plants have become established. Any watering necessary along the seaward side of the dune will be done by hand on an "as needed" basis.

Marine Turtle Protection Conditions.

15. **Fill Restrictions**. During the marine turtle nesting season, the contractor shall not advance the beach fill more than 500 feet along the shoreline between dusk and the following day, until the daily nesting survey is completed, and the beach has been cleared for fill advancement. If the 500-foot advancement limitation is not feasible for the project, an alternative distance shall be established during the preconstruction meeting, if a distance can be agreed upon in consultation with FWC. If the work area is extended, nighttime nesting surveys are required, and a Marine Turtle Permit Holder is required to be present on-site to ensure that no nesting and hatching marine turtles are present. If any nesting turtles are sighted on the beach within the immediate construction area, activities shall cease immediately until the turtle has returned to the water and the Marine Turtle Permit Holder responsible for nest monitoring has relocated the nest.

16. **Marine Turtle or Nest Encounters**. Upon locating a dead or injured marine turtle, a hatchling, or egg that may have been harmed or destroyed as a result of the project, the Permittee shall be responsible for notifying FWC Wildlife Alert at 1-888-404-FWCC (3922). Care shall be taken in handling injured marine turtles or exposed eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials for later analysis. If a marine turtle nest is excavated during construction activities, but not as part of the authorized nest relocation process outlined in these specific conditions, 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.

17. **Tilling, Compaction and Escarpment Remediation Requirements**. For the years after the first-year sand placement (out-year), compaction monitoring, tilling and escarpment monitoring are not required if placed material no longer remains on the dry beach.

    a. **Compaction Sampling**. Sand compaction shall be monitored in the area of sand placement immediately after completion of the nourishment event, and two weeks prior to marine turtle nesting season, for three (3) subsequent years. 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 prior to the beginning of marine turtle nesting season. If a few values exceeding 500 psi are

present randomly within the project area, tilling will not be required. Compaction monitoring shall be in accordance with the following protocol:

i. 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).

ii. At each station, the cone penetrometer shall be pushed to depths of 6, 12 and 18 inches three times (i.e., three replicates at each depth). 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 shall include all 18 values for each transect line, and the final 6 averaged compaction values.

iii. If values exceeding 500 psi are distributed throughout the project area, but do not exist at two adjacent stations at the same depth, then the Permittee shall consult with the FWC to determine if tilling is required. A tilling waiver based on these compaction values shall be submitted to the FWC at marineturtle@myfwc.com.

b. **Tilling Requirements**. If tilling is performed regardless of post-construction compaction levels or tilling is required based on compaction measurements, the area shall be tilled to a depth of 36 inches.

i. All tilling activity shall be completed prior to the marine turtle nesting season. If the project is completed during the marine turtle nesting season, tilling shall not be performed in areas where nests have been left in place or relocated.

ii. Each pass of the tilling equipment shall be overlapped to allow thorough and even tilling. A relatively even surface, with no deep

ruts or furrows, shall be created during tilling. To do this, chain-linked fencing or other material shall be dragged over those areas as necessary after tilling.

iii. Tilling shall occur landward of the wrack line and shall avoid all naturally vegetated areas that are at least 3 square feet in size, as well as any planted areas that have been authorized by the Department. A 3-foot-wide No- Tilling buffer shall be maintained around vegetated areas. The slope between the mean high-water line and the mean low water line shall be maintained to approximate natural slopes.

c. **Escarpment Surveys.** Visual surveys for escarpments along the project area shall be made immediately after completion of sand placement, two weeks prior to marine turtle nesting season, and weekly for three (3) subsequent years, each year placed sand remains on the beach. Escarpment remediation shall be as follows:

i. Prior to marine turtle nesting season, escarpments that interfere with marine turtle nesting or that exceed 18 inches in height for a distance of at least 100 feet shall be leveled to the natural beach contour or the beach profile shall be reconfigured to minimize scarp formation. Any escarpment removal shall be reported relative to R-monument location to FWC at marineturtle@myfwc.com, with a copy sent to the JCP Compliance Officer.

ii. If weekly surveys during the marine turtle nesting season document escarpments that exceed 18 inches in height for a distance of at least 100 feet and have persisted for more than two weeks, the FWC shall be contacted immediately to determine the appropriate action to be taken. Submitted information shall include locations and measurements of the escarpments and marine turtle nests located within 20 feet of the escarpments, with photographs when possible. Upon written notification, the Permittee shall level escarpments in accordance with methods that minimize impacts to any existing nest in coordination with the FWC and the marine turtle permit holder. An annual summary of escarpment surveys and actions taken shall be submitted electronically to FWC (marineturtle@myfwc.com).

d. If compaction sampling, tilling or escarpment removal occurs during shorebird breeding season, the Shorebird Conditions (including

surveys) included in this authorization shall be followed. No heavy equipment shall operate, and no compaction sampling or tilling shall occur within 300 feet of any shorebird nest. If flightless shorebird chicks are present within the work zone or equipment travel corridor, a Bird Monitor shall be present during the operation to ensure that no heavy equipment operates within 300 feet of the flightless young. It is the responsibility of the Permittee to ensure that their contractors avoid tilling, scarp removal or dune vegetation planting in areas where nesting birds are present.

18. **Post-Construction Monitoring and Reporting Marine Turtle Protection Conditions**

a. For each fill placement event, reports for all required nesting surveys shall be provided for the initial or remaining marine turtle nesting season and for up to three years additional nesting seasons if the placed material remains on the beach, accordance with the Table 1 (below). Surveys shall record the nest numbers, nesting success, reproductive success (hatching and emergence), disorientations, and lost nests due to erosion and/or inundation, by species. If nesting and reproductive success is less than the criteria in the table below, an additional year of monitoring and additional conditions prior to the next sand placement on this beach may be required by the Department and FWC. In accordance with Table 1:

i. For the remainder of the nesting season immediately following construction, and for the following year, the number and type of emergences (nests or false crawls) shall be reported per species. A third year of nesting surveys may be required if nesting success for any species on the nourished beach is less than 40%.

ii. For the remainder of the nesting season immediately following construction, reproductive success shall be reported for all loggerhead, Kemp's Ridley, green and leatherback nests.

iii. If the documented reproductive success for each species meets or exceeds the required criteria, monitoring for reproductive success shall be recommended, but not required for the second-year post-construction.

b. Data shall be reported for the nourished areas in accordance with **Table 1**. Summaries shall include all crawl activity, hatching success of a representative sampling of nests left in place (if any) by species, project name and applicable project permit numbers and dates of

construction. Summaries shall be submitted in electronic format (Excel spreadsheets) to the FWC Imperiled Species Management section at marineturtle@myfwc.com and copied to JCPCompliance@dep.state.fl.us. All summaries should be submitted by January 15th of the following year. The FWC Excel spreadsheet is available upon request from marineturtle@myfwc.com.

Table 1. Marine Turtle Monitoring for Beach Placement of Material

Date	Duration	Variable	Criterion
Nesting Success	Year of construction, two years post construction if placed sand remains on beach and variable does not meet criterion based on previous year	Number of nests and non-nesting emergences by day by species	40 percent or greater
Hatching success	Year of construction and one-year post construction if placed sand remains on beach and variable does not meet success criterion based on previous year	Number of hatchlings by species to hatch from egg	60 percent or greater (a statistically valid number of loggerhead and green nests, and all leatherback nests)
Emergence Success	Year of construction and one-year post construction if placed sand remains on beach and variable does not meet success criterion based on previous year	Number of hatchlings by species to emerge from nest onto beach	Average must not be significantly different than the average hatching success
Disorientations	Year of construction and two years post construction if placed sand remains on the beach	Number of nests and individuals that misorient or disorient	

Date	Duration	Variable	Criterion
Lighting Surveys	Two surveys the year following construction, one survey between May 1 and May 15 and second survey between July 15 and August 1	Number, location and photographs of lights visible from nourished berm, corrective actions and notifications made	Lighting survey and meeting resulting with plan for reduction in lights visible from nourished berm
Compaction	Three seasons following construction. Not required if the beach is tilled prior to nesting season each year placed sand remains on beach	Shear resistance	Less than 500 psi
Escarpment Surveys	Weekly during nesting season for three years each year placed sand remains on the beach	Number of scarps 18 inches or greater extending for more than 100 feet that persist for more than 2 weeks	Successful remediation of all persistent scarps as needed

19. Lighting surveys shall be conducted from the renourished berm and action taken to ensure that no artificial lights are visible from any dry portion of the newly elevated beach. The first survey shall be conducted between May 1 and May 15 for the first nesting season following construction, or immediately after sand placement if construction is not completed until after May 15. The survey shall follow standard techniques for such a survey, such as including the number and type of visible lights, location of lights, and photo documentation (additional techniques as per the 2015 USFWS Statewide Programmatic Biological Opinion).

    a. For each visible light source, the Permittee shall document that the property owner has been notified of the problem light and has been provided with recommendations for correcting the light. Recommendations shall be in accordance with local lighting ordinances, and a report summarizing all visible lights shall be forwarded to local code enforcement. If no lighting ordinances exist,

the recommendation shall be that no lights or light sources shall be visible from the newly elevated beach. A report summarizing all visible lights shall also be submitted to FWC at marineturtle@myfwc.com and copied to JCPCompliance@dep.state.fl.us by the 1st of the month following the survey.

b. The second survey shall be conducted between July 15 and August 1 to assess any remaining visible lights requiring corrective action. The survey shall be conducted from the top of the foreshore slope (i.e., the seaward edge of the filled berm before it slopes into the water), facing landward. A summary annual report of the surveys documenting what corrective actions or local enforcement actions have been taken shall be submitted to FWC by December 31 of that year. Upon request by the FWC, the Permittee shall set up a meeting with the county or municipality, USFWS and FWC to discuss the survey report, as well as any documented marine turtle disorientations in or adjacent to the project area.

Shorebird Protection.

20. The term "shorebird" refers to all solitary nesting shorebirds and colonial nesting seabirds. If any project activities as described below are conducted, the following shorebird protection conditions are required during the shorebird breeding cycle, which includes nesting. The following conditions are intended to avoid direct impacts associated with the construction of the project and may not address all potential take incidental to the operation and use related to this authorization.

a. Shorebird breeding season dates for this project area are March 1 through September 1. Note that while most species have completed the breeding cycle by September 1, flightless young may be present through September and must be protected if present.

b. Any parts of the project where "project activities" on the beach take place entirely outside the breeding season, do not require shorebird surveys. The term "project activities" includes operation of vehicles on the beach, movement or storage of equipment on the beach, sand placement or sand removal, and other similar activities that may harm or disturb shorebirds. Bird survey routes must be established and monitored throughout the entire breeding season in any parts of the project area where: 1) potential shorebird breeding habitat occurs, and 2) project activities are expected to occur at any time within the

breeding season.

c. Bird surveys shall be conducted in all potential beach-nesting bird habitats within the project boundaries that may be impacted by construction or pre-construction activities. One or more shorebird survey routes shall be established by the Permittee to cover project areas which require shorebird surveys. These routes must be approved by the FWC Regional Biologist as part of the Environmental Protection Plan approval process. Routes shall not be modified without prior FWC approval.

d. During the pre-construction and construction phases of the project, the Permittee shall ensure that surveys for detecting breeding activity and the presence of flightless chicks shall be completed on a daily basis by a qualified bird monitor prior to movement of equipment, operation of vehicles, or other activities that could potentially disrupt breeding behavior or cause harm to the birds or their eggs or young. If all project activities are completed and all personnel and equipment have been removed from the beach prior to the end of the breeding season, route surveys shall continue to be conducted at least weekly through the end of the breeding season. If breeding or nesting behavior is confirmed by the presence of a scrape, eggs or young, the Permittee (or their designee) shall establish a 300-foot buffer around the site and notify the FWC Regional Biologist within 24 hours.

e. The Bird Monitor shall conduct a shorebird education and identification program (and/or provide educational materials) with the on-site staff to ensure protection of precocial (mobile) chicks. All personnel are responsible for watching for shorebirds, nests, eggs and chicks. If the Bird Monitor finds that shorebirds are breeding within the project area, a bulletin board shall be placed and maintained in the construction staging area with the location map of the construction site showing the bird breeding areas and a warning, clearly visible, stating that “NESTING BIRDS ARE PROTECTED BY LAW INCLUDING THE FLORIDA ENDANGERED AND THREATENED SPECIES ACT AND THE STATE and FEDERAL MIGRATORY BIRD ACTS”.

f. **Bird Monitor Requirements.** The Permittee shall ensure that shorebird surveys are conducted by trained, dedicated individuals (Bird Monitor) with proven shorebird identification skills and avian survey experience. Bird Monitors shall review and become familiar with the general information, employ the data collection protocol, and

implement data entry procedures outlined on the FWC's FSD website (http://www.flshorebirddatabase.org or Florida Shorebird Database). The Permittee shall submit a list of Bird Monitors, with their contact information and a summary of qualifications, including bird identification skills and avian survey experience to the FWC Regional Biologist for approval. The Permittee shall submit the names and contact information of the Bird Monitors who have been approved by FWC to JCPCompliance@dep.state.fl.us, prior to any construction or shorebird surveys. In order to be approved, the Bird Monitors must meet the following minimum qualifications:

i. Has previously participated in beach-nesting bird surveys in Florida (provide references or resume). Experience with previous projects must document the ability to 1) identify all species of beach-nesting birds by sight and sound, 2) identify breeding/territorial behaviors, and find nests of shorebirds that occur in the project area, and 3) identify habitats preferred by shorebirds nesting in the project area.

ii. Have a clear working knowledge of, and adhere to, the Breeding Bird Protocol for Florida's Seabirds and Shorebirds.

iii. Have completed full-length webinars: Route-Surveyor Training and Rooftop Monitoring Training, including the annual refresher training. Training resources can be found on the Florida Shorebird Database (FSD) website.

iv. Familiar with FWC beach driving guidelines.

v. Experience posting beach-nesting bird sites, consistent with Florida Shorebird Alliance (FSA) Guidelines.

vi. Has registered as a contributor to the FSD.

21. **Bird Survey Protocols**. Bird survey protocols, including downloadable field data sheets, are available on the FSD website. All breeding activity shall be reported to the FSD website within one week of data collection. If the use of this website is not feasible for data collection, the FWC Regional Biologist must be contacted for alternative methods of reporting. The Permittee shall ensure that the Bird Monitors use the following survey protocols:

a. Surveys shall be conducted by walking the length of all survey routes and visually surveying for the presence of shorebirds exhibiting

breeding behavior, shorebird chicks or shorebird juveniles, as outlined in the FSD Breeding Bird Protocol for Shorebirds and Seabirds. Use of binoculars (minimum 8x40) is required and use of spotting scope may be necessary to accurately survey the area. If an ATV or other vehicle is needed to cover large survey routes, the Bird Monitor shall stop at intervals of no greater than 600 feet to visually inspect for breeding activity.

b. Once breeding is confirmed by the presence of a scrape, eggs or young, the Permittee (or their designee) shall notify the FWC Regional Biologist within 24 hours.

22. **Shorebird Buffer Zones and Travel Corridors**. The Permittee shall require the Bird Monitor(s) and Contractor(s) to meet the following:

a. The Bird Monitor(s) shall establish a disturbance-free buffer zone around any location within the project area where the Bird Monitor has observed shorebirds engaged in breeding behavior, including territory defense. A 300-foot buffer shall be established around each nest or around the perimeter of each colonial nesting area. A 300-foot buffer shall also be placed around the perimeter of areas where shorebirds are seen digging nest scrapes or defending nest territories. All construction activities, movement of vehicles, stockpiling of equipment, and pedestrian traffic are prohibited in the buffer zone**. Smaller, site-specific buffers may be established if approved in writing by the FWC Regional Biologist**. Travel corridors shall be designated and marked outside the buffer areas for pedestrian, equipment or vehicular traffic.

b. The Bird Monitor(s) shall keep breeding sites under sufficient surveillance to determine if birds appear agitated or disturbed by construction or other activities in adjacent areas. If birds do appear to be agitated or disturbed by these activities, then the Bird Monitor(s) shall immediately widen the buffer zone to a sufficient size to protect breeding birds.

c. The Bird Monitor(s) shall ensure that where breeding birds will tolerate pedestrian traffic, traditional pedestrian access will not be blocked. This is generally the case with lateral movement of beach-goers walking parallel to the beach at or below the highest tide line. Pedestrian traffic may also be allowed when breeding was initiated within 300 feet of an established beach access pathway.

d. The Bird Monitor(s) shall ensure that the perimeters of designated buffer zones shall be marked according to FSA Posting Guidelines: (http://flshorebirdalliance.org/resources/instructions-manuals.aspx) with posts, twine and FWC-approved signs stating "Do Not Enter, Important Nesting Area" or similar language around the perimeter (see example of signage for marking designated buffer zones at http://myfwc.com/conservation/you- conserve/wildlife/shorebirds/ . Posts shall not exceed 3 feet in height once installed. Symbolic fencing (twine, string or rope) should be placed between all posts at least 2.5 feet above the ground and rendered clearly visible to pedestrians. If pedestrian pathway and/or equipment travel corridor modifications are approved by the FWC Regional Biologist, these shall be clearly marked. **Posting shall be maintained in good repair until no active nests, eggs, or flightless young are present**. Although solitary nesters may leave the buffer zone temporarily with their chicks, the posted area continues to provide a potential refuge for the family until breeding is complete. Breeding is not considered to be completed until all chicks have fledged.

e. The Permittee shall ensure that the Bird Monitor(s) designate and mark travel corridors outside the buffer areas so as not to cause disturbance to breeding birds. Heavy equipment, other vehicles, or pedestrians may transit past breeding areas in these corridors. Stopping or turning heavy equipment and vehicles shall be prohibited within the designated travel corridors adjacent to the breeding site. When flightless chicks are present within or adjacent to travel corridors, movement of vehicles shall be adequately monitored by the Bird Monitor(s), who shall advise the contractor whose responsibility it is to ensure no chicks are in the path of the moving vehicle. In addition, tracks, ruts, or holes capable of trapping flightless chicks shall be smoothed or leveled after the Bird Monitor(s) inspect them for the presence of flightless young.

f. Any injury or death of a shorebird (including crushing eggs or young) resulting from project activities shall be reported immediately to the FWC Regional Biologist.

SPECIFIC CONDITIONS - PHYSICAL MONITORING REQUIRED:

23. The approved Physical Monitoring Plan can be revised at any later time by written request of the Permittee and with the written approval of the Department. If subsequent to approval of the Monitoring Plan there is a request for modification of the permit, the Department may require revised or additional monitoring requirements as a condition of approval of the permit modification.

24. If the collection of profile surveys were to be conducted as part of the county-wide monitoring program, there would be no need to duplicate the monitoring effort and those county-generated profile surveys would be acceptable in meeting this specific physical monitoring requirement, provided they satisfy the general requirements specified below in sub-item (a).

    As guidance for obtaining Department approval, the plan shall generally contain the following items:

    a. Topographic and bathymetric profile surveys of the beach and offshore shall be conducted prior to commencement of construction, immediately following completion of construction, and biennially thereafter beginning one or two years following completion of construction. A pre-construction survey of the project area to receive beach fill may use surveys conducted for purposes of construction bidding, contracting or construction management. The post-construction survey of the beach fill may use surveys and other information collected periodically during construction for purposes of construction management and payment. Alternatively, the post-construction survey may consist of a single beach-offshore profile survey event of the project monitoring area conducted within 60 days after completion of beach fill placement.

       Thereafter, monitoring surveys shall be conducted biennially beginning approximately one year following completion of construction until the next beach nourishment event or the expiration of the project design life, whichever occurs first. The monitoring surveys shall be conducted during a spring or summer month and repeated as close as practicable during that same month of the year. If the time period between the post-construction survey and the first biennial monitoring survey is less than six months, then the Permittee may at their discretion postpone the first monitoring survey until the following spring/summer.

       The monitoring area shall include profile surveys at each of the Department of Environmental Protection's reference monuments within the bounds of the beach fill area and along at least 5,000 feet of the adjacent shoreline on both sides of the beach fill area. All work activities and deliverables for the biennial monitoring surveys shall be conducted in accordance with the latest update of the Department's *Monitoring Standards for Beach Erosion Control Projects, Sections 01000 and 01100.*

b. The Permittee shall submit an engineering report and the monitoring data to the Department within 90 days following completion of the construction and each biennial monitoring survey.

The report shall summarize and discuss the data, the performance of the beach fill project, and identify erosion and accretion patterns within the monitored area. Results shall be analyzed for patterns, trends, or changes between annual surveys and cumulatively since project construction. In addition, the report shall include a comparative review of project performance to performance expectations and identification of adverse effects attributable to the project.

The report shall specifically include:

- A record of the volume and location of all beach fill or inlet sand bypassing material placed within the project area;
- The volume and percentage of advance nourishment lost since the last beach nourishment project as measured landward of the MHW line of the most recent survey;
- The most recent MHW shoreline positions (feet) in comparison with the design profile at each individual monument location;
- The MHW shoreline position changes (feet) relative to the pre-construction survey at each individual monument location for all the monitoring periods;
- The total measured remaining volume (cubic yards) in comparison with the total predicted remaining volume (cubic yards) above the MHW line and above the Depth of Closure for the entire project area over the successive monitoring periods; and,
- Other shoreline position and volumetric analysis the Permittee or Engineer deem useful in assessing, with quantitative measurements, the performance of the project.

The report shall include computations, tables and graphic illustrations of volumetric and shoreline position changes for the monitoring area. An appendix shall include superimposed plots of the two most recent beach profile surveys, the design profile, and pre- and post-construction beach profile at each individual monument location.

c. An electronic copy of the monitoring report and the survey data shall be submitted to the Department's JCP Compliance Officer. Failure to submit reports and data in a timely manner constitutes grounds for revocation of the permit. When submitting any monitoring information to the Department, please include a transmittal cover letter clearly labeled with the following at the top of each page: **This monitoring information is submitted in accordance with the approved Monitoring Plan for Permit No. 0363427-001- JC for the monitoring period [XX].**

SPECIFIC CONDITIONS – WATER QUALITY MONITORING:

25. In order to assure that turbidity levels do not exceed the compliance standards established in this permit, construction at the project site shall be monitored closely by an independent third party with formal training in water quality monitoring and professional experience in turbidity monitoring for coastal construction projects. Also, an individual familiar with beach construction techniques and turbidity monitoring shall be present at all times when fill material is placed on the beach. This individual shall have authority to alter construction techniques or shut down the beach construction operations if turbidity levels exceed the compliance standards established in this permit. The names and qualifications of those individuals performing these functions, along with 24-hour contact information, shall be submitted for approval pursuant to Specific Condition 3.

26. Water Quality - Turbidity shall be monitored as follows:

Units: Nephelometric Turbidity Units (NTUs).

Frequency: Monitoring at the placement site shall be conducted 3 times daily, approximately 4 hours apart, and at any other time that there is a likelihood of an exceedance of the turbidity standard, during all operations.

All turbidity sampling shall be conducted while the highest project-related turbidity levels are crossing the edge of the mixing zone. The compliance samples and the corresponding background samples shall be collected at approximately the same time, i.e., one shall immediately follow the other.

Location: ***Background:*** Sampling shall occur at surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above the bottom, clearly outside the influence of any artificially generated turbidity plume or the influence of an outgoing inlet plume.

Beach Site: Samples shall be collected at least 300 meters up-current from any portion of the beach that has been, or is being, filled during the current construction event, at the same distances offshore as the associated compliance samples.

Compliance: Sampling shall occur at surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above the bottom.

Beach Site: Samples shall be collected where the densest portion of the turbidity plume crosses the edge of the mixing zone polygon, which measures up to 150 meters offshore and up to 1,000 meters alongshore or at the edge of the nearest hardbottom in the down- current direction, whichever is closest to the discharge point into the Atlantic Ocean.

Note: If the plume flows parallel to the shoreline, the densest portion of the plume may be close to shore, in shallow water. In that case, it may be necessary to access the sampling location from the shore, in water that is too shallow for a boat.

Intermediate Monitoring (required when using a mixing zone that exceeds 150 meters in size): At surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above bottom. At points approximately 250, 500 and 750 meters down-current from the discharge point, within the densest portion of any visible turbidity plume generated by this project. These measurements will be used to calibrate the size of the mixing zone for future events.

Calibration: The instruments used to measure turbidity shall be fully calibrated with primary standards within one month of the commencement of the project, and at least once a month throughout the project. Calibration with secondary standards shall be verified each morning prior to use, after each time the instrument is turned on, and after field sampling using two secondary turbidity "standards" that bracket the anticipated turbidity samples. If the post-sampling calibration value deviates more than 8% from the previous calibration value, results shall be reported as estimated and a description of the

problem shall be included in the field notes.

Analysis of turbidity samples shall be performed in compliance with DEP- SOP-001/01 FT 1600 Field Measurement of Turbidity: http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/2008sops/ft1600.pdf

If the turbidity monitoring protocol specified above prevents the collection of accurate data, the person in charge of the turbidity monitoring shall contact the JCP Compliance Officer to establish a more appropriate protocol. Once approved in writing by the Department, the new protocol shall be implemented through an administrative permit modification.

27. The **compliance** locations given above shall be considered the limits of the temporary mixing zone for turbidity allowed during construction. If monitoring reveals turbidity levels at the **compliance** sites that are greater than 29 NTUs above the corresponding background turbidity levels, construction activities shall **cease immediately** and not resume until corrective measures have been taken and turbidity has returned to acceptable levels. Any such occurrence shall also be immediately reported to the JCP Compliance Officer via email at JCPCompliance@dep.state.fl.us and include in the subject line, "TURBIDITY EXCEEDANCE", and the Project Name and Permit Number. Also notify the Department's Central District office.

    a. When reporting a turbidity exceedance, the following information shall also be included:

        i. the Project Name;

        ii. the Permit Number (0363427-001-JC);

        iii. location and level (NTUs above background) of the turbidity exceedance, (shown on a map with GPS coordinates);

        iv. the time and date that the exceedance occurred; and

        v. the time and date that construction ceased.

    b. Prior to re-commencing the construction, a report shall be emailed to the Department with the same information that was included in the "Exceedance Report", plus the following information:

i. turbidity monitoring data collected during the shutdown documenting the decline in turbidity levels and achievement of acceptable levels;

ii. corrective measures that were taken; and

iii. cause of the exceedance.

28. **Turbidity Reports:** All turbidity monitoring data shall be submitted within one week of analysis. The data shall be presented in tabular format, indicating the measured turbidity levels at the compliance sites for each depth, the corresponding background levels at each depth and the number of NTUs over background at each depth. Any exceedances of the turbidity standard (29 NTUs above background) shall be highlighted in the table. In addition to the raw and processed data, the reports shall also contain the following information:

a. Time of day samples were taken;

b. Dates of sampling and analysis;

c. GPS location of sample. When possible, coordinates should be provided in decimal degrees with a 5 decimal level of precision (i.e., 0.000001). Please also indicate the datum;

d. Depth of water body;

e. Depth of each sample;

f. Antecedent weather conditions, including wind direction and velocity;

g. Tidal stage and direction of flow;

h. Water temperature;

i. A geo-referenced map, overlaid on an aerial photograph, indicating the sampling locations (background and compliance), the visible plume pattern within the applicable mixing zone and direction of flow. The turbidity sampling map shall also include the boundaries of the benthic resources within 150 meter of the construction activities for which turbidity was sampled. A sample map shall be reviewed and approved by the Department prior to construction;

j. A statement describing the methods used in collection, handling, storage and analysis of the samples;

k. A statement by the individual responsible for implementation of the sampling program concerning the authenticity, precision, limits of detection, calibration of the meter, accuracy of the data and precision of the GPS measurements;

l. When samples cannot be collected, include an explanation in the report. If unable to collect samples due to severe weather conditions, include a copy of a current report from a reliable, independent source, such as an online weather service.

Weekly turbidity monitoring reports shall be submitted electronically to the JCP Compliance Officer at JCPCompliance@dep.state.fl.us. Reports shall be submitted under a cover letter containing the following statement: "This information is provided in partial fulfillment of the monitoring requirements in Permit No. 0363427-001-JC." The cover letter shall summarize any significant compliance issues. Also, please clearly reference the permit number and project name on each page of the report.

Failure to submit monitoring reports in a timely manner constitutes a violation of the permit pursuant to Chapter 403.161, F.S.,

SPECIFIC CONDITIONS - BIOLOGICAL MONITORING:

29. No impacts to hardbottom resources are authorized by this permit. Biological monitoring of nearshore hardbottom areas shall be conducted to provide the Department with reasonable assurance that any unpermitted, project-related, persistent or temporary, negative impacts (direct or indirect) to hardbottom resources will be documented, if they occur (see Specific Condition 30). Unpermitted project related impacts documented during the course of monitoring shall be mitigated for. Impacts and their mitigation will be handled through compliance and enforcement action, and the amount of mitigation may be determined according to the Department's UMAM assessment.

30. The Permittee shall adhere to the current, Department approved **Biological Monitoring Plan** (dated November 2018), which is a binding part of this permit. The Permittee is responsible for ensuring that their selected monitoring firm is knowledgeable of all permit conditions pertaining to monitoring requirements (including the approved Monitoring Plan); not just the scope of work in the contract prepared by the Permittee/contractor.

The aim of hardbottom biological monitoring is to identify any unpermitted direct and / or secondary adverse impacts to nearshore hardbottom resources due to the spreading of project sand further than permitted (i.e., seaward of the permitted ETOF) should they occur. As such, nearshore hardbottom adjacent to, updrift, and downdrift of the fill template, beyond the ETOF, shall be monitored. A single pre-construction monitoring event shall be conducted prior to the initial fill placement event (beach restoration) conducted under this Permit. This pre-construction monitoring event shall serve as the baseline for all post-construction (beach restoration or nourishment) monitoring conducted under this Permit. An immediate post-construction monitoring event (within six months of project completion) and three annual post-construction monitoring events (Years 1, 2, and 3 post-construction) shall be conducted following each fill placement event (beach restoration or nourishment) (i.e., each fill placement event shall trigger a complete round of post-construction monitoring). Unless otherwise approved by FDEP staff, all monitoring events shall be conducted during summer months (May through September), as close as practicable to the date the baseline survey was conducted. Standard operating procedures shall be used during each monitoring event to provide consistent and repeatable collection of data.

Surveys conducted during each monitoring event will document sediment depth and cover as well as the abundance, distribution, condition, and function of hardbottom resources (biotic assemblages). **Table 2** (below), titled “Hardbottom Monitoring Summary”, summarizes surveys and tasks required in the Biological Monitoring Plan; these are described in detail in the Plan itself. Reports are required to be submitted following each survey, according to the Plan. The Permittee shall acquire written approval from the Department prior to implementing any revisions to the approved Biological Monitoring Plan.

Table 2. Hardbottom Monitoring Summary

Survey Unit	**Survey**	**Frequency**	**Deliverables**
Permanent Transects (N=20); 9 Biological Transects and 11 Sediment Only Transects	Line-Intercept: along all 20 transects	**Pre-construction (N=1):** Once prior to initial fill placement event. **Post-construction (N=4 per fill placement event):** Immediately (within 6 months) and annually for 3 years (years 1, 2, and 3) following each fill placement event.	Excel spreadsheet, PDF of field sheets
	Interval Sediment Depth Measurements: along all 20 transects		Excel spreadsheet, PDF of field sheets
	Qualitative Video: along all 9 Biological transects		Video
	Quadrat Sampling: within all 0.5 m^2 quadrats along all 9 Biological transects		Excel spreadsheet, PDF of field sheets
Hardbottom Edge	Mapping of Landward Hardbottom Edge: between R-69.5 and R-87		Shapefiles

Reporting requirements for biological monitoring are as follows:

a. The biological monitoring firm shall notify the Department (JCP Compliance Officer) when biological monitoring has begun and when biological monitoring has been completed. Additionally, the biological monitoring firm shall submit brief, weekly progress reports to the Department during each monitoring period.

   All raw data that are collected shall be submitted simultaneously to the JCP Compliance Officer, the contractor and the Permittee as collected in the field and as entered into spreadsheets for analysis, beginning with the pre-construction (baseline) monitoring event. Raw data associated with post-construction monitoring shall be provided to the JCP Compliance Officer within 45 days of completing each post-construction monitoring event. Raw data shall be provided to the JCP Compliance Officer in electronic format, preferably on a single portable hard drive or via an FTP site. All data shall be provided in a standardized format, as specified in the approved Biological Monitoring Plan. The monitoring agent shall confirm that all data submitted in Excel workbooks (transect monitoring data) are consistent with the field datasheets to ensure accuracy and shall correct any errors or inconsistencies prior to the 45-day deadline. Data provided to the JCP Compliance Officer shall consist of the following: aerial photographs

(if required), video and in situ photographs; hardbottom edge survey data; raw transect survey data, and field datasheets (see **Table 2**. "Hardbottom Monitoring Summary", above). Descriptions of all raw data materials (and their formats) to be provided to the JCP Compliance Officer are detailed in the attached approved Biological Monitoring Plan.

c. Within 90 days of completing each post-construction monitoring event, the monitoring agent shall provide a biological monitoring report to the JCP Compliance Officer in electronic format. The report will be submitted by the monitoring firm directly and concurrently to the DEP/Permittee/Agent. The content and format of the monitoring report shall meet the criteria set forth in the approved Biological Monitoring Plan.

SPECIFIC CONDITIONS – POST CONSTRUCTION:

31. Within 90 days after completion, of construction of the permitted or authorized activity, the Permittee shall submit a notice of completion to the JCP Compliance Officer that includes the following information:
    a. The permit number (0363427-001-JC) and the project name (Indian River County Sector 5 Beach and Dune Restoration Project).

    b. A statement of full compliance with the requirements and specifications of this permit

NOTICE OF RIGHTS

FLAWAC Review
The applicant, or any party within the meaning of Section 373.114(1)(a) or 373.4275, F.S., may also seek appellate review of this order before the Land and Water Adjudicatory Commission under Section 373.114(1) or 373.4275, F.S. Requests for review before the Land and Water Adjudicatory Commission must be filed with the Secretary of the Commission and served on the Department within 20 days from the date when this order is filed with the Clerk of the Department.

Judicial Review
Once this decision becomes final, any party to this action has the right to seek judicial review pursuant to Section 120.68, F.S., by filing a Notice of Appeal pursuant to Rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, M.S. 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of

Appeal. The Notice of Appeal must be filed within 30 days from the date this action is filed with the Clerk of the Department.

Attachments:

1. Approved Permit Drawings (15 pages)
2. Biological Monitoring Plan (approved November 2018)
3. Physical Monitoring plan
4. Sediment QA/QC Plan

EXECUTION AND CLERKING:

Executed in Tallahassee, Florida.
STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

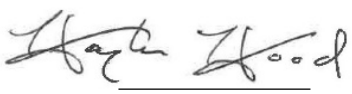
Gregory W. Garis
Program Administrator
Beaches, Inlets and Ports
Program Division of Water
Resource Management

CERTIFICATE OF SERVICE
The undersigned duly designated deputy clerk hereby certifies that this permit and all copies were sent on the filing date below

cc: Robert Brantly, FDEP, DWRM, Robert.Brantly@dep.state.fl.us; Jennifer K Steele, FDEP, DWRM, Jennifer.K.Steele@dep.state.fl.us ; Brendan Biggs, FDEP, DWRM; Brendan.Biggs@dep.state.fl.us ; Rob Buda, FDEP, DWRM, Rob.Buda@dep.state.fl.us; Catherine Florko, FDEP, DWRM, Catherine.Florko@dep.state.fl.us

JCP Compliance Officer
BIPP Permit File
MarineTurtle@MyFWC.com
ConservationPlanningServices@myfwc.com

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to Section 120.52, F. S., with the designated Department Clerk, receipt of which is hereby acknowledged.



Clerk

February 1, 2019
Date

DEPARTMENT OF THE ARMY PERMIT

Permittee: Indian River County, Public Works
Attn: Rich Szpyrka
1801 27th Street, Building A
Vero Beach, Florida 32960

Permit No: SAJ-2018-01171(SP-AWP)

Issuing Office: 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 placement of 155,000 cubic yards (cy) of beach quality sand by truck haul to restore and maintain the area of critical erosion along Sector 5. A total of 2,700 cy of beach quality sand is proposed to be placed below the mean high water line (MHWL). The fill below the MHWL would span 2.59 acres.

The template consists of a flat dune crest extending from the existing upland grade at elevation +15.0 feet NAVD for R-70 to R-82, (transition from +15.0 to +14.0 located between R-82 and R-83), +14.0 feet NAVD for R-83 to R-84, (transition from +14.0 to +13.0 located between R-84 and R-85), and +13.0 feet NAVD for R-85 to R-86, or at the elevation to match an existing backshore structure (i.e. seawall). If necessary, the landward side of the constructed dune crest is to slope down no steeper than 1V:5H to meet with the existing grade. The template's dune crest width is typically 11 to 25 feet, and averages 18 feet wide (relative to November 2017 condition). From the seaward edge of the constructed dune crest, the template slopes down at 1V:3H to +8.0 feet NAVD. The template includes a narrow flat berm at +8.0 feet NAVD that is typically 12 to 18 feet wide, and averages 17 feet wide. From the seaward edge of the berm, the template slopes down at 1V:8H until intersecting with the existing profile. The intersection elevation varies due to the beach shape at individual profiles, but typically intersects near mean high water (+0.6 feet NAVD). The work described above is to be completed in accordance with the 11 attachments affixed at the end of this permit instrument.

Project Location: The project site is located along the shoreline of the Atlantic Ocean beginning at Mariner Beach Lane, Florida Department of Environmental Protection (FDEP) Range Monument (R-70), and extends south to Bay Oak Lane within the City of

Vero Beach (R-86). The project limits are referred to as Indian River County - Sector 5. The project is located in Sections 19, 20, 29, and 32, Township 32 South, Range 40 East, and Section 5, Township 33 South, Range 40 East, Indian River County, Florida.

Directions to site: From I-95 in Florida, take exit 147 for FL-60. Turn onto FL-60 E (West Vero Corridor) toward Vero Beach. Travel 8.6 miles. Turn left onto lndrio River Road. Travel 1.0 mile. Turn right onto SR-60 E (Merrill P Barber Bridge). Travel 1.0 mile. Continue onto Beach land Blvd. Travel 0.7 miles to Ocean Drive. The Sexton Plaza parking lot is located on the eastern side of the intersection of Beachland Blvd and Ocean Drive. Sexton Plaza is located just south of the midpoint of the project at R-81.5.

Approximate Central Coordinates: Latitude: 27.6625° North
Longitude: 80.3583° West

Permit Conditions

General Conditions:

1. The time limit for completing the work authorized ends on **March 26, 2034**. 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 been 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.

Special Conditions:

1. **Reporting Address:** All reports, documentation, Notice to Proceed, and correspondence required by the conditions of this permit, including any reports required by the FDEP permit number 0363427-001-JC (Attachment 2) shall be submitted to the following addresses and/or email:

U.S. Army Corps of Engineers
Regulatory Division
Enforcement Section
Jacksonville, Fl 32232

For electronic mail: SAJ-RD-Enforcement@usace.army.mil (not to exceed 10 MB)

USFWS
1339 20th Street
Vero Beach, Fl 32960

Southeast Regional Office, Habitat Conservation
NOAA, National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, Florida 33701

The Permittee shall reference this permit number, SAJ-2018-01171(SP-AWP), on all submittals.

2. Before the commencement of sand placement, the County Attorney or designee will brief the designated construction supervisor and On-site Representative about the stop work procedures, and applicable Federal, state, and local laws pertaining to the discovery of human remains and archaeological materials. The Permittee will provide minutes of this briefing with the notice of commencement required in Special Condition number 4.

3. The attached Specific Conditions of Water Quality Certification/Permit number 0363427-001-JC dated February 1, 2019, issued by the FDEP (Attachment 2), are hereby incorporated in this Department of the Army (DA) permit. The Permittee agrees

that should the above referenced State permit be modified in any way the Permittee will apply to the Corps for a modification to this permit instrument.

4. **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. The Permittee shall also provide the briefing minutes required in Special Condition 2.

Beach fill

5. Based on the beach profile survey conducted in November 2017, the Permittee shall place +/-155,000 cubic yards of beach quality sand within the permitted template along 3.1 linear miles of Atlantic Ocean shoreline between FDEP Reference Monuments R-70 and R-86 at a frequency no greater than every two (2) years for the duration of the permit. The volume may vary based on updated profile survey of the beach in accordance with Special Condition No. 24 of the FDEP permit (0363427-001-JC). The varying volume of material shall maintain the project design intent to not impact nearshore hardbottom. The beach template consists of a flat dune crest extending from the existing upland grade at elevation +15.0 feet NAVD for R-70 to R-82, (transition from +15.0 to +14.0 located between R-82 and R-83), +14.0 feet NAVD for R-83 to R-84, (transition from +14.0 to +13.0 located between R-84 and R-85), and +13.0 feet NAVD for R-85 to R-86, or at the elevation to match an existing backshore structure (i.e. seawall). If necessary, the landward side of the constructed dune crest is to slope down no steeper than 1V:5H to meet with the existing grade. The template's dune crest width is typically 11 to 25 feet, and averages 18 feet wide (relative to November 2017 condition). From the seaward edge of the constructed dune crest, the template slopes down at 1V:3H to +8.0 feet NAVD. The template includes a narrow flat berm at +8.0 feet NAVD that is typically 12 to 18 feet wide, and averages 17 feet wide. From the seaward edge of the berm, the template slopes down at 1V:8H until intersecting with the existing profile. The intersection elevation varies due to the beach shape at individual profiles, but typically intersects near mean high water (+0.6 feet NAVD).

6. The Permittee agrees to utilize only beach compatible sand which meets the standards under the Florida Administrative Code rule 62B-41.007(2)(j) for placement within the project. Florida Administrative Code rule 62B-41.007(2)(j) states: To protect the environmental functions of Florida's beaches, only 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 (4.0<) and 4.76mm (-2.25<) (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 existing coastal system at the disposal site and shall not contain:

1. Greater than 5 percent, by weight, silt, clay or colloids passing the #230 sieve (4.0<);
2. Greater than 5 percent, by weight, fine gravel retained on the #4 sieve (-2.25<);
3. Coarse gravel, cobbles or material retained on the 3/4 inch sieve in a percentage or size greater than found on the native beach;
4. Construction debris, toxic material or other foreign matter; and
5. Not result in cementation of the beach.

If rocks or other non-specified materials appear on the surface of the filled beach in excess of 50% of background in any 10,000 square foot area, then surface rock should be removed from those areas. These areas shall also be tested for subsurface rock percentage and remediated as required. If the natural beach exceeds any of the limiting parameters listed above, then the fill material shall not exceed the naturally occurring level for that parameter.

Monitoring

7. The Permittee agrees all material placed on the beach face will be in compliance with FDEP permit and FDEP-approved Sediment QA/QC Plan dated August 30, 2018, Attachment 3.

8. The Permittee shall survey the beach profiles in accordance with the attached Physical Monitoring Plan dated April 12, 2018, Attachment 4.

9. The Permittee shall monitor the nearshore hardbottom in accordance with the attached Hardbottom Biological Monitoring Plan dated September 2018, Attachment 5.

10. The Permittee agrees to provide the engineering monitoring report and the monitoring data to the Corps within 90 days of completion of each report and survey.

11. The Permittee agrees that should the monitoring or survey data indicate that a net loss of nearshore hardbottom habitat has occurred as a result of the project the Permittee shall notify the Corps via a request for permit modification within 60 days of discovery of the impacts and propose a mitigation plan to offset the loss. The mitigation proposal will also include mitigation to compensate for the temporal loss of nearshore hardbottom habitat function associated with the additional impacts. The Corps reserves the right to fully evaluate, amend, and approve the compensatory mitigation proposal. The mitigation shall be completed within sixty (60) days following approval of a mitigation plan.

Endangered and Threatened Species

12. **Biological Opinion**: This Corps permit does not authorize the Permittee to take an endangered species, in particular the loggerhead sea turtle, leatherback sea turtle, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, West Indian manatee, Johnson's seagrass, smalltooth sawfish, shortnose sturgeon, southeastern beach mouse or the piping plover. In order to legally take a listed species, the Permittee must have separate authorization under the Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a BO under ESA Section 7, with "incidental take" provisions with which the Permittee must comply). The enclosed U.S. Fish and Wildlife Service (Service), Statewide Programmatic Biological Opinion (SPBO) dated March 13, 2015 (FWS 2015); and Programmatic Piping Plover Biological Opinion (P3BO) dated May 22, 2013 (FWS 2013) (Attachments 6 and 7) contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BOs. Authorization under this Corps permit is conditional upon compliance with all of the mandatory terms and conditions associated with incidental take of the attached BOs, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BOs, 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 Service is the appropriate authority to determine compliance with the terms and conditions of its BOs, and with the ESA.

13. **South Atlantic Regional Biological Assessment (SARBA)**: The Permittee shall comply with the Project Design Criteria specified for beach placement actions. The SARBA and Appendix G "Loggerhead Critical Habitat" are provided as Attachment 8 of this permit.

14. **Manatee Conditions**: The Permittee shall comply with the "Standard Manatee Conditions for In-Water Work – 2011" provided in Attachment 9 of this permit.

15. **Sea Turtle and Smalltooth Sawfish Conditions**: The Permittee shall comply with National Marine Fisheries Service's "Sea Turtle and Smalltooth Sawfish Construction Conditions" dated March 23, 2006 and provided in Attachment 10 of this permit.

16. The Permittee shall replace any beach/dune vegetation inadvertently destroyed during construction with plants of the same species.

Cultural Resources/Historic Properties

17. Cultural Resources/Historic Properties:

a. No structure or work shall adversely affect, impact, or disturb properties listed in the *National Register of Historic Places* (NRHP) or those eligible for inclusion in the NRHP.

b. If during the ground disturbing activities and construction work within the permit area, there are archaeological/cultural materials encountered which were not the subject of a previous cultural resources assessment survey (and which shall include, but not be limited to: pottery, modified shell, flora, fauna, human remains, ceramics, stone tools or metal implements, dugout canoes, evidence of structures or any other physical remains that could be associated with Native American cultures or early colonial or American settlement), the Permittee shall immediately stop all work and ground-disturbing activities within a 100-meter diameter of the discovery and notify the Corps within the same business day (8 hours). The Corps shall then notify the Florida State Historic Preservation Officer (SHPO) and the appropriate Tribal Historic Preservation Officer(s) (THPO(s)) to assess the significance of the discovery and devise appropriate actions.

c. Additional cultural resources assessments may be required of the permit area in the case of unanticipated discoveries as referenced in accordance with the above Special Condition; and if deemed necessary by the SHPO, THPO(s), or Corps, in accordance with 36 CFR 800 or 33 CFR 325, Appendix C (5). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume on non-federal lands without written authorization from the SHPO for finds under his or her jurisdiction, and from the Corps.

d. In the unlikely event that unmarked human remains are identified on non-federal lands, they will be treated in accordance with Section 872.05 Florida Statutes. All work and ground disturbing activities within a 100-meter diameter of the unmarked human remains shall immediately cease and the Permittee shall immediately notify the medical examiner, Corps, and State Archeologist within the same business day (8-hours). The Corps shall then notify the appropriate SHPO and THPO(s). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume without written authorization from the State Archeologist and from the Corps.

As-Built

18. **As-Builts:** The Permittee shall conduct an as-built survey of the beach fill placement within 30 days of completion of the each beach fill event. The Permittee shall submit the as-built drawings of the authorized work and a completed As-Built Certification Form (Attachment 11) to the Corps within 90 days of completion of each event. The drawings shall be signed and sealed by a registered professional engineer and include the following:

a. A plan view drawing of the location of the authorized work footprint (as shown on the permit drawings) with an overlay of the work as constructed in the same scale as the attached permit drawings (8.5-inch by 11-inch). The drawing shall show all fill placement and dredging.

b. List any deviations between the work authorized by this permit and the work as constructed. In the event that the completed work deviates, in any manner, from the authorized work, describe on the As-Built Certification Form the deviations between the work authorized by this permit and the work as constructed. Clearly indicate on the as-built drawings any deviations that have been listed. Please note that the depiction and/or description of any deviations on the drawings and/or As-Built Certification Form does not constitute approval of any deviations by the U.S. Army Corps of Engineers.

c. The Department of the Army Permit number.

d. Include pre- and post-construction aerial photographs of the project site, if available.

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.

Kendra Cope 04/02/19

(PERMITTEE) (DATE)

Kendra Cope

(PERMITTEE NAME-PRINTED)

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

April 2, 2019

(DISTRICT ENGINEER) (DATE)

for Andrew D. Kelly, Jr.
Colonel, U.S. Army
District Commander

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, have the transferee sign and date below.

_____ _____
(TRANSFEREE-SIGNATURE) (DATE)

_____
(NAME-PRINTED)

_____
(ADDRESS)

_____
(CITY, STATE, AND ZIP CODE)

Attachments to Department of the Army Permit Number SAJ-2018-01171(IP-AWP)

1. PERMIT DRAWINGS: 15 pages, dated April 12, 2018

2. WATER QUALITY CERTIFICATION: Specific Conditions of the water quality permit/certification in accordance with General Condition number 5 on page 2 of this DA permit. 40 pages.

3. QA/QC plan Monitoring Plan: 6 pages

4. Physical Monitoring Plan: 3 pages

5. Hardbottom Biological Monitoring Plan: 14 pages

6. USFWS Biological Opinion – SPBO: 193 pages

7. USFWS Biological Opinion – P3BO: 64 pages

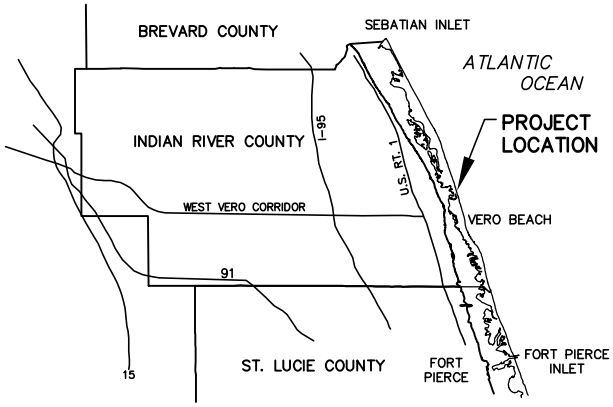
8. South Atlantic Regional Biological Assessment (SARBA) – 111 pages

9. Standard Manatee Conditions for In-Water Work - 2011: 2 pages

10. Sea Turtle and Smalltooth Sawfish Construction Conditions dated March 23, 2006: 1 page

11. As-Built Certification Form: 2 pages

SECTOR 5
BEACH AND DUNE RESTORATION PROJECT
INDIAN RIVER COUNTY, FL

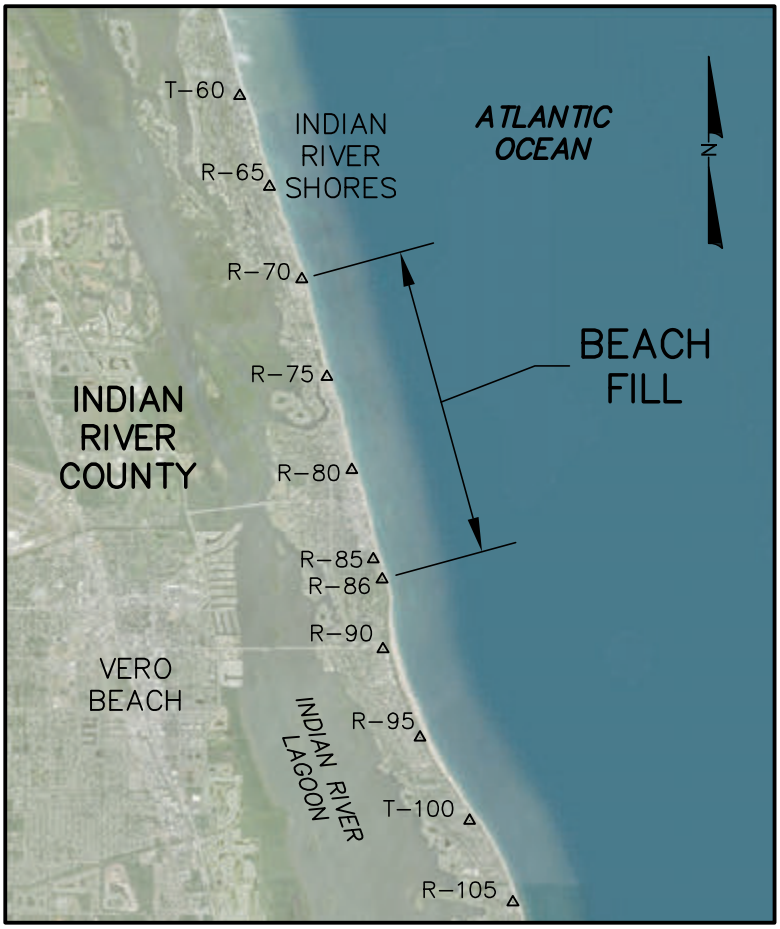


INDEX TO SHEETS

NO.	TITLE
1	COVER SHEET
2	PROJECT OVERVIEW MAP
3–5	PROJECT PLAN VIEW
6–14	CROSS SECTIONS
15	PLANTING DETAIL

PROJECT AREA

SECTION: 32S–19, 20, 29, 32; 33S–5
TOWNSHIP: 32S, 33S
RANGE: 40E
NORTHERN LIMIT: 27°41.10'N / 80°21.89'W
SOUTHERN LIMIT: 27°38.52'N / 80°21.11'W



NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

This item has been digitally signed and sealed by William L. Reilly, PE on April 12, 2018 using a Digital Signature.
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SECTOR 5 BEACH AND DUNE RESTORATION PROJECT
COVER SHEET

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BOCA RATON, FLORIDA 33431
www.aptim.com
PH. (561) 391-8102
FAX (561) 391-9116
C.O.A. FL. #4028

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BY: GK
COMM NO.: 636208650
SHEET: 1 of 15

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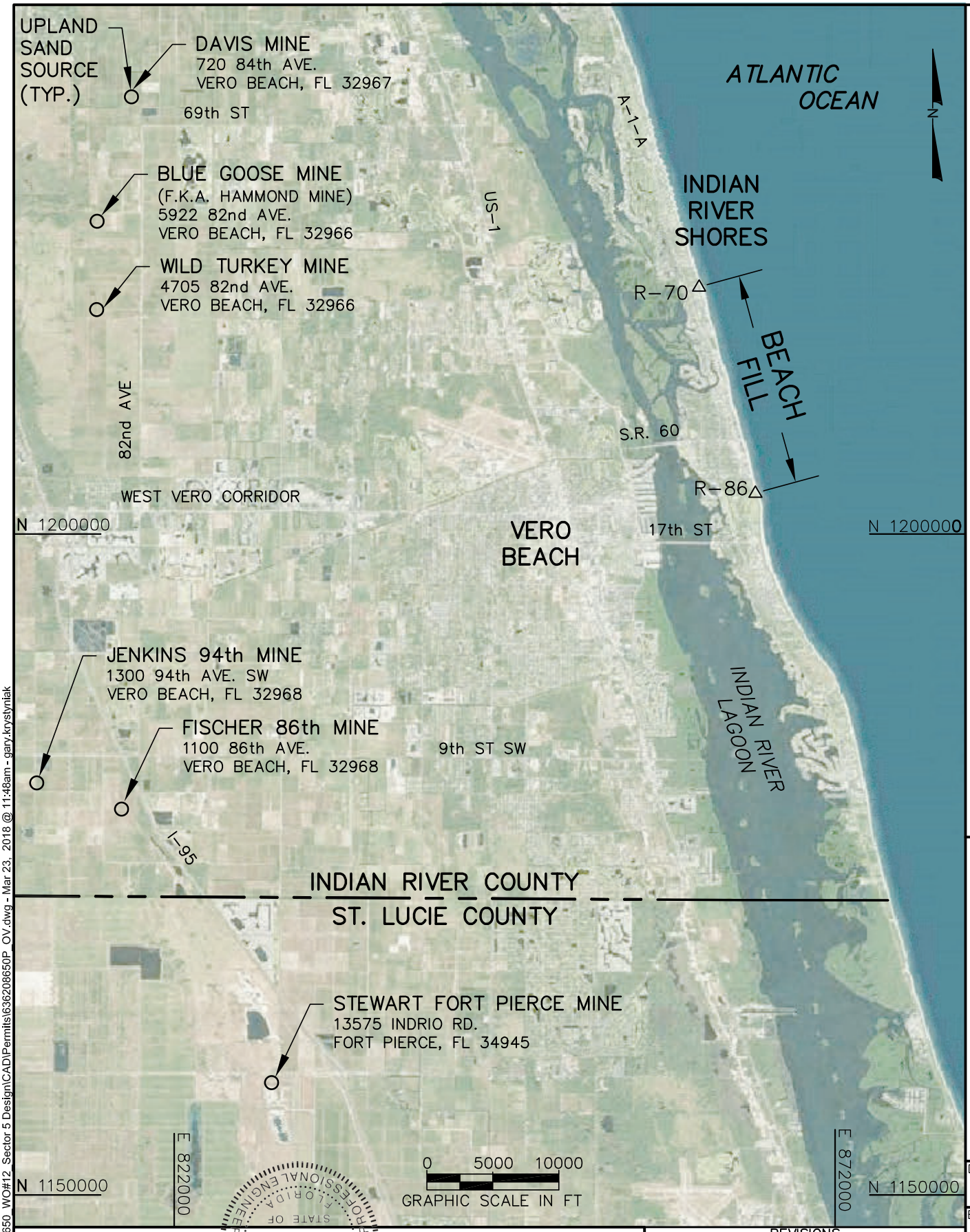

INDIAN RIVER COUNTY, FL
SECTOR 5 BEACH AND DUNE RESTORATION PROJECT
PROJECT OVERVIEW

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STATE OF FLORIDA WILLIAM L. REILLY LICENSE NO. 69050 PROFESSIONAL ENGINEER

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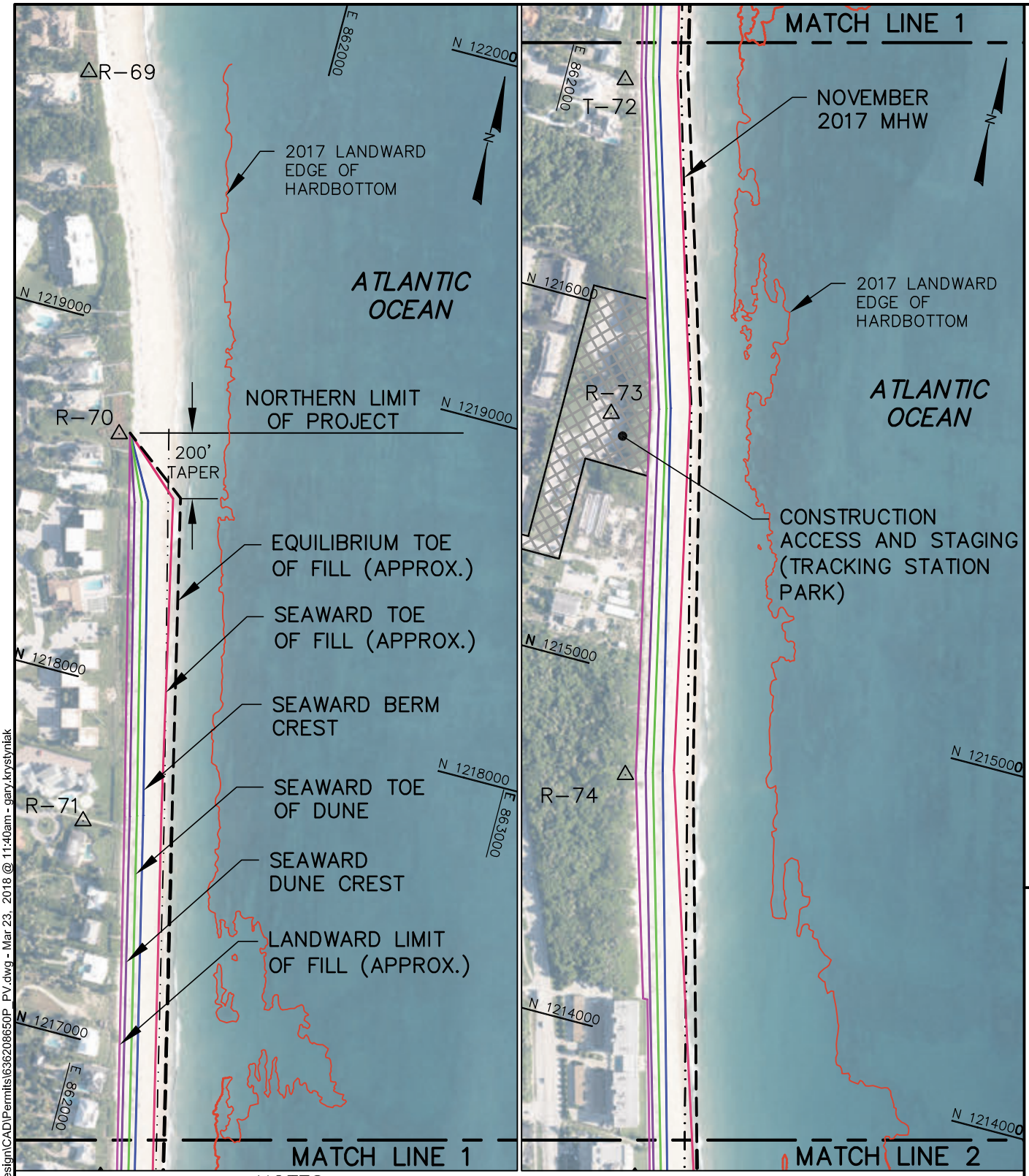

NOTES:

1. AERIAL PHOTOGRAPHY JULY 28, 2017.
2. LANDWARD EDGE OF HARDBOTTOM DELINEATED BY APTIM USING JULY 28, 2017 AERIAL PHOTOGRAPHY.
3. COORDINATES ARE IN FEET REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83).

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INDIAN RIVER COUNTY, FL
SECTOR 5 BEACH AND DUNE RESTORATION PROJECT
PLAN VIEW

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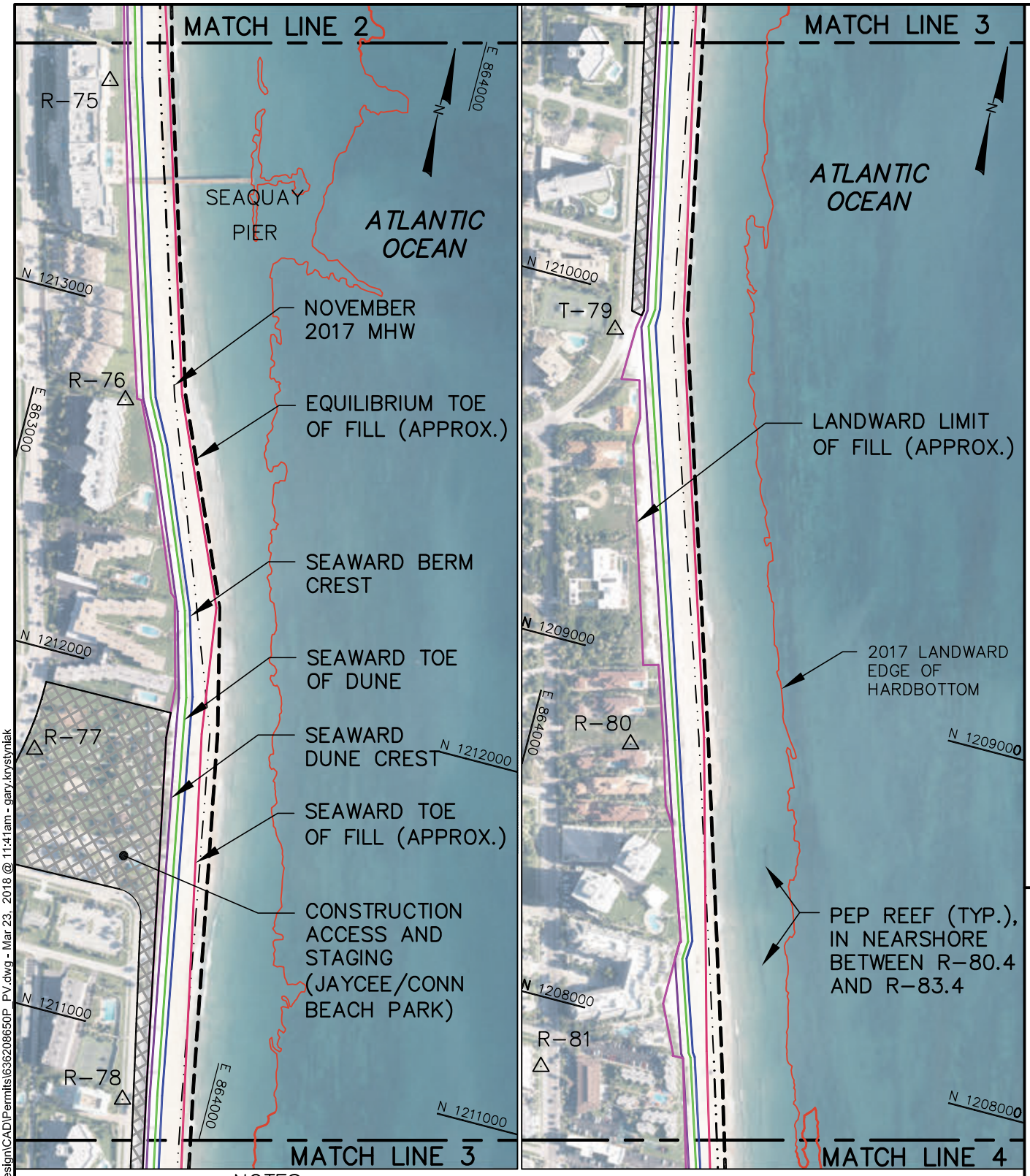

INDIAN RIVER COUNTY, FL
SECTOR 5 BEACH AND DUNE RESTORATION PROJECT
PLAN VIEW

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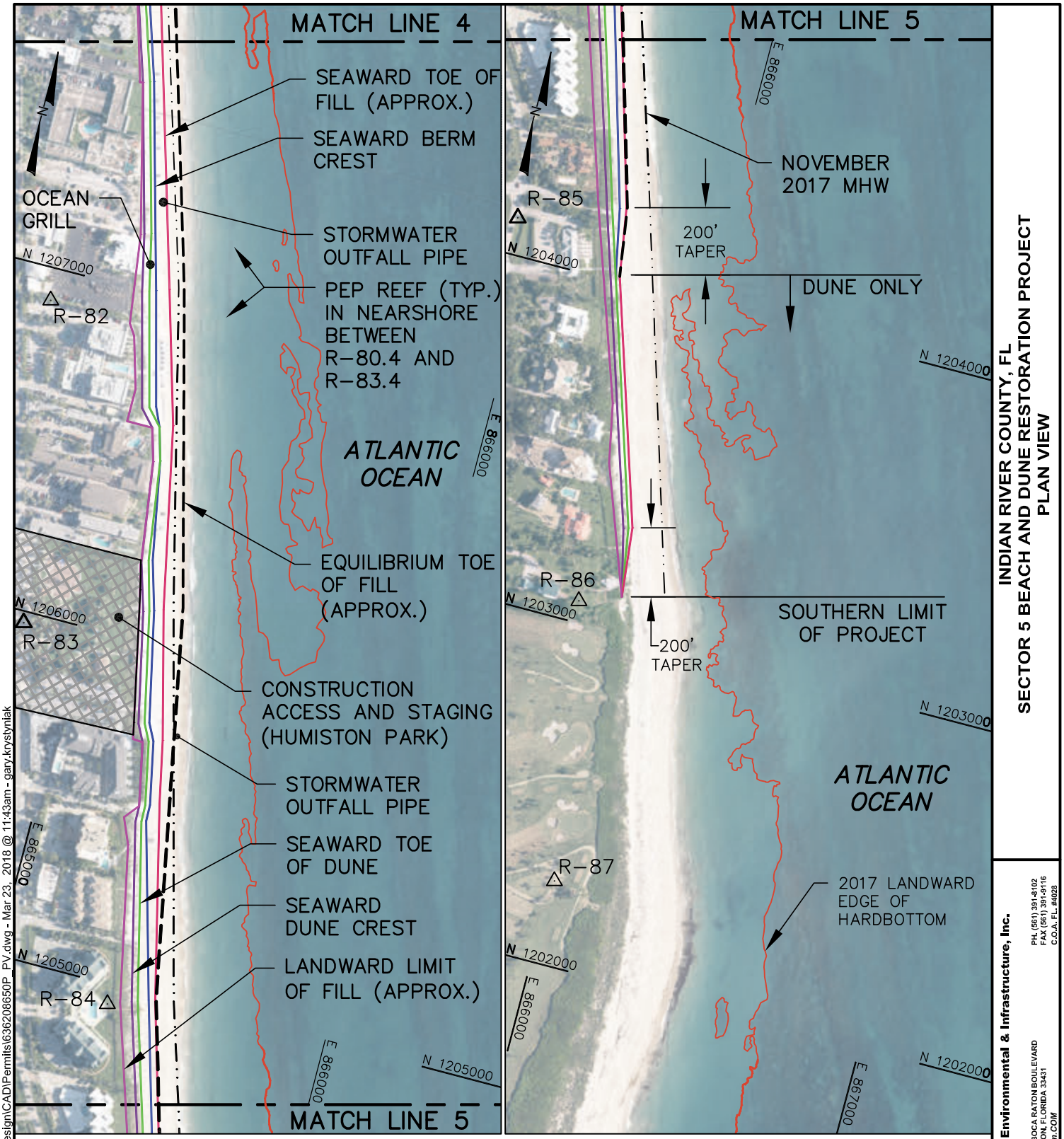

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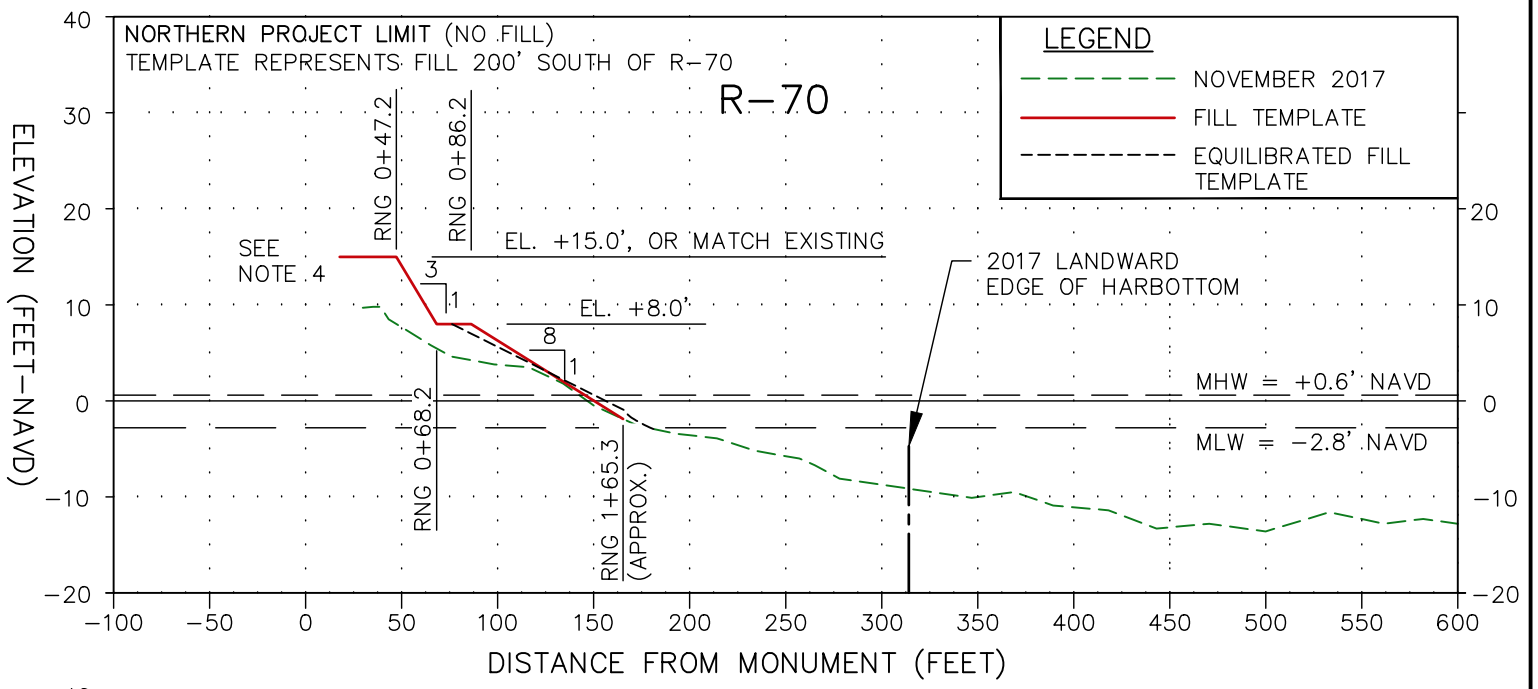

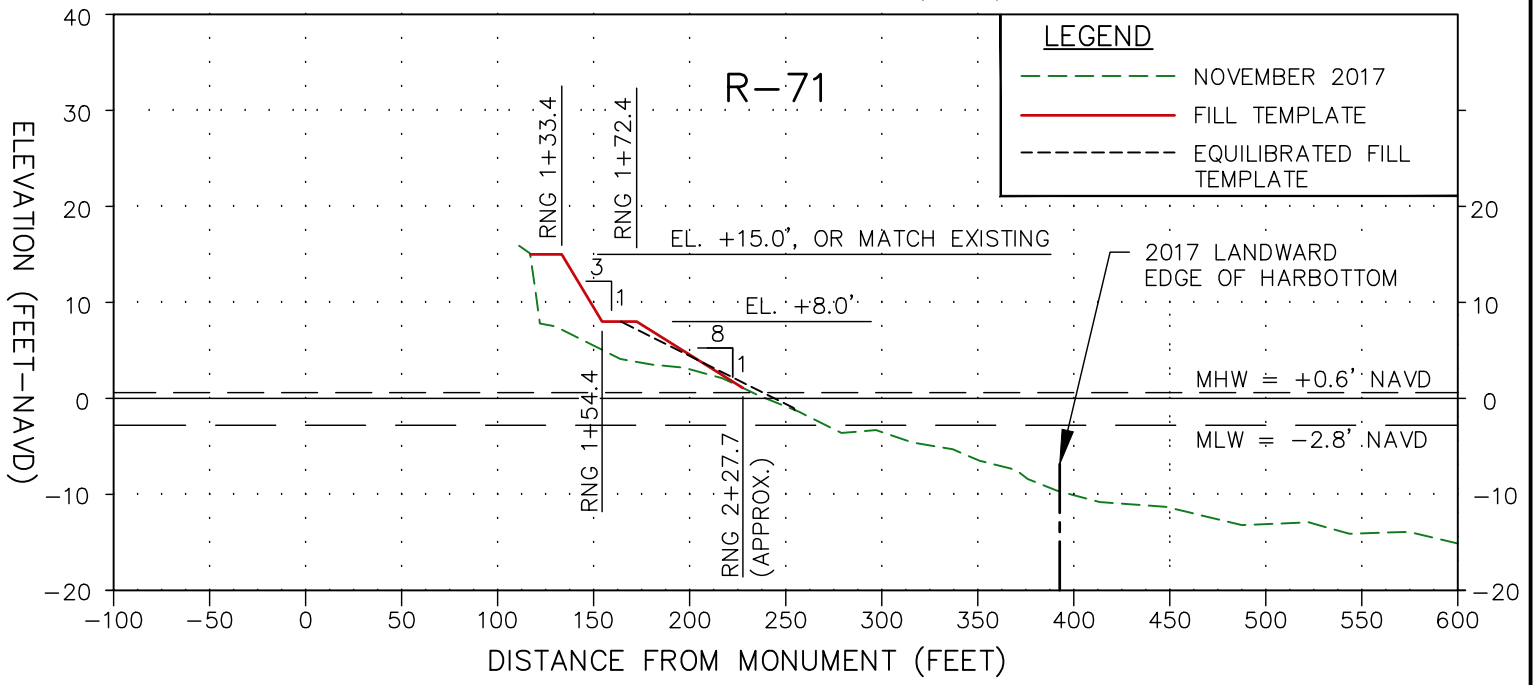

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INDIAN RIVER COUNTY, FL
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CROSS SECTIONS

BY:	DATE:	COMM NO.:	SHEET:
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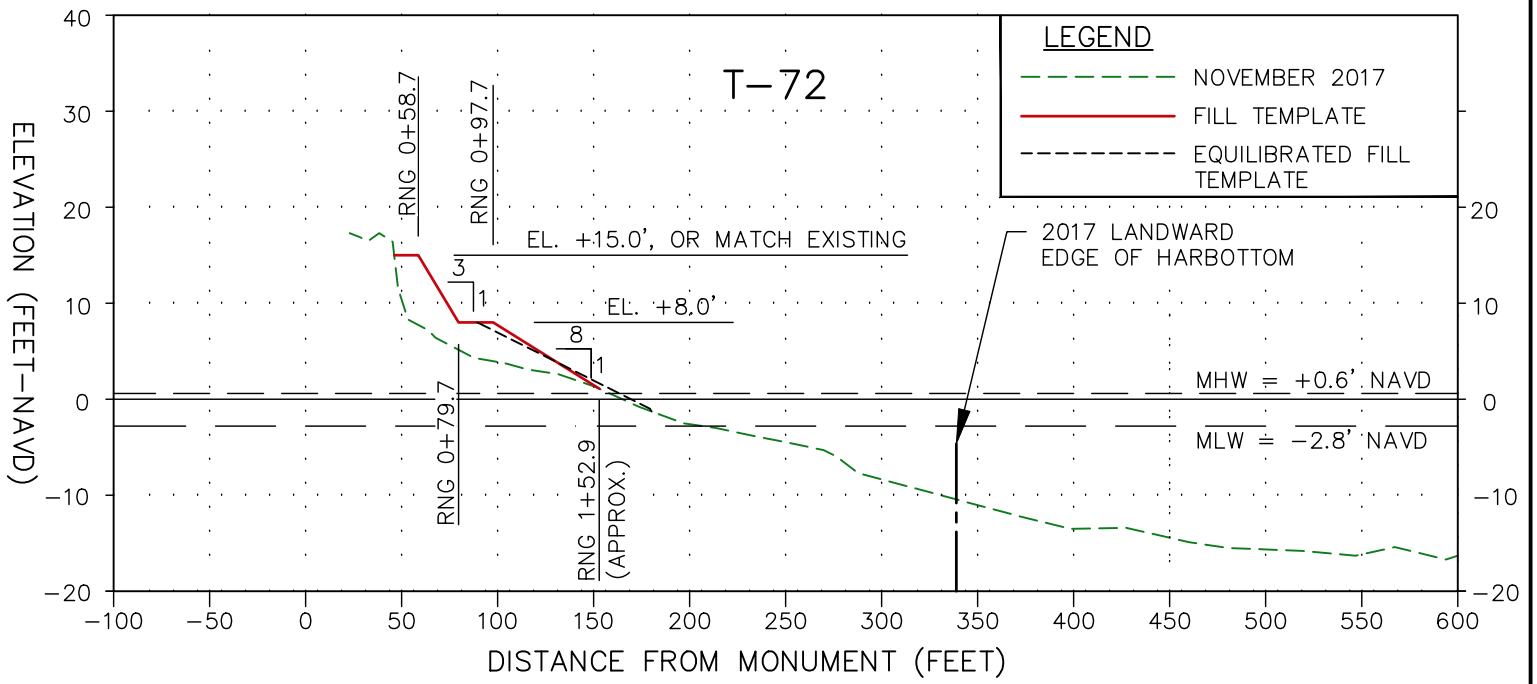

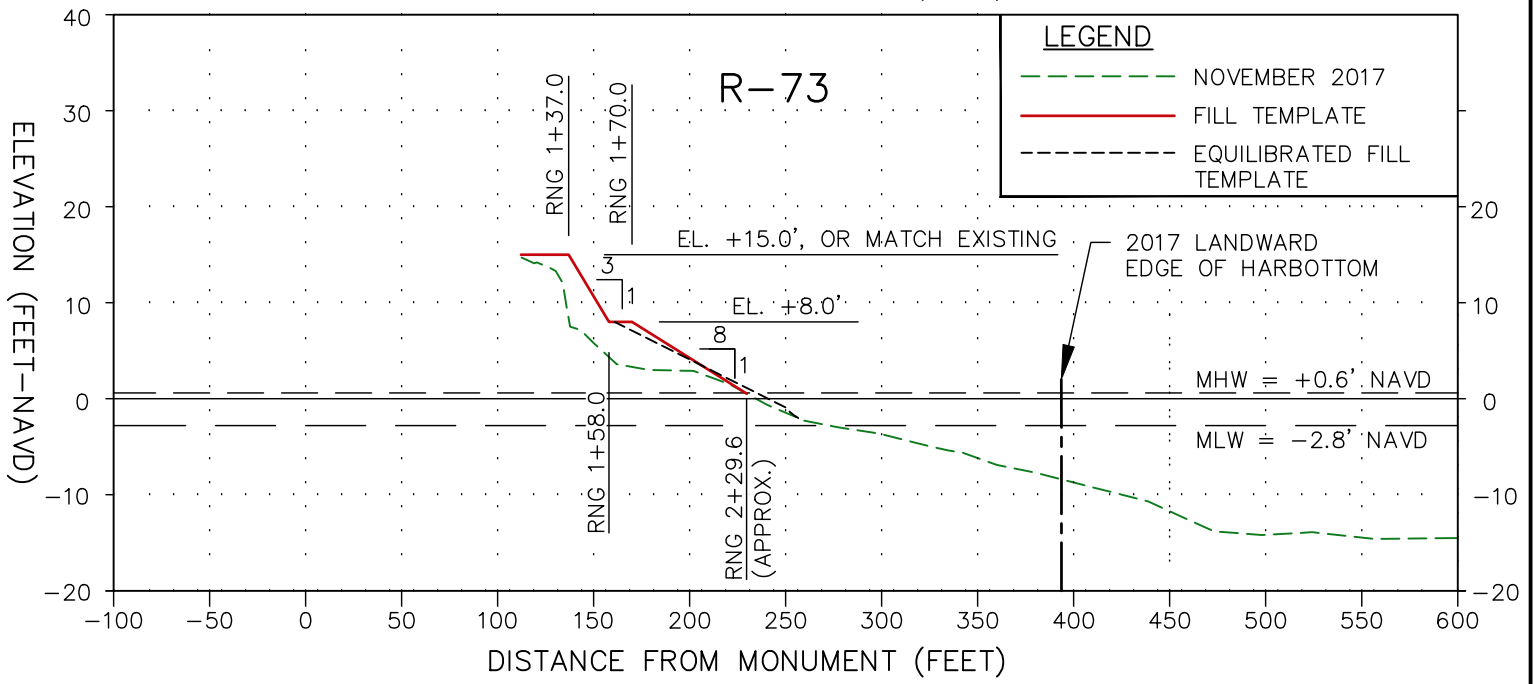

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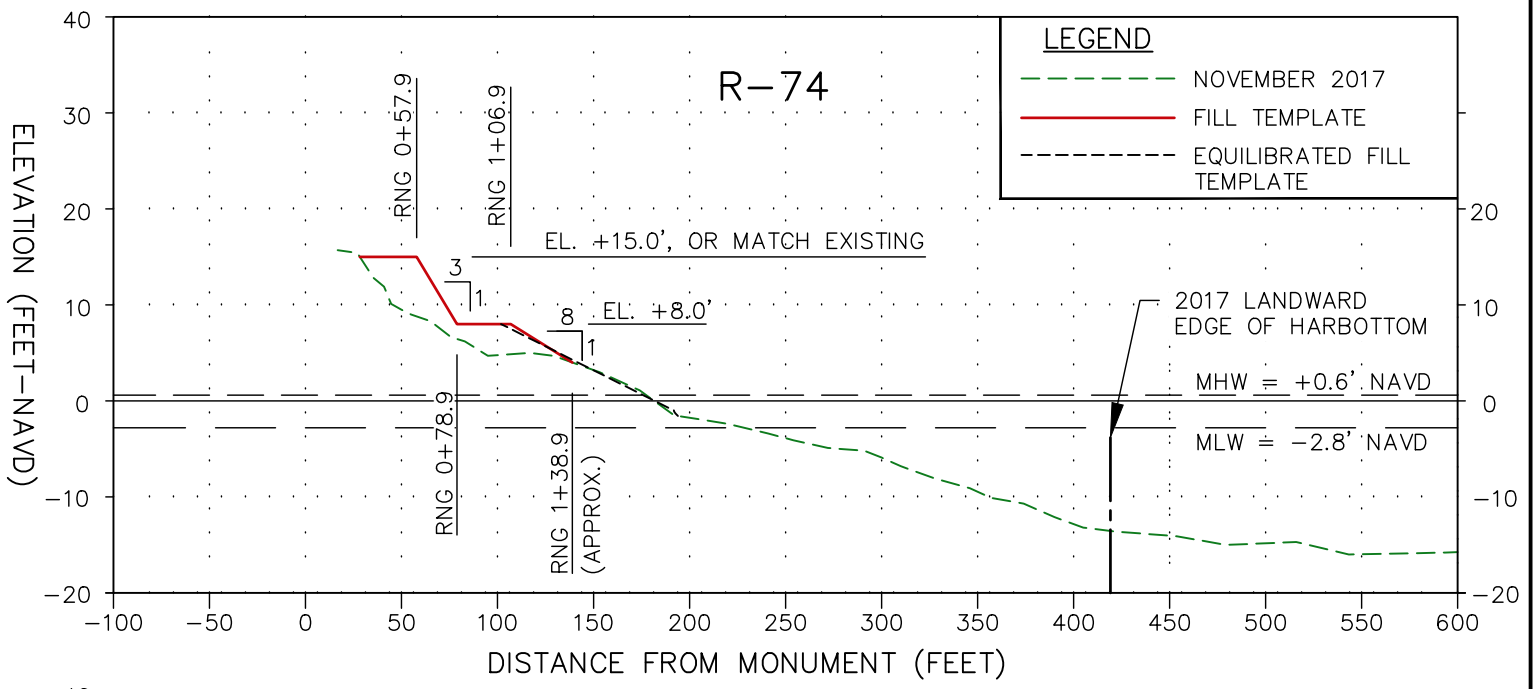
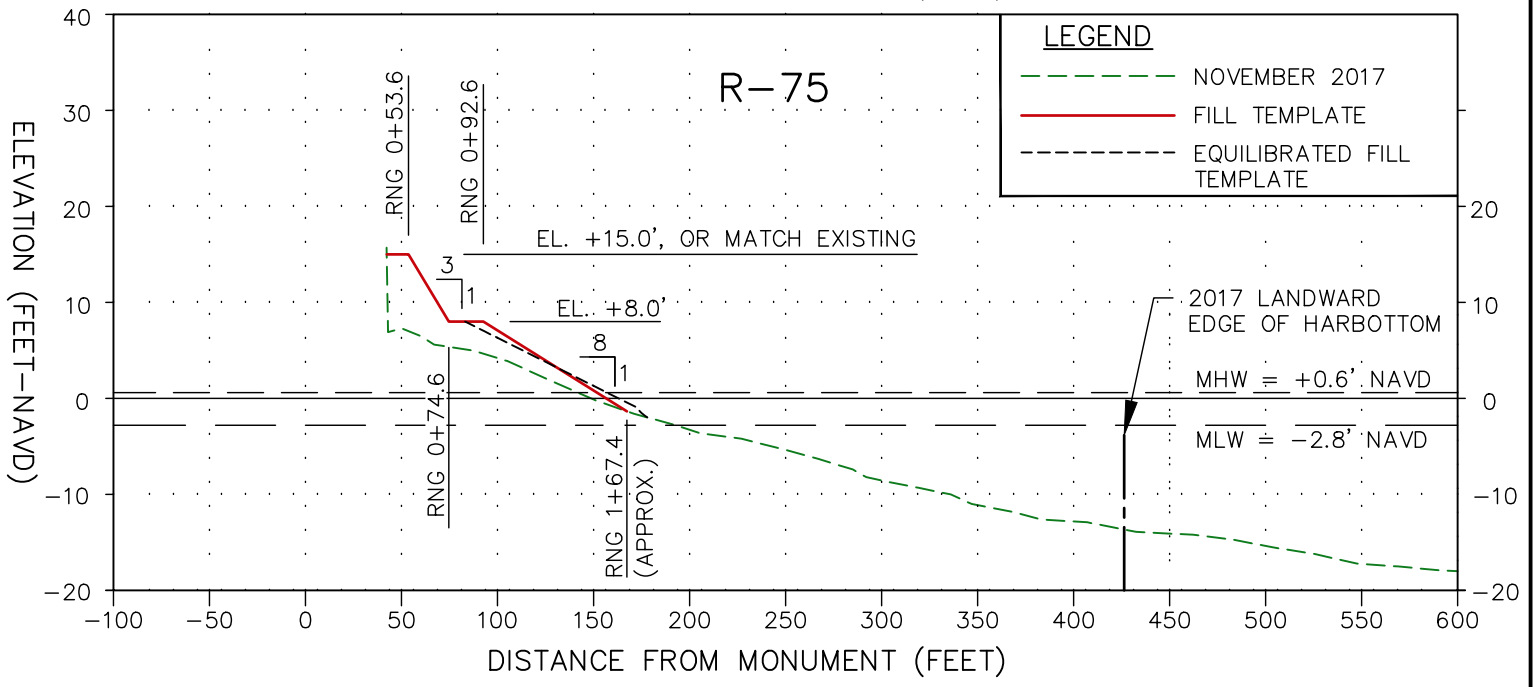
4. CONSTRUCTED DUNE CROSS-SECTION WITH EXISTING GRADE TO BE FIELD DETERMINED. IF NECESSARY, SLOPE DOWN NO STEEPER THAN 1V:5H.





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INDIAN RIVER COUNTY, FL
SECTOR 5 BEACH AND DUNE RESTORATION PROJECT
CROSS SECTIONS

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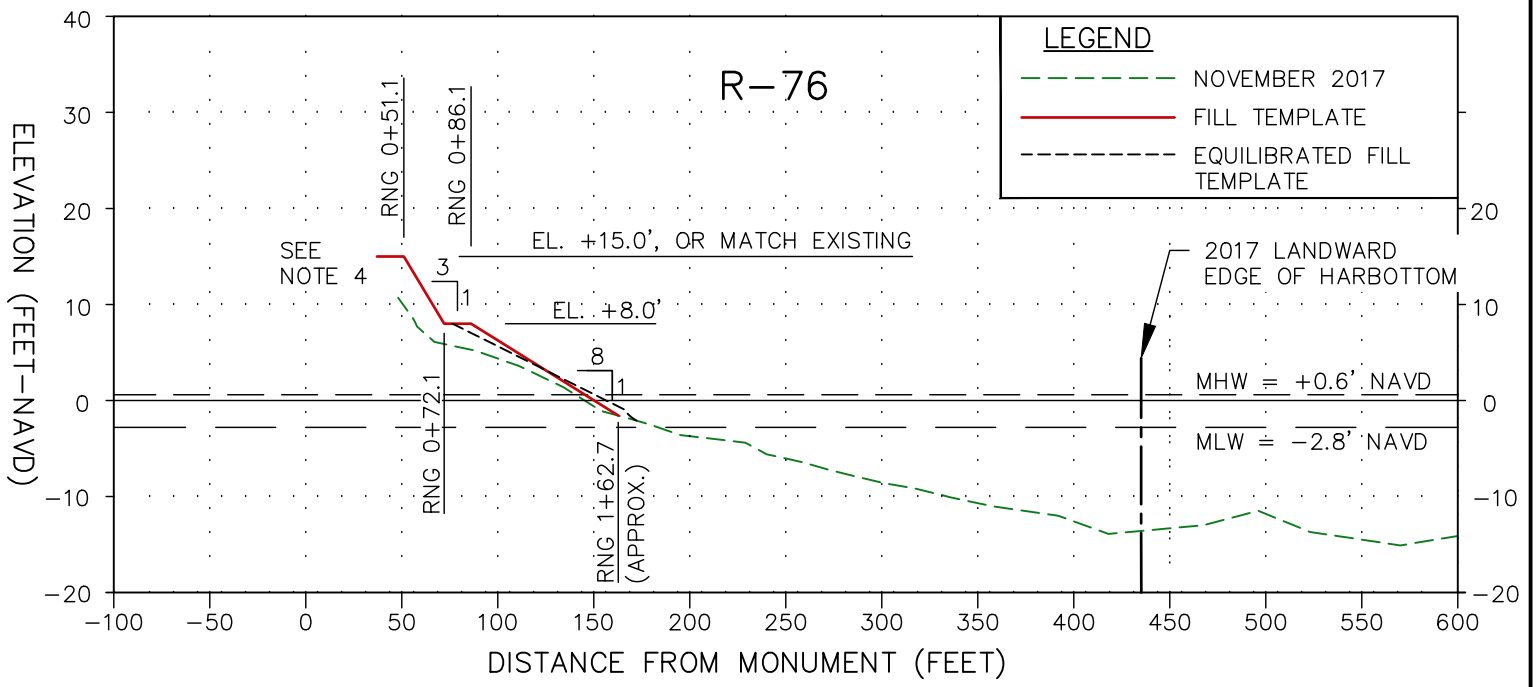

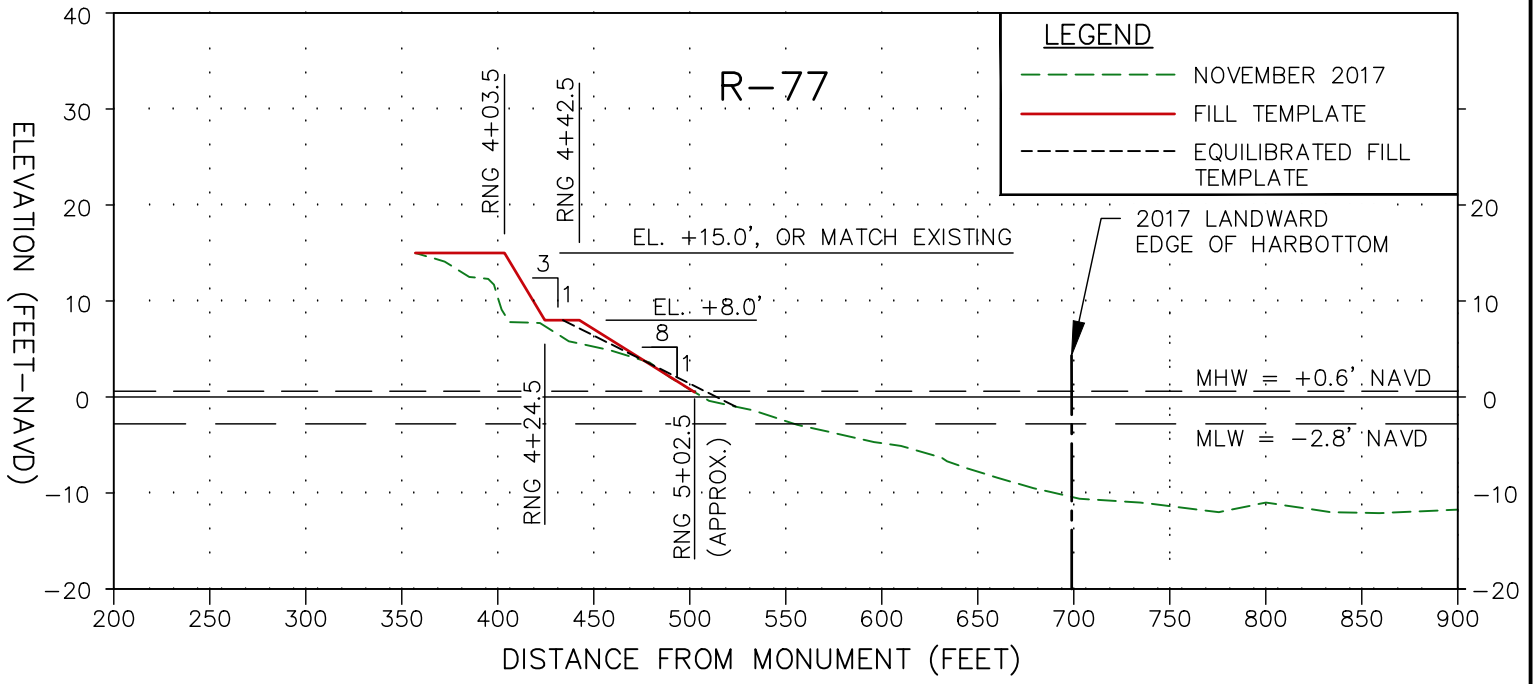

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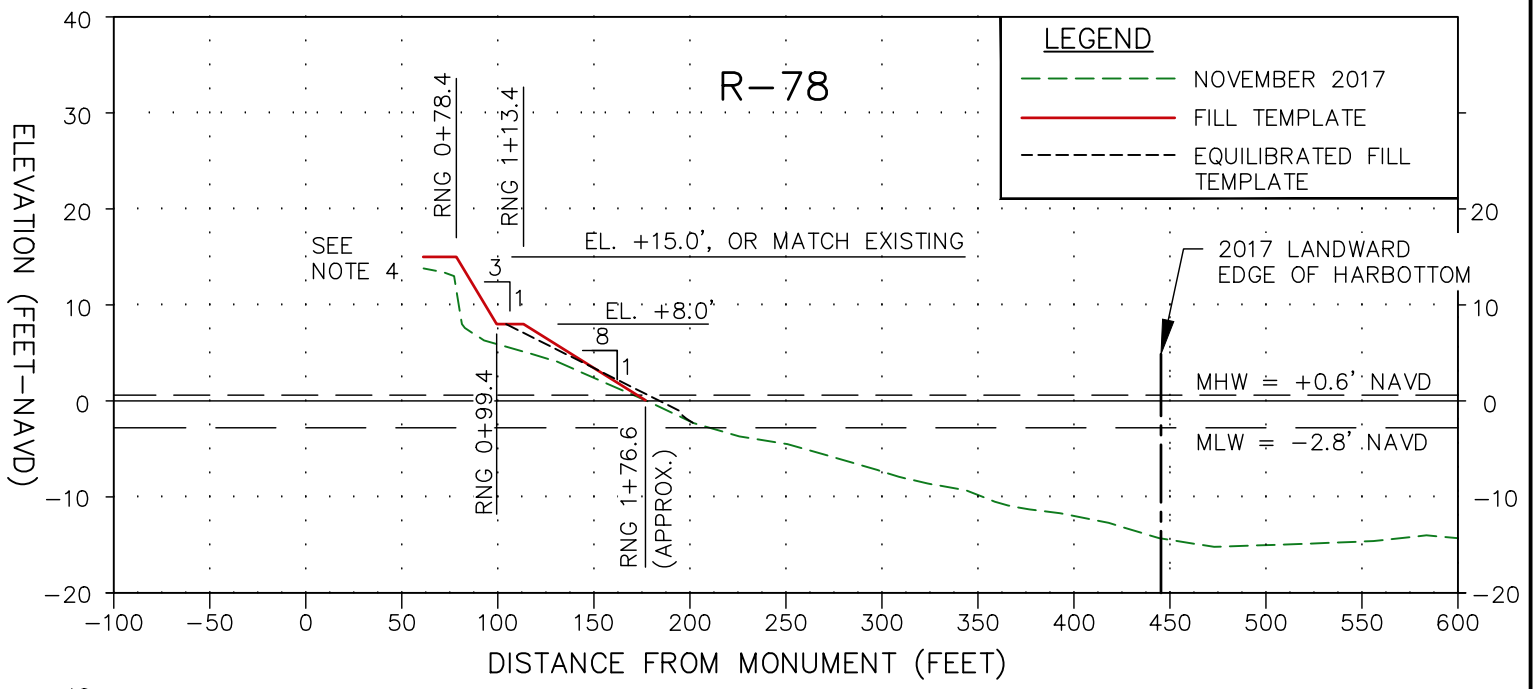

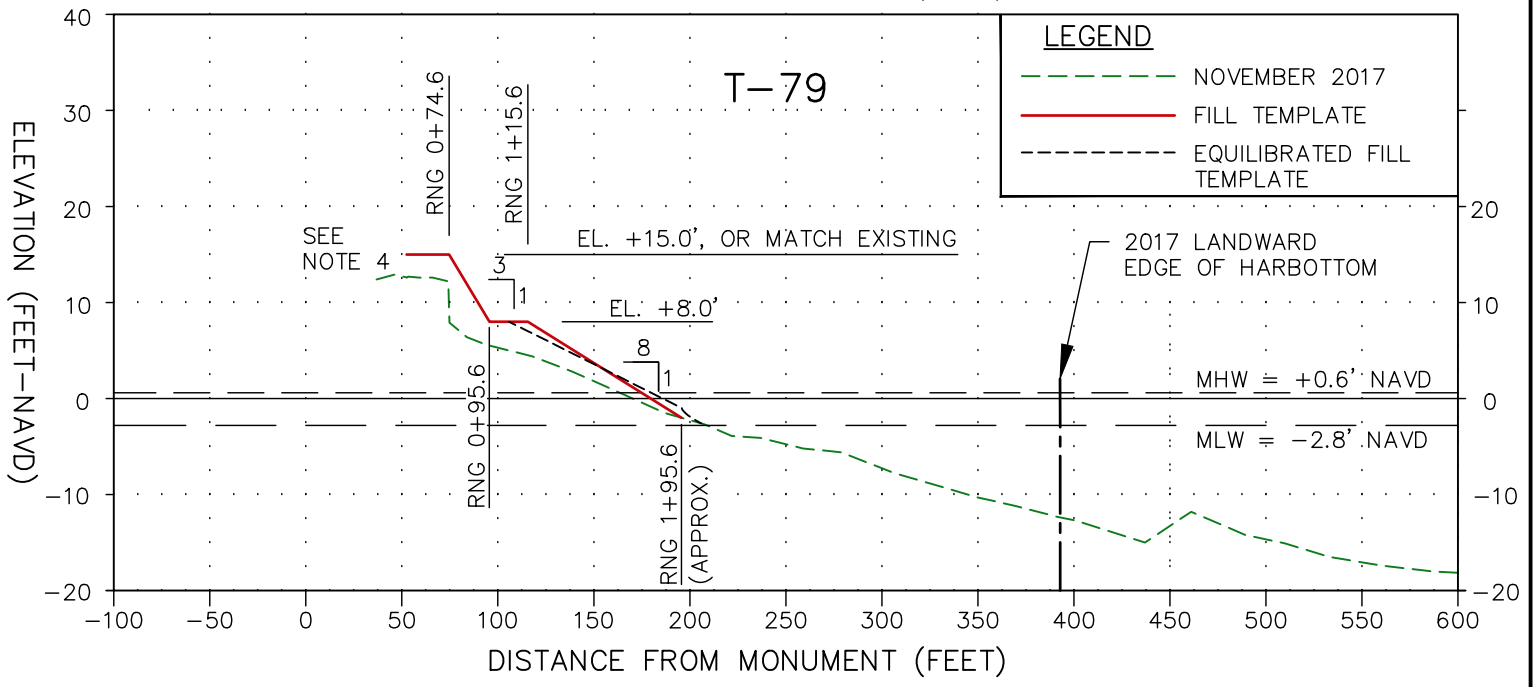

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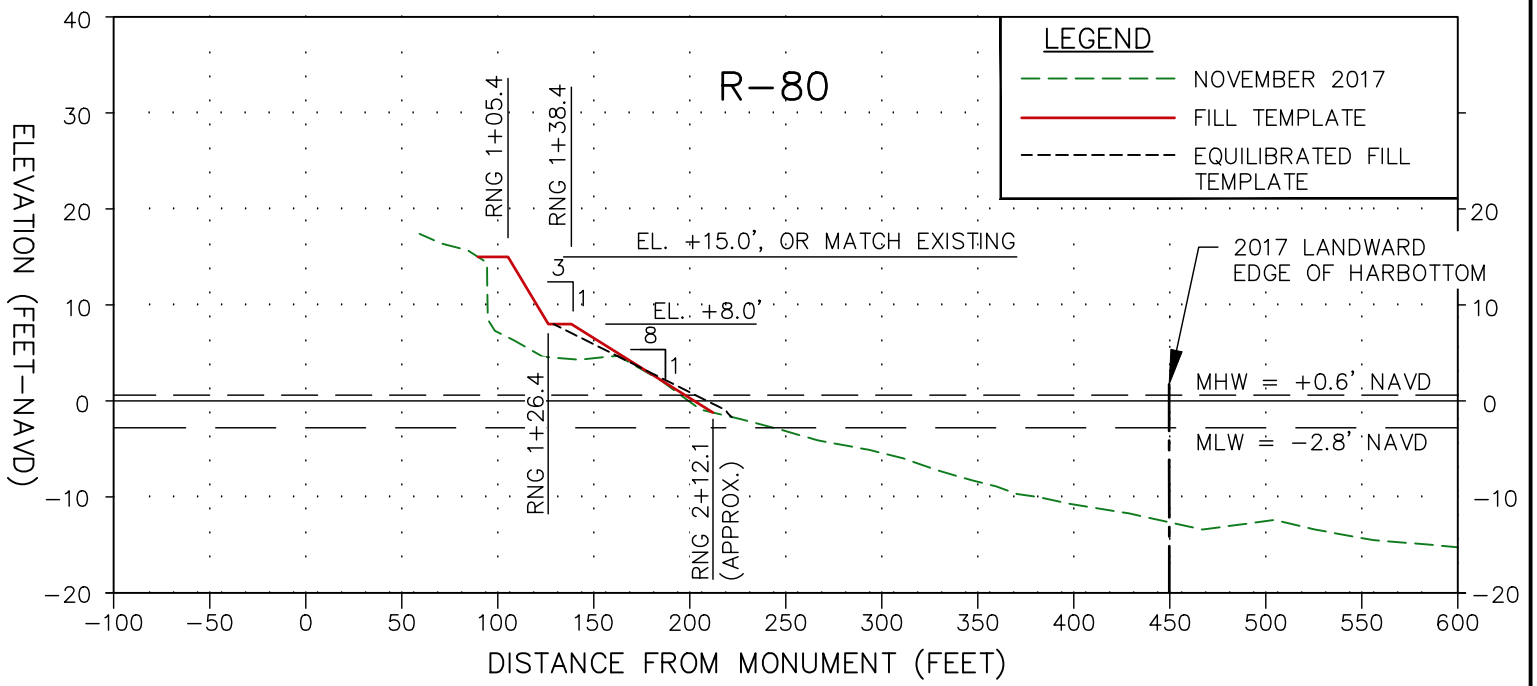

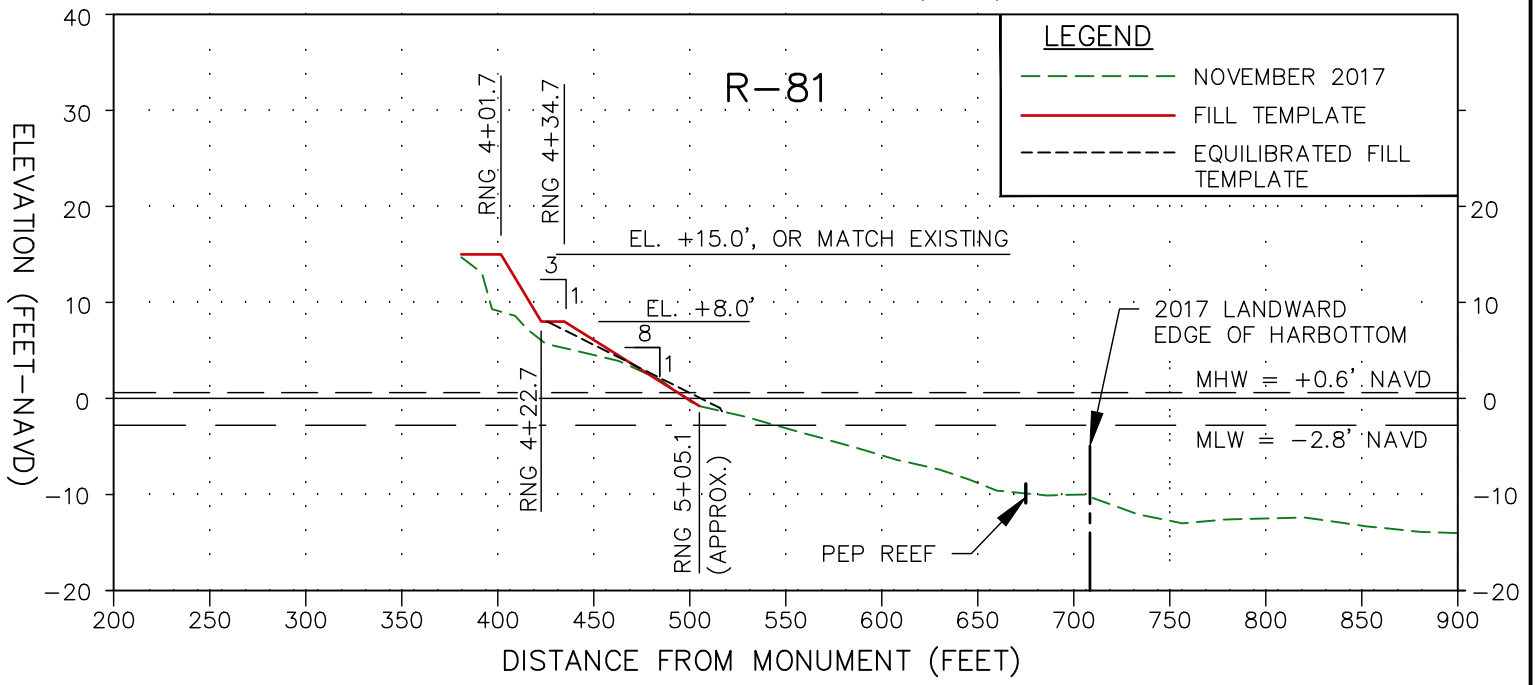

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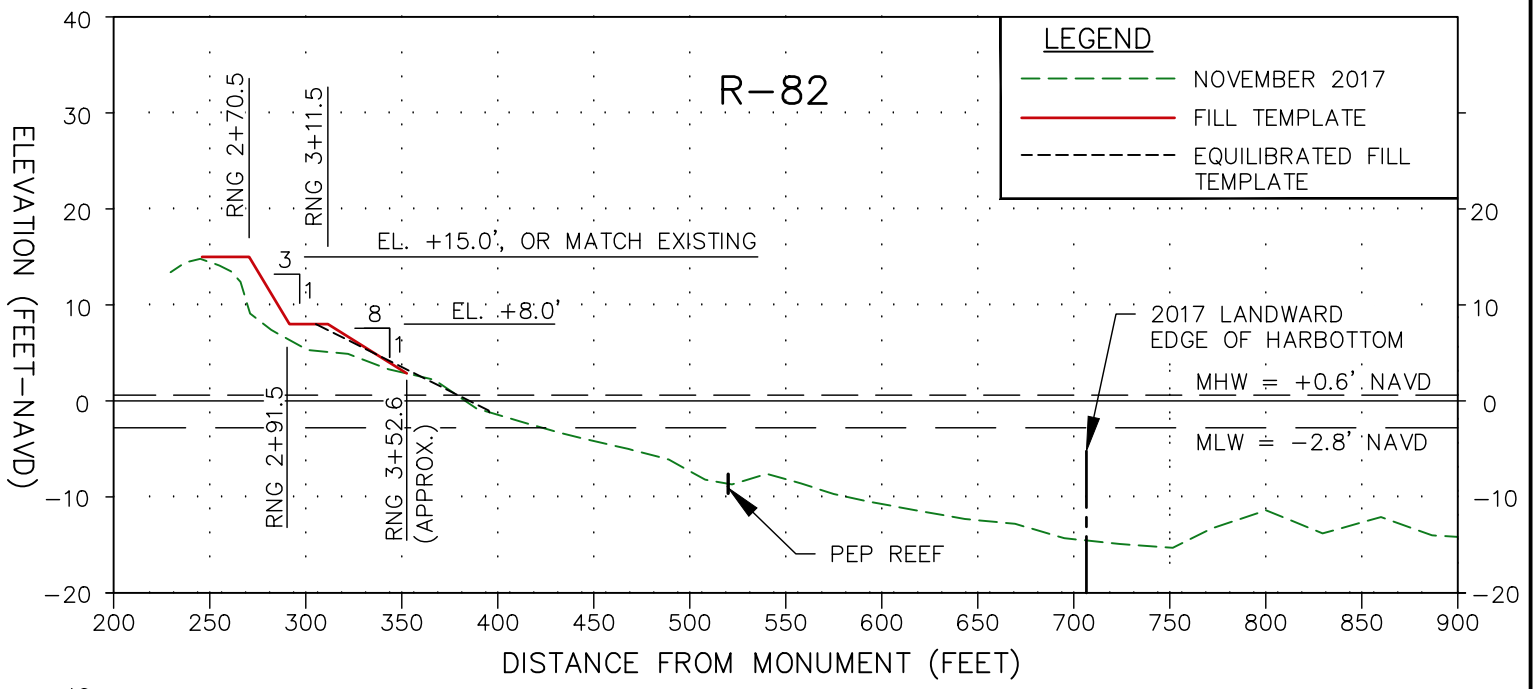

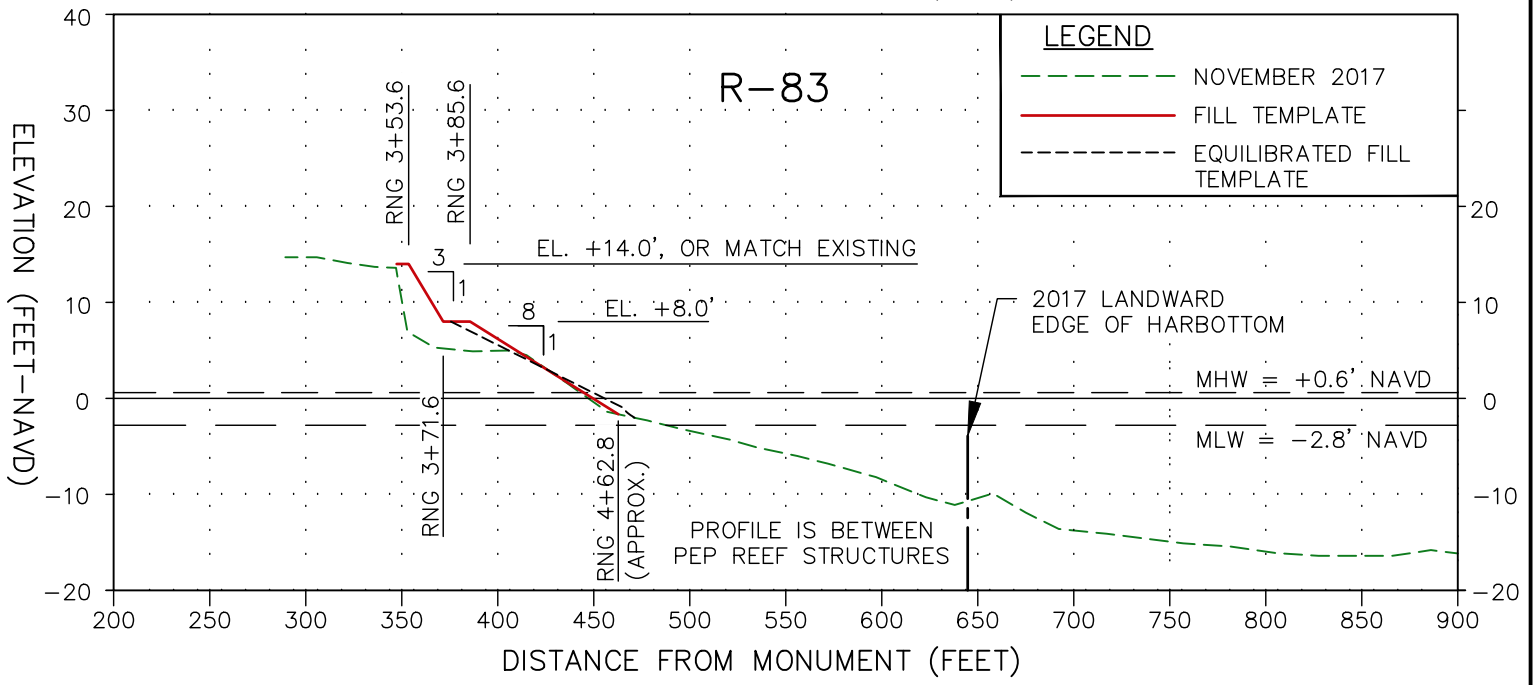

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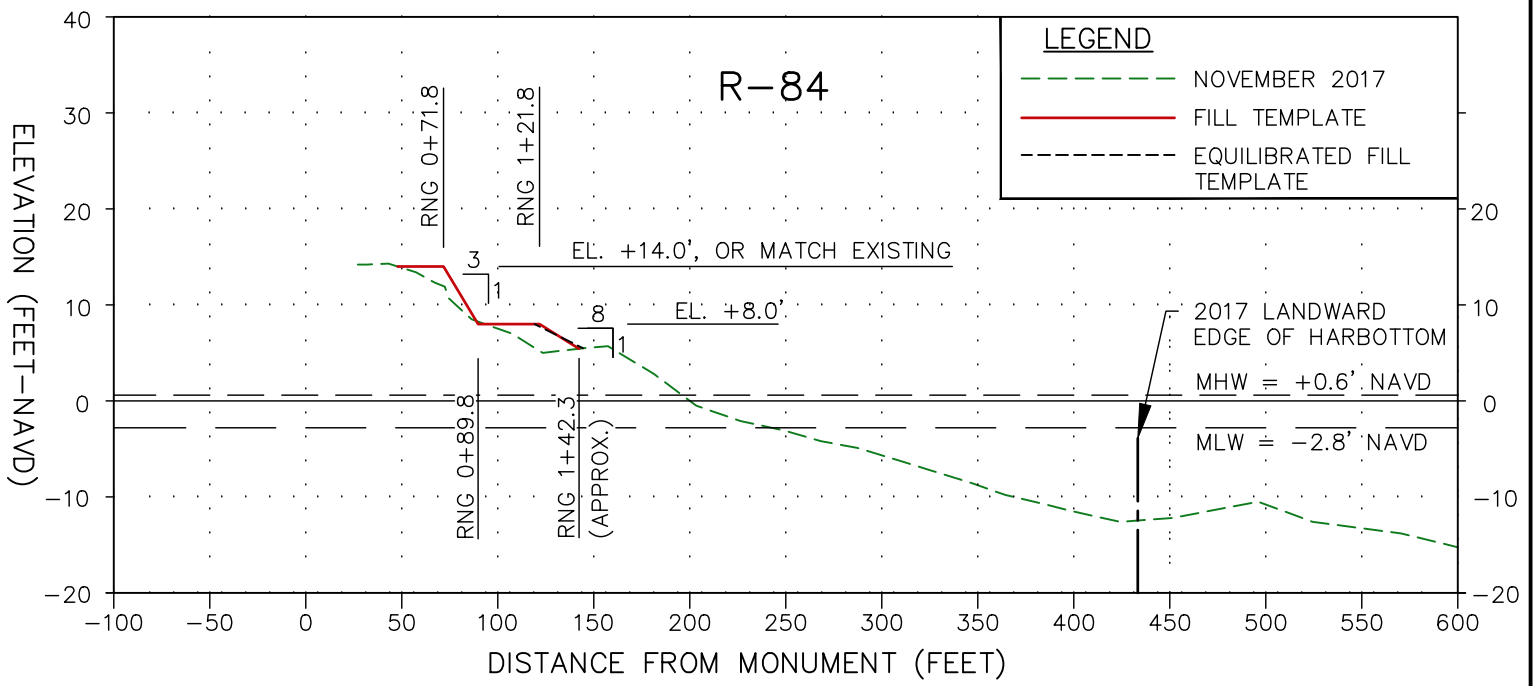

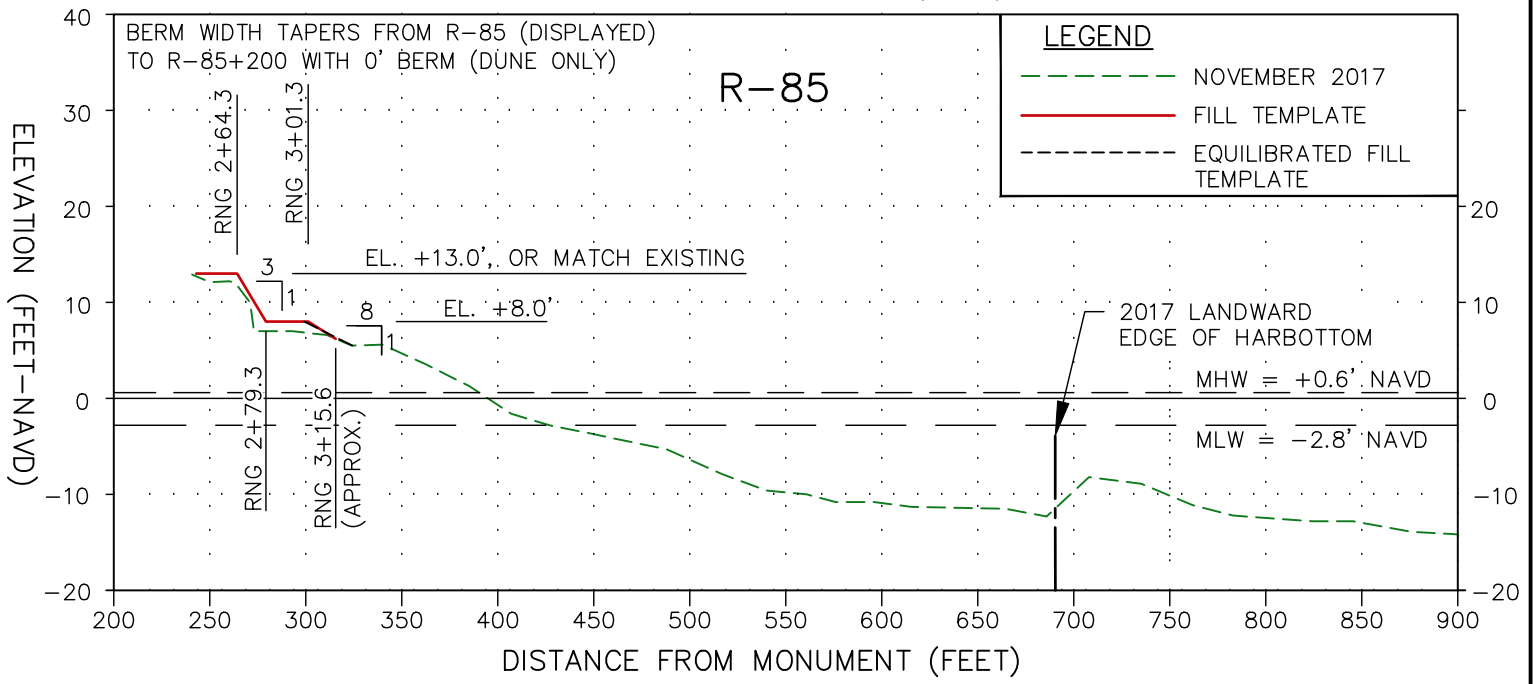

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

WILLIAM L. REILLY P.E. No. 69030 — DATE

STATE OF FLORIDA — WILLIAM L. REILLY — LICENSE NO. 69030 — PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by William L. Reilly, PE on April 12, 2018 using a Digital Signature.
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REVISIONS		
DESCRIPTION	BY	DATE

BY:	GK
DATE:	3/6/18
COMM NO.:	636208650
SHEET:	13 of 15

Aptim Environmental & Infrastructure, Inc.
2481 N.W. BOCA RATON BOULEVARD
BOCA RATON, FLORIDA 33431
www.aptim.com
PH. (561) 391-8102
FAX (561) 391-9116
C.O.A. FL. #4028

TITLE:

INDIAN RIVER COUNTY, FL
SECTOR 5 BEACH AND DUNE RESTORATION PROJECT
CROSS SECTIONS

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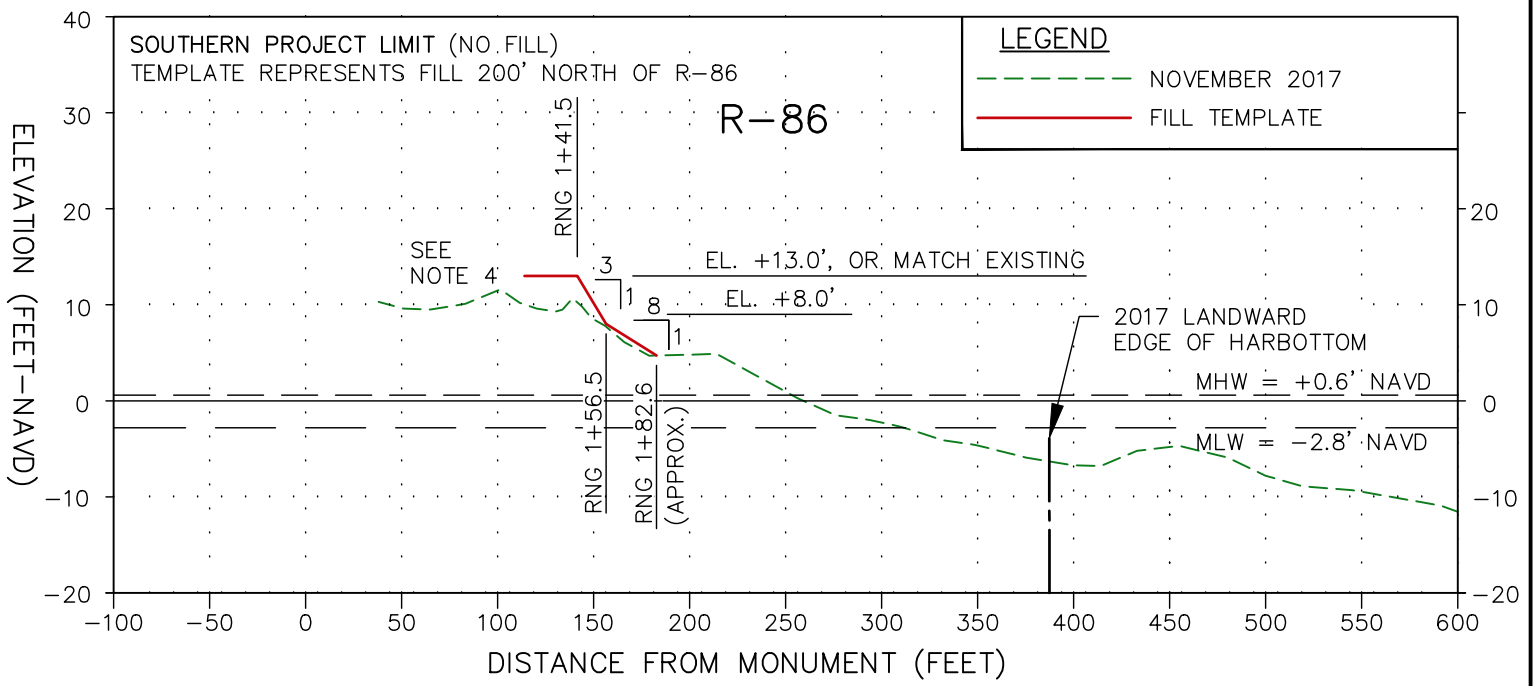

NOTES:

1. ELEVATIONS ARE IN FEET REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD).
2. LANDWARD EDGE OF HARDBOTTOM DELINEATED BY APTIM USING JULY 28, 2017 AERIAL PHOTOGRAPHY.
3. BEACH PROFILE SURVEYS COLLECTED BY MORGAN AND EKLUND, INC.
4. CONSTRUCTED DUNE CREST INTERSECTION WITH EXISTING GRADE TO BE FIELD DETERMINED. IF NECESSARY, SLOPE DOWN NO STEEPER THAN 1V:5H.

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

WILLIAM L. REILLY P.E. No. 69050

DATE

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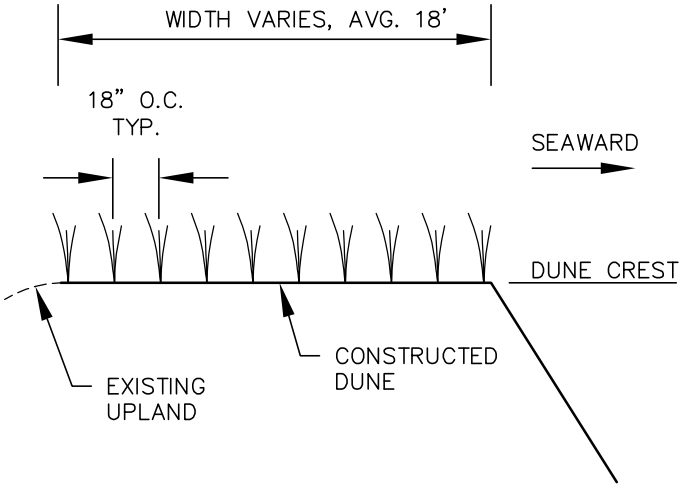
TITLE:

INDIAN RIVER COUNTY, FL
SECTOR 5 BEACH AND DUNE RESTORATION PROJECT
CROSS SECTIONS

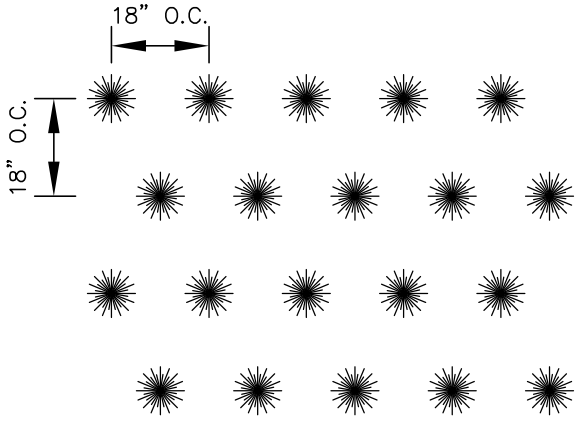
PLANTING DETAIL					
PLANT TYPE	SCIENTIFIC NAME	PERCENT DISTRIBUTION	QUANTITY (APPROX.)	SIZE	SPACING
SEA OATS	UNIOLA PANICULATA	80% to 85%	107,000	1" LINER	18" O.C.
BITTER PANICGRASS	PANICUM AMARUM	10% TO 15%	16,000	1" LINER	18" O.C.
RAILROAD VINE	IPOMOEA PES-CAPRAE	4% TO 8% (RELATIVELY EQUAL ABUNDANCE OF EACH)	8,000	2" LINER	18" O.C.
DUNE SUNFLOWER	HELIANTHUS DEBILIS			2" LINER	18" O.C.

PLANTING NOTES:

1. ALL PLANTING TO BE INSTALLED ON THE DUNE CREST. IN THE EVENT OF SURPLUS PLANT UNITS, PLANTS MAY BE INSTALLED ON THE UPPERMOST PORTION OF THE SEAWARD DUNE SLOPE OR LANDWARD OF THE CONSTRUCTED FILL TO ENHANCE AREAS OF EXISTING VEGETATION.
2. ALL PLANTINGS MUST BE OF NATIVE SPECIES.
3. ALL PLANTINGS SHALL BE AT A MINIMUM OF 6" BELOW THE SURROUNDING GRADE, AS MEASURED FROM THE TOP OF THE ROOT BALL TO THE SAND SURFACE.
4. ALL PLANTINGS SHALL BE IN STAGGERED ROWS SPACED AT 18" ON CENTER (O.C.).
5. DISTRIBUTION OF PLANTED SPECIES SHALL BE RANDOM ACROSS THE PLANTING AREA (18" O.C.).



TYPICAL DUNE PLANTING
CROSS SECTION
NOT TO SCALE



TYPICAL DUNE PLANTING
STAGGERED LAYOUT
NOT TO SCALE

NOT FOR CONSTRUCTION
FOR REGULATORY REVIEW ONLY

WILLIAM L. REILLY P.E. No. 69050

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DATE

REVISIONS		
DATE	BY	DESCRIPTION

INDIAN RIVER COUNTY, FL
SECTOR 5 BEACH AND DUNE RESTORATION PROJECT
PLANTING DETAIL

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DATE: 3/6/18
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COMM NO.: 636208650
SHEET: 15 of 15

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FLORIDA DEPARTMENT OF
Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Ron DeSantis
Governor

Jeanette Nuñez
Lt. Governor

Noah Valenstein
Secretary

CONSOLIDATED JOINT COASTAL PERMIT AND SOVEREIGN SUBMERGED LANDS AUTHORIZATION

PERMITTEE:
Indian River County
1801 27th Street, Building
A Vero Beach, FL 32960

AGENT:
Thomas P. Pierro, PE, D.CE
APTIM
9143 Philips Highway, Suite 400
Jacksonville, FL, 32256

PERMIT INFORMATION:
Permit Number: 0363427-001-JC

Project Name: Indian River County Sector 5 Beach and Dune Restoration Project.

County: Indian River County.

Issuance Date: 1 February 2019

Expiration Date: 1 February 2034

REGULATORY AUTHORIZATION:

This permit is issued under the authority of Chapter 161 and Part IV of Chapter 373, Florida Statutes (F.S.), and Title 62, Florida Administrative Code (F.A.C.). Pursuant to Operating Agreements executed between the Department of Environmental Protection (Department) and the water management districts, as referenced in Chapter 62-113, F.A.C., the Department is responsible for reviewing and taking final agency action on this activity.

PROJECT DESCRIPTION:

The project is to restore 3.1 miles (4.99 kilometers) of beach and dune in Indian River County by placing approximately 155,000 cubic yards (118,500 cubic meters) of sand using upland sources. Following restoration, the project will also include periodic beach nourishment as needed.

The design template includes multiple shoreline segments with dune only or a combination of dune and berm sand placement along the project shoreline. The dune crest elevation consists of a flat dune crest extending from the existing grade at +15.0 feet NAVD at the Departments Reference Monuments R-70 to R-82, then transitions from +15.0 to +14.0 NAVD between R-82 and R-83, continues at +14.0 feet NAVD between R-83 and R-84 then transitions from +14.0 to +13.0 between R-84 to R-85, then

continues at +13.0 feet NAVD between R-85 and R-86, matching an existing backshore structure. The landward dune crest will tie into existing grade or structure, at a slope no steeper than 1V:5H (Vertical: Horizontal). The dune crest width varies along the project area from 11 to 25 feet, and averages 18 feet wide. From the seaward edge of the dune crest, the template is sloped seaward at 1V:3H to +8.0 NAVD. The berm extends seawards from the +8.0 intersections with the dune slope averaging 17 feet wide. The seaward berm slope is 1V:8H until intersecting with the existing profile near mean high water +0.6 feet NAVD. The toe of fill varies along the project area and extended slightly seaward on some sections of the template. Sand placement in the project template between R-85 and R-86 will be a dune only. Salt-tolerant native dune vegetation will be planted on the restored dunes.

The project area is to be restored and nourished with sand trucked from the Stewart Materials Fort Pierce mine. Three construction access points/staging areas have been identified for the project.

PROJECT LOCATION:

The beach restoration and nourishment site is located along approximately 3.1 miles (4.99 kilometers) of Vero Beach, Indian River Shores, and unincorporated Indian River County coastline between the Department Reference Monuments R-70 and R-86, in Indian River County, Sections 19, 20, 29, 32, Townships 32 South, Range 40 East, and Section 5, Township 33 South, Range 40 East; Atlantic Ocean, Class III Florida Waters.

The upland sand source is the Stewart Materials Fort Pierce mine. The upland staging and access areas are located at Tracking Station Park (R-72.7 to 73.2), Jaycee Park and Conn Beach (R-77.0 to R-79.1) and Humiston Park (R-82.8 to 83.4).

PROPRIETARY AUTHORIZATION:

This activity also requires a proprietary authorization, as the activity is located on sovereign submerged lands held in trust by the Board of Trustees of the Internal Improvement Trust Fund (Board of Trustees), pursuant to Article X, Section 11 of the Florida Constitution, and Sections 253.002 and 253.77, F.S. The activity is not exempt from the need to obtain a proprietary authorization. The Board of Trustees delegated, to the Department, the responsibility to review and take final action on this request for proprietary authorization in accordance with Section 18-21.0051, F.A.C., and the Operating Agreements executed between the Department and the water management districts, as referenced in Chapter 62-113, F.A.C. This proprietary authorization has been reviewed in accordance with Chapter 253, F.S., Chapter 18-21 and Section 62-330.075, F.A.C., and the policies of the Board of Trustees.

The Department has also determined that the beach restoration activity qualifies for a Letter of Consent to use sovereign, submerged lands, as long as the work performed is located within the boundaries as described herein and is consistent with the terms and

conditions herein. Therefore, consent is hereby granted pursuant to Chapter 253.77, F.S., to perform the activity on the specified sovereign submerged lands.

COASTAL ZONE MANAGEMENT:

This permit constitutes a finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act.

WATER QUALITY CERTIFICATION:

This permit constitutes certification of compliance with state water quality standards pursuant to Section 401 of the Clean Water Act, 33 U.S.C. 1341.

OTHER PERMITS:

Authorization from the Department does not relieve you from the responsibility of obtaining other permits (Federal, State, or local) that may be required for the project. When the Department received your permit application, a copy was sent to the U.S. Army Corps of Engineers (Corps) for review. The Corps will issue their authorization directly to you, or contact you if additional information is needed. If you have not heard from the Corps within 30 days from the date that your application was received by the Department, contact the nearest Corps regulatory office for status and further information. Failure to obtain Corps authorization prior to construction could subject you to federal enforcement action by that agency.

AGENCY ACTION:

The above-named Permittee is hereby authorized to construct the work that is outlined in the Project Description and Project Location of this permit and as shown on the approved permit drawings, plans and other documents attached hereto. This agency action is based on the information submitted to the Department as part of the permit application, and adherence with the final details of that proposal shall be a requirement of the permit. This permit and authorization to use sovereign submerged lands are subject to the General Conditions, General Consent Conditions and Specific Conditions, which are a binding part of this permit and authorization. Both the Permittee and their Contractor are responsible for reading and understanding this permit (including the permit conditions and the approved permit drawings) prior to commencing the authorized activities, and for ensuring that the work is conducted in conformance with all the terms, conditions and drawings

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GENERAL CONDITIONS:

1. All activities authorized by this permit shall be implemented as set forth in the project description, permit drawings, plans and specifications approved as a part of this permit, and all conditions and requirements of this permit. The Permittee

shall notify the Department in writing of any anticipated deviation from the permit prior to implementation so that the Department can determine whether a modification of the permit is required pursuant to Rule 62B-49.008, F.A.C.

2. If, for any reason, the Permittee does not comply with any condition or limitation specified in this permit, the Permittee shall immediately provide the Department and the appropriate District office of the Department with a written report containing the following information: a description of and cause of noncompliance; and the period of noncompliance, including dates and times; and, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

3. This permit does not eliminate the necessity to obtain any other applicable licenses or permits that may be required by federal, state, local or special district laws and regulations. This permit is not a waiver or approval of any other Department permit or authorization that may be required for other aspects of the total project that are not addressed in this permit.

4. Pursuant to Sections 253.77 and 373.422, F.S., prior to conducting any works or other activities on state-owned submerged lands, or other lands of the state, title to which is vested in the Board of Trustees, the Permittee must receive all necessary approvals and authorizations under Chapters 253 and 258, F.S. Written authorization that requires formal execution by the Board of Trustees shall not be considered received until it has been fully executed.

5. Any delineation of the extent of a wetland or other surface water submitted as part of the permit application, including plans or other supporting documentation, shall not be considered specifically approved unless a specific condition of this permit or a formal determination under Section 373.421(2), F.S., provides otherwise.

6. This permit does not convey to the Permittee or create in the Permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the Permittee. The issuance of this permit does not convey any vested rights or any exclusive privileges.

7. This permit or a copy thereof, complete with all conditions, attachments, plans and specifications, modifications, and time extensions shall be kept at the work site of the permitted activity. The Permittee shall require the contractor to review the complete permit prior to commencement of the activity authorized by this permit.

8. The Permittee, by accepting this permit, specifically agrees to allow authorized Department personnel with proper identification and at reasonable times, access to the premises where the permitted activity is located or conducted for the purpose of ascertaining compliance with the terms of the permit and with the rules of the Department and to have access to and copy any records that must be kept under conditions of the permit; to inspect the facility, equipment, practices, or operations regulated or required under this permit; and to sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

9. At least 48 hours prior to commencement of activity authorized by this permit, the Permittee shall electronically submit to the Department, by email at JCPCompliance@dep.state.fl.us, and the appropriate District office of the Department a written notice of commencement of construction indicating the actual start date and the expected completion date and an affirmative statement that the Permittee and the contractor, if one is to be used, have read the general and specific conditions of the permit and understand them.

10. If any prehistoric or historic artifacts, such as pottery or ceramics, stone tools or metal implements, shipwreck remains or anchors, dugout canoes or other physical remains that could be associated with Native American cultures, or early Colonial or American settlement are encountered at any time within the project site area, the permitted project shall cease all activities involving subsurface disturbance in the immediate vicinity of such discoveries. The Permittee, or other designee, shall contact the Florida Department of State, Division of Historical Resources, Compliance and Review Section at (850)245- 6333 or (800)847-7278, as well as the appropriate permitting agency office. Project activities shall not resume without verbal and/or written authorization from the Division of Historical Resources. In the event that unmarked human remains are encountered during permitted activities, all work shall stop immediately and the proper authorities notified in accordance with Section 872.05, F.S.

11. Within 30 days after completion of construction or completion of a subsequent maintenance event authorized by this permit, the Permittee shall electronically submit to the Department, by email at JCPCompliance@dep.state.fl.us, and the appropriate District office of the Department a written statement of completion and certification by a registered professional engineer. This certification shall state that all locations and elevations specified by the permit have been verified; the activities authorized by the permit have been performed in compliance with the plans and specifications approved as a part of the permit, and all conditions of the permit; or shall describe any deviations from the plans and specifications, and all conditions of the permit. When the completed activity differs substantially from the permitted plans, any substantial deviations shall be noted and explained

on as-built drawings electronically submitted to the Department, by email at JCPCompliance@dep.state.fl.us.

GENERAL CONSENT CONDITIONS:

1. Authorizations are valid only for the specified activity or use. Any unauthorized deviation from the specified activity or use and the conditions for undertaking that activity or use shall constitute a violation. Violation of the authorization shall result in suspension or revocation of the grantee's use of the sovereignty submerged land unless cured to the satisfaction of the Board.

2. Authorizations convey no title to sovereignty submerged land or water column, nor do they constitute recognition or acknowledgment of any other person's title to such land or water.

3. Authorizations may be modified, suspended or revoked in accordance with their terms or the remedies provided in Sections 253.04 and 258.46, F.S., or Chapter 18-14, F.A.C.

4. Structures or activities shall be constructed and used to avoid or minimize adverse impacts to sovereignty submerged lands and resources.

5. Construction, use or operation of the structure or activity shall not adversely affect any species that is endangered, threatened or of special concern, as listed in Rules 68A- 27.003, 68A-27.004 and 68A-27.005, F.A.C.

6. Structures or activities shall not unreasonably interfere with riparian rights. When a court of competent jurisdiction determines that riparian rights have been unlawfully affected, the structure or activity shall be modified in accordance with the court's decision.

7. Structures or activities shall not create a navigational hazard.

8. Structures shall be maintained in a functional condition and shall be repaired or removed if they become dilapidated to such an extent that they are no longer functional. This shall not be construed to prohibit the repair or replacement subject to the provisions of Rule18-21.005, F.A.C., within one year, of a structure damaged in a discrete event such as a storm, flood, accident or fire.

9. Structures or activities shall be constructed, operated and maintained solely for water dependent purposes, or for non-water dependent activities authorized under paragraph 18-21.004(1)(f), F.A.C., or any other applicable law.

SPECIFIC CONDITIONS - ADMINISTRATIVE:

1. Pursuant to Chapter 161.141, F.S., prior to construction of the beach restoration, the Board of Trustees must establish the line of mean high water for any area affected by this project that does not already have an Erosion Control Line (ECL). This is required to establish the boundary line between sovereignty lands of the state bordering on the Atlantic Ocean and the upland properties. No work shall commence until the Erosion Control Line has been established to the satisfaction of the Department and recorded in the public records of the county in which the project is located.

2. All reports or notices relating to this permit shall be electronically submitted to the Department's JCP Compliance Officer (e-mail address: JCPCompliance@dep.state.fl.us) unless otherwise specified in the specific conditions of this permit.

SPECIFIC CONDITIONS - PRIOR TO CONSTRUCTION

3. **Notice to Proceed and Pre-Construction Submittals**. No work shall be conducted under this permit until the Permittee has received a written notice to proceed from the Department for each event. At least 30 days prior to the requested date of issuance of the notice to proceed, the Permittee shall submit a written request for a Notice to Proceed along with the following items for review and approval by the Department:

    a. An electronic copy of detailed ***final construction plans and specifications*** for all authorized activities. The plans and specifications must be consistent with the project description of this permit and the attached permit drawings, and shall also be certified by a professional engineer (P.E.), who is registered in the State of Florida. The Permittee shall point out any deviations from the Project Description of this permit (as stated above) or the approved permit drawings (attached to this permit), and any significant changes would require a permit modification. The plans and specifications shall include a description of the dredging and construction methods to be utilized and drawings and surveys that show all biological resources and work spaces (e.g., anchoring areas, pipeline corridors, staging areas, boat access corridors, etc.) to be used for this project;

    b. Documentation that the ***Erosion Control Line*** has been executed and recorded in the County Records;

    c. ***Turbidity monitoring qualifications***: The names, credentials

(demonstrating experience and qualifications) and contact information for the individuals who will conduct the turbidity monitoring. Turbidity monitors shall have prior training in water quality monitoring and experience in turbidity monitoring for coastal construction projects. The turbidity monitors shall be independent of the design engineer and the construction contractor. If turbidity levels exceed the compliance standards established in this permit, the turbidity monitor shall be required (pursuant to Specific Conditions 27 and 28) to immediately inform the JCP Compliance Officer within 24 hours.

d. A ***Scope of Work*** for the turbidity monitoring shall be provided to ensure that the right equipment is available and that monitoring protocols will be sufficient to conduct the monitoring correctly at any location, and under any conditions.

e. Prior to the second event authorized under this permit, and each subsequent event, the results of the intermediate turbidity monitoring shall be evaluated and provided to the Department. If the results indicate that the project can be built using a smaller mixing zone, this adjustment shall be made through an administrative modification to the permit prior to commencement of construction;

f. ***Draft turbidity sampling map.*** An example of the geo-referenced map that will be provided with turbidity reports, including aerial photography and the boundaries for benthic resources (pursuant to Specific Condition 28).

g. ***Biological monitoring qualifications***. Biological monitoring qualifications of firms and their staff shall be submitted to the JCP Compliance Officer for review and approval. If additional monitoring team(s) are subcontracted, or new staff are added to the monitoring team, proposed changes and qualifications shall be submitted to the JCP Compliance Officer for review at least 30 days prior to a monitoring event. The Permittee's selected biological monitoring firm is fully responsible for training of new staff members and subcontractors, as well as the QA/QC verification of their work;

h. Documentation from the U.S. Fish and Wildlife Service (FWS) that this work will be covered under a **Statewide Programmatic Biological Opinion** or a Biological Opinion (BO) issued for construction on this project site. If the BO contains conditions that are not already contained herein, the Notice to Proceed may be withheld if it is determined that

the permit requires a modification to include those additional conditions.

i. ***Fish and Wildlife Monitoring Qualification***: To ensure that individuals conducting monitoring of fish and wildlife resources have the appropriate qualification, the Permittee shall provide documentation demonstrating expertise/experience in surveying the types of resources that are present in the project. The Department and FWC will review this information for confirmation that the monitors are capable of meeting the requirements in this authorization. This documentation shall include the following:

   a. Marine Turtle Protection: Monitoring plan, including a list of the names and permit numbers for the Marine Turtle Permit Holders.

   b. Shorebird Protection: Monitoring plan, including a list of Bird Monitors with their contact information, summary of qualifications including bird identification skills, and avian survey experience, proposed locations of shorebird survey routes, and the locations of travel routes.

j. ***A Baseline Nearshore Hardbottom Survey***. A full pre-construction (baseline) survey shall be completed and submitted to the Department prior to the issuance of the Notice to Proceed. This survey shall comply with and meet the requirements of applicable Approved Biological Monitoring Plans.

4. **Pre-Construction Conference.** The Permittee shall conduct a pre-construction conference to review the specific conditions and monitoring requirements of this permit with Permittee's contractors, the engineer of record, those responsible for turbidity monitoring, those responsible for protected species monitoring, staff representatives from the Fish and Wildlife Conservation Commission (FWC) and the JCP Compliance Officer (or designated Department staff representatives) prior to each construction event. In order to ensure that appropriate representatives are available, at least twenty-one (21) days prior to the intended commencement date for the permitted construction, the Permittee is advised to contact the Department, and the other agency representatives listed below:

DEP JCP Compliance Officer
e-mail: JCPCompliance@dep.state.fl.us

FWC Imperiled Species Management Section

e-mail: marineturtle@myfwc.com

FWC Regional Biologist
See Contact list for phone numbers
- (http://myfwc.com/conservation/you-conserve/wildlife/shorebirds/contacts)

The Permittee is also advised to schedule the pre-construction conference at least a week prior to the intended commencement date. At least seven (7) days in advance of the pre- construction conference, the Permittee shall provide written notification, advising the participants of the agreed-upon date, time and location of the meeting, and also provide a meeting agenda and a teleconference number.

SPECIFIC CONDITIONS – CONSTRUCTION ACTIVITIES

5. The Permittee shall not store or stockpile tools, equipment, materials, etc., within littoral zones or elsewhere within surface waters of the state without prior written approval from the Department. Storage, stockpiling or access of equipment on, in, over or through beds of submerged aquatic vegetation, wetlands or hardbottom is prohibited unless it occurs within a work area or ingress/egress corridor that is specifically approved by this permit and is shown on the approved permit drawings. Anchoring or spudding of vessels and barges within beds of aquatic vegetation or hardbottom is also prohibited

6. The Permittee shall not conduct project operations or store project-related equipment in, on or over dunes, or otherwise impact dune vegetation, outside the approved staging, beach access and dune restoration areas designated in the permit drawings.

7. The non-shelly sand product from Stewart Material Mine in Fort Pierce, FL was reviewed and approved for use in this project. Any additional upland sand sources proposed for use under this permit shall be approved via permit modification.

8. Sediment quality will be assessed as outlined in the Sediment QA/QC plan dated 30 August 2018. Any occurrences of placement of material not in compliance with the Plan shall be handled according to the protocols set forth in the Sediment QA/QC plans. The sediment testing result shall be submitted to FDEP within 90 days following the completion of beach construction. The Sediment QA/QC plans shall include the following:

a. If during construction, the Permittee or Engineer determines that the beach fill material does not comply with the sediment compliance specifications, measures will be taken to avoid further placement of noncompliant fill, and the sediment inspection results will be reported to the Department.

b. The Permittee will submit post-construction sediment testing results and an analysis report as outlined in the Sediment QA/QC plan to the Department within 90 days following beach construction. The sediment testing results will be certified by a P.E. or P.G. from the testing laboratory. A summary table of the sediment samples and test results for the sediment compliance parameters as outlined in Table 1 of the Sediment QA/QC plan shall accompany the complete set of laboratory testing results. A statement of how the placed fill material compares to the sediment analysis and volume calculations from the geotechnical investigation shall be included in the sediment testing results report.

c. A post-remediation report containing the site map, sediment analysis, and volume of non-compliant fill material removed and replaced, or otherwise remediated, will be submitted to the Department within 7 days following completion of remediation activities.

SPECIFIC CONDITIONS – WILDLIFE

9. ***In-water Activity***. The Permittee shall adhere to the following requirements for all in- water activity:

a. The Permittee shall instruct all personnel associated with the project about the presence of marine turtles and manatees, and the need to avoid collisions with (and injury to) these protected marine species. The Permittee shall be responsible for harm to these resources and shall require their contractors to advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees or marine turtles, which are protected under the Endangered Species Act, the Marine Mammal Protection Act, the Marine Turtle Protection 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 project area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels shall follow routes of deep water whenever possible.

c. Siltation or turbidity barriers (if used) shall be made of material in which manatees and marine turtles cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers shall not impede manatee or marine turtle movement or travel.

d. The Permittee is responsible for all on-site project personnel and shall require them to observe water-related activities for the presence of marine turtles and manatee(s). All in-water operations shall be immediately shall be shut down if a marine turtle or manatee comes within 50 feet of the operation. For unanchored vessels, operators shall disengage the propeller and drift out of the potential impact zone. If drifting would jeopardize the safety of the vessel then idle speed may be used to leave the potential impact zone. Activities shall not resume until the animal(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the animal(s) has not reappeared within 50 feet of the operation. Animals shall not be herded away or harassed into leaving.

e. Any collision with (or injury to) a marine turtle or manatee shall be reported immediately to the FWC Hotline at 1-888-404-3922, and to FWC at ImperiledSpecies@myFWC.com. Any collision with (and/or injury to) a marine turtle shall also be reported immediately to the Sea Turtle Stranding and Salvage Network (STSSN) at SeaTurtleStranding@myfwc.com.

f. Temporary signs concerning manatees shall be prominently posted prior to and during all in-water project activities, at sufficient locations to be regularly and easily viewed by all personnel engaged in water-related activities. Two temporary signs, which have already been approved for this use by the FWC, shall be posted at each location. One sign shall read “Caution Boaters – Watch for Manatees”. A second sign measuring at least 8 ½" by 11", shall explain the requirements for “Idle Speed/No Wake” and the shutdown of in-water operations. All signs shall be removed by the Permittee upon completion of the project. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to ImperiledSpecies@myFWC.com.

10. Beach nourishment shall occur outside of the main part of marine turtle nesting season, starting after October 31 and completed before May 1. During the May 1 through October 31 period, no construction equipment shall be placed or stored on the beach. Temporary approvals of work to extend into marine turtle nesting season may be authorized on a case by case basis. Such authorizations

shall be in writing from the Department with FWC approval and accompanied by proof the extension is covered under a valid Biological Opinion. If such an authorization is granted all conditions below shall be followed.

11. Construction-related activities are authorized to occur on the nesting beach (seaward of existing coastal armoring structures or dune crest and all sandy beach areas such as those used for beach access during the early nesting season (March 1 through May 1) and late nesting season (November 1 through November 30) under the following conditions:

    a. Daily early morning marine turtle nest surveys shall start at the beginning of marine turtle nesting season (March 1). Daily nesting surveys shall continue through November 30, or until two weeks after the last crawl in the project area, whichever is earlier.

    b. Daily nesting surveys shall be conducted beginning ½ hour prior to sunrise, and no construction activity may commence until completion of the marine turtle survey each day.

    c. The Permittee shall ensure that marine turtle nesting surveys are conducted as required in this authorization, and only conducted by personnel with a valid FWC Marine Turtle Permit, that covers all project activities as required by Chapter 68E-1, F.A.C. If needed, contact FWC at MTP@myfwc.com for information on the authorized Marine Turtle Permit Holders in the project area.

    d. Only those nests laid in the area where sand placement will occur shall be relocated, and nest relocation shall cease after the sand placement is completed. Nests requiring relocation shall be moved no later than 9 a.m., the morning following deposition (no longer than 12 hours from the time the eggs are laid), to a nearby self-release beach site in a secure setting, where artificial lighting will not interfere with hatchling orientation. The relocation site shall be determined in conjunction with and approved by FWC prior to nest relocations. Relocated nests shall not be placed in organized groupings. Relocated nests shall be randomly staggered along the length and width of beach settings that are not expected to experience any of the following: inundation by high tides; severe erosion; previous egg loss; or illumination by artificial lighting.

    e. Nests deposited within areas where construction activities will not occur for 65 days, or nests laid in the nourished berm prior to tilling, shall be marked and left in place. The Marine Turtle Permit Holder shall install on-beach markers at the nest site and shall also install a secondary

marker at a point as far landward as possible to assure that the nest can be located should the on-beach marker be lost. No activity shall occur within the marked area, nor shall any activities occur that 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.

f. Beginning March 1, daytime surveys shall be conducted for leatherback sea turtle nests. Nighttime surveys for leatherback marine turtles shall begin when the first leatherback crawl is recorded within the project or adjacent beach area through April 30, or until completion of the project, whichever is earliest. Nightly nesting surveys shall be conducted from 9 p.m. until 6 a.m. The project area shall be surveyed at 1- hour intervals and eggs shall be relocated per the preceding requirements. Since leatherbacks require at least 1.5 hours to complete nesting, the1-hour interval will ensure that all nesting leatherbacks are encountered.

12. ***Construction Area Project Lighting*. No temporary lighting of the construction area is authorized at any time during the main portion of marine turtle nesting season (May 1 through October 31).** During early and late nesting season, direct lighting of the beach and nearshore waters shall be limited to the immediate area of active construction while meeting safety requirements as required by law. Lighting on offshore and onshore equipment shall be minimized by reducing the number of fixtures, shielding, lowering the height and appropriately placing fixtures to avoid excessive illumination of the water's surface and nesting beach. The intensity of lighting shall be reduced to the minimum standard required for general construction area safety. Shields shall be affixed to the light housing on dredge and land-based lights and be large enough to block lamp light from being transmitted outside the construction area or to the adjacent marine turtle nesting beach. (Figure 1 below).

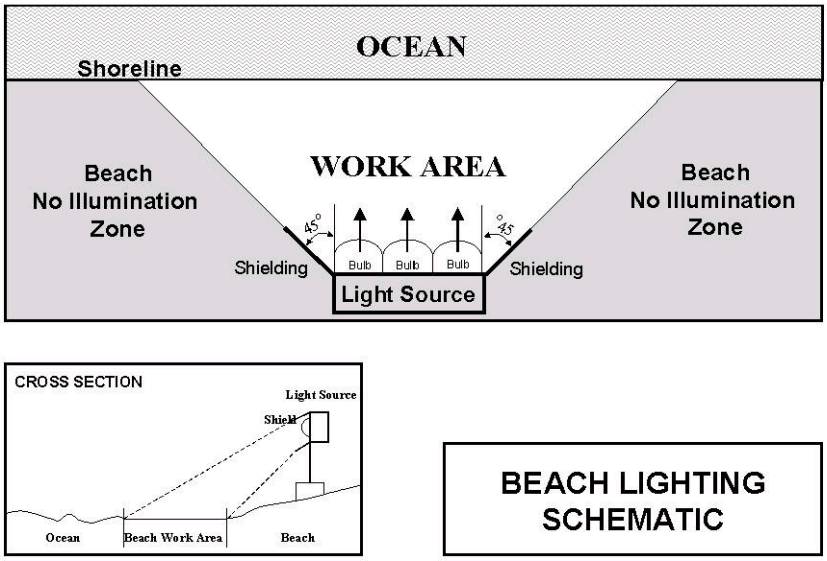


Figure 1

13. ***All Beach Related Activities.*** The Permittee shall adhere to the following requirements for all beach-related activities during marine turtle and shorebird nesting/breeding seasons (March 1 through October 31) in Indian River County.

    a. The Permittee shall require their contractor and protected species monitors to inspect all work areas that have excavations and temporary alteration of beach topography to determine which areas have deviations (such as depressions, ruts, holes and vehicle tracks) capable of trapping flightless shorebird chicks or marine turtle hatchlings each day. If so, the deviations shall be filled or leveled from the natural beach profile prior to 9:00 p.m. each day. The beach surface shall also be inspected after completion of the project, and all tracks, mounds, ridges or impressions, etc. left by construction equipment on the beach shall be smoothed and leveled.

    b. If any debris, including derelict construction or coastal armoring material, concrete and metal occurs on the beach placement site, it shall be removed from the beach to the maximum extent practicable prior to any placement of fill material. If debris removal activities will take place during protected species nesting seasons, the work shall be conducted during daylight hours only, and shall not commence until completion of daily monitoring surveys.

    c. **Equipment Storage and Placement**. Staging areas and temporary

storage for construction equipment and pipes shall be located off the beach to the maximum extent practicable during March 1 through October 31. Nighttime storage of construction equipment that is not in use shall be located off the beach. All construction pipes that are in use on the beach shall be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system, and if placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune.

d. If it is necessary to extend construction pipes past a known shorebird nesting site, then those pipes shall be placed landward of the site before birds are active in that area. No pipe or sand shall be placed seaward of a shorebird nesting site during the shorebird nesting season. If such placement is not feasible for the project, FWC's Regional Biologist shall be contacted for alternative measures. See contacts available at http://myfwc.com/conservation/you-conserve/wildlife/shorebirds/contacts.

e. **Beach Driving**. All vehicles shall be operated at speeds less than 6 mph and run at or below the high-tide line. All personnel associated with the project shall be instructed about the potential presence of onsite protected species, and the need to avoid injury and disturbance to these species. In addition, all vehicles operated on the beach shall operate in accordance with the FWC's Best Management Practices for Operating Vehicles on the Beach (http://myfwc.com/conservation/you-conserve/wildlife/beach- driving/). *Note: when flightless chicks are present within or adjacent to travel corridors, construction-related vehicles shall not be driven through the corridor unless a Bird Monitor is present.*

14. ***Dune Planting Conditions. Planting of dune vegetation is encouraged outside of marine turtle nesting season. However, planting activities may occur during the marine turtle nesting season March 1 through October 31 under the following conditions:***

a. It is the responsibility of the Permittee to ensure that the project area and access sites are surveyed for marine turtle nesting activity. All nest surveys and activities involving marine turtles shall be conducted only by persons with a valid FWC permit issued pursuant to Florida Administrative Code 68E-1. For information regarding marine turtle permit holders, contact the FWC at MTP@myfwc.com.

b. Marine turtle nest surveys shall be initiated at the beginning of the nesting season or 65 days prior to installation of plants (whichever is

later). Surveys shall continue until completion of the project or through September 15 (whichever is earliest). Surveys shall be conducted throughout the project area and all beach access sites.

c. Any nests deposited in the area shall be left in place. The marine turtle permit holder shall install an on-beach marker at any nest site and a secondary marker located at a point as far landward as possible to ensure that future location of the nest will be possible should the on-beach marker be lost. A series of stakes and survey ribbon or string shall be installed to establish an area of 3 feet radius surrounding the nest. No planting or other activity shall occur within this area nor shall any activity occur which might cause indirect impacts within this area. Nest sites shall be inspected daily to ensure nest markers have not been removed.

d. The use of heavy equipment (including vehicles such as trucks) is not authorized in marine turtle nesting habitat. A lightweight (ATV style) vehicle, with tire pressures of 10 psi or less can operate on the beach if required.

e. Any vegetation planting shall be installed by hand labor/tools only.

f. All activity shall be confined to daylight hours and shall not occur prior to the completion of all necessary marine turtle surveys and conservation activities within the project area. Nighttime storage of equipment or materials shall be off the beach.

g. In the event a nest is disturbed or uncovered during planting activity, the Permittee shall cease all work and immediately contact the marine turtle permit holder responsible for marine turtle conservation measures within the project area. If a nest(s) cannot be safely avoided during construction, all activity within the affected project area shall be delayed until complete hatching and emergence of the nest.

h. All planting related activities must avoid marked marine turtle nests including those that may be on the beach before and after the marine turtle nesting season dates (May 1 through October 31). Any impacts to nests or marine turtles that inadvertently occur shall be immediately reported the Florida Fish and Wildlife Conservation Commission (FWC) at MarineTurtle@myfwc.com, and all work shall stop until authorized to continue by the Department and FWC.

i. All irrigation lines for the dune restoration planting, if proposed, will

be temporarily installed along the landward side of the dune only and will be removed once the plants have become established. Any watering necessary along the seaward side of the dune will be done by hand on an "as needed" basis.

Marine Turtle Protection Conditions.

15. **Fill Restrictions**. During the marine turtle nesting season, the contractor shall not advance the beach fill more than 500 feet along the shoreline between dusk and the following day, until the daily nesting survey is completed, and the beach has been cleared for fill advancement. If the 500-foot advancement limitation is not feasible for the project, an alternative distance shall be established during the preconstruction meeting, if a distance can be agreed upon in consultation with FWC. If the work area is extended, nighttime nesting surveys are required, and a Marine Turtle Permit Holder is required to be present on-site to ensure that no nesting and hatching marine turtles are present. If any nesting turtles are sighted on the beach within the immediate construction area, activities shall cease immediately until the turtle has returned to the water and the Marine Turtle Permit Holder responsible for nest monitoring has relocated the nest.

16. **Marine Turtle or Nest Encounters**. Upon locating a dead or injured marine turtle, a hatchling, or egg that may have been harmed or destroyed as a result of the project, the Permittee shall be responsible for notifying FWC Wildlife Alert at 1-888-404-FWCC (3922). Care shall be taken in handling injured marine turtles or exposed eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials for later analysis. If a marine turtle nest is excavated during construction activities, but not as part of the authorized nest relocation process outlined in these specific conditions, 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.

17. **Tilling, Compaction and Escarpment Remediation Requirements**. For the years after the first-year sand placement (out-year), compaction monitoring, tilling and escarpment monitoring are not required if placed material no longer remains on the dry beach.

    a. **Compaction Sampling**. Sand compaction shall be monitored in the area of sand placement immediately after completion of the nourishment event, and two weeks prior to marine turtle nesting season, for three (3) subsequent years. 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 prior to the beginning of marine turtle nesting season. If a few values exceeding 500 psi are

present randomly within the project area, tilling will not be required. Compaction monitoring shall be in accordance with the following protocol:

i. 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).

ii. At each station, the cone penetrometer shall be pushed to depths of 6, 12 and 18 inches three times (i.e., three replicates at each depth). 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 shall include all 18 values for each transect line, and the final 6 averaged compaction values.

iii. If values exceeding 500 psi are distributed throughout the project area, but do not exist at two adjacent stations at the same depth, then the Permittee shall consult with the FWC to determine if tilling is required. A tilling waiver based on these compaction values shall be submitted to the FWC at marineturtle@myfwc.com.

b. **Tilling Requirements**. If tilling is performed regardless of post-construction compaction levels or tilling is required based on compaction measurements, the area shall be tilled to a depth of 36 inches.

i. All tilling activity shall be completed prior to the marine turtle nesting season. If the project is completed during the marine turtle nesting season, tilling shall not be performed in areas where nests have been left in place or relocated.

ii. Each pass of the tilling equipment shall be overlapped to allow thorough and even tilling. A relatively even surface, with no deep

ruts or furrows, shall be created during tilling. To do this, chain-linked fencing or other material shall be dragged over those areas as necessary after tilling.

iii. Tilling shall occur landward of the wrack line and shall avoid all naturally vegetated areas that are at least 3 square feet in size, as well as any planted areas that have been authorized by the Department. A 3-foot-wide No- Tilling buffer shall be maintained around vegetated areas. The slope between the mean high-water line and the mean low water line shall be maintained to approximate natural slopes.

c. **Escarpment Surveys.** Visual surveys for escarpments along the project area shall be made immediately after completion of sand placement, two weeks prior to marine turtle nesting season, and weekly for three (3) subsequent years, each year placed sand remains on the beach. Escarpment remediation shall be as follows:

i. Prior to marine turtle nesting season, escarpments that interfere with marine turtle nesting or that exceed 18 inches in height for a distance of at least 100 feet shall be leveled to the natural beach contour or the beach profile shall be reconfigured to minimize scarp formation. Any escarpment removal shall be reported relative to R-monument location to FWC at marineturtle@myfwc.com, with a copy sent to the JCP Compliance Officer.

ii. If weekly surveys during the marine turtle nesting season document escarpments that exceed 18 inches in height for a distance of at least 100 feet and have persisted for more than two weeks, the FWC shall be contacted immediately to determine the appropriate action to be taken. Submitted information shall include locations and measurements of the escarpments and marine turtle nests located within 20 feet of the escarpments, with photographs when possible. Upon written notification, the Permittee shall level escarpments in accordance with methods that minimize impacts to any existing nest in coordination with the FWC and the marine turtle permit holder. An annual summary of escarpment surveys and actions taken shall be submitted electronically to FWC (marineturtle@myfwc.com).

d. If compaction sampling, tilling or escarpment removal occurs during shorebird breeding season, the Shorebird Conditions (including

surveys) included in this authorization shall be followed. No heavy equipment shall operate, and no compaction sampling or tilling shall occur within 300 feet of any shorebird nest. If flightless shorebird chicks are present within the work zone or equipment travel corridor, a Bird Monitor shall be present during the operation to ensure that no heavy equipment operates within 300 feet of the flightless young. It is the responsibility of the Permittee to ensure that their contractors avoid tilling, scarp removal or dune vegetation planting in areas where nesting birds are present.

18. **Post-Construction Monitoring and Reporting Marine Turtle Protection Conditions**

a. For each fill placement event, reports for all required nesting surveys shall be provided for the initial or remaining marine turtle nesting season and for up to three years additional nesting seasons if the placed material remains on the beach, accordance with the Table 1 (below). Surveys shall record the nest numbers, nesting success, reproductive success (hatching and emergence), disorientations, and lost nests due to erosion and/or inundation, by species. If nesting and reproductive success is less than the criteria in the table below, an additional year of monitoring and additional conditions prior to the next sand placement on this beach may be required by the Department and FWC. In accordance with Table 1:

i. For the remainder of the nesting season immediately following construction, and for the following year, the number and type of emergences (nests or false crawls) shall be reported per species. A third year of nesting surveys may be required if nesting success for any species on the nourished beach is less than 40%.

ii. For the remainder of the nesting season immediately following construction, reproductive success shall be reported for all loggerhead, Kemp's Ridley, green and leatherback nests.

iii. If the documented reproductive success for each species meets or exceeds the required criteria, monitoring for reproductive success shall be recommended, but not required for the second-year post-construction.

b. Data shall be reported for the nourished areas in accordance with **Table 1**. Summaries shall include all crawl activity, hatching success of a representative sampling of nests left in place (if any) by species, project name and applicable project permit numbers and dates of

construction. Summaries shall be submitted in electronic format (Excel spreadsheets) to the FWC Imperiled Species Management section at marineturtle@myfwc.com and copied to JCPCompliance@dep.state.fl.us. All summaries should be submitted by January 15th of the following year. The FWC Excel spreadsheet is available upon request from marineturtle@myfwc.com.

Table 1. Marine Turtle Monitoring for Beach Placement of Material

Date	Duration	Variable	Criterion
Nesting Success	Year of construction, two years post construction if placed sand remains on beach and variable does not meet criterion based on previous year	Number of nests and non-nesting emergences by day by species	40 percent or greater
Hatching success	Year of construction and one-year post construction if placed sand remains on beach and variable does not meet success criterion based on previous year	Number of hatchlings by species to hatch from egg	60 percent or greater (a statistically valid number of loggerhead and green nests, and all leatherback nests)
Emergence Success	Year of construction and one-year post construction if placed sand remains on beach and variable does not meet success criterion based on previous year	Number of hatchlings by species to emerge from nest onto beach	Average must not be significantly different than the average hatching success
Disorientations	Year of construction and two years post construction if placed sand remains on the beach	Number of nests and individuals that misorient or disorient	

Date	Duration	Variable	Criterion
Lighting Surveys	Two surveys the year following construction, one survey between May 1 and May 15 and second survey between July 15 and August 1	Number, location and photographs of lights visible from nourished berm, corrective actions and notifications made	Lighting survey and meeting resulting with plan for reduction in lights visible from nourished berm
Compaction	Three seasons following construction. Not required if the beach is tilled prior to nesting season each year placed sand remains on beach	Shear resistance	Less than 500 psi
Escarpment Surveys	Weekly during nesting season for three years each year placed sand remains on the beach	Number of scarps 18 inches or greater extending for more than 100 feet that persist for more than 2 weeks	Successful remediation of all persistent scarps as needed

19. Lighting surveys shall be conducted from the renourished berm and action taken to ensure that no artificial lights are visible from any dry portion of the newly elevated beach. The first survey shall be conducted between May 1 and May 15 for the first nesting season following construction, or immediately after sand placement if construction is not completed until after May 15. The survey shall follow standard techniques for such a survey, such as including the number and type of visible lights, location of lights, and photo documentation (additional techniques as per the 2015 USFWS Statewide Programmatic Biological Opinion).

    a. For each visible light source, the Permittee shall document that the property owner has been notified of the problem light and has been provided with recommendations for correcting the light. Recommendations shall be in accordance with local lighting ordinances, and a report summarizing all visible lights shall be forwarded to local code enforcement. If no lighting ordinances exist,

the recommendation shall be that no lights or light sources shall be visible from the newly elevated beach. A report summarizing all visible lights shall also be submitted to FWC at marineturtle@myfwc.com and copied to JCPCompliance@dep.state.fl.us by the 1st of the month following the survey.

b. The second survey shall be conducted between July 15 and August 1 to assess any remaining visible lights requiring corrective action. The survey shall be conducted from the top of the foreshore slope (i.e., the seaward edge of the filled berm before it slopes into the water), facing landward. A summary annual report of the surveys documenting what corrective actions or local enforcement actions have been taken shall be submitted to FWC by December 31 of that year. Upon request by the FWC, the Permittee shall set up a meeting with the county or municipality, USFWS and FWC to discuss the survey report, as well as any documented marine turtle disorientations in or adjacent to the project area.

Shorebird Protection.

20. The term "shorebird" refers to all solitary nesting shorebirds and colonial nesting seabirds. If any project activities as described below are conducted, the following shorebird protection conditions are required during the shorebird breeding cycle, which includes nesting. The following conditions are intended to avoid direct impacts associated with the construction of the project and may not address all potential take incidental to the operation and use related to this authorization.

a. Shorebird breeding season dates for this project area are March 1 through September 1. Note that while most species have completed the breeding cycle by September 1, flightless young may be present through September and must be protected if present.

b. Any parts of the project where "project activities" on the beach take place entirely outside the breeding season, do not require shorebird surveys. The term "project activities" includes operation of vehicles on the beach, movement or storage of equipment on the beach, sand placement or sand removal, and other similar activities that may harm or disturb shorebirds. Bird survey routes must be established and monitored throughout the entire breeding season in any parts of the project area where: 1) potential shorebird breeding habitat occurs, and 2) project activities are expected to occur at any time within the

breeding season.

c. Bird surveys shall be conducted in all potential beach-nesting bird habitats within the project boundaries that may be impacted by construction or pre-construction activities. One or more shorebird survey routes shall be established by the Permittee to cover project areas which require shorebird surveys. These routes must be approved by the FWC Regional Biologist as part of the Environmental Protection Plan approval process. Routes shall not be modified without prior FWC approval.

d. During the pre-construction and construction phases of the project, the Permittee shall ensure that surveys for detecting breeding activity and the presence of flightless chicks shall be completed on a daily basis by a qualified bird monitor prior to movement of equipment, operation of vehicles, or other activities that could potentially disrupt breeding behavior or cause harm to the birds or their eggs or young. If all project activities are completed and all personnel and equipment have been removed from the beach prior to the end of the breeding season, route surveys shall continue to be conducted at least weekly through the end of the breeding season. If breeding or nesting behavior is confirmed by the presence of a scrape, eggs or young, the Permittee (or their designee) shall establish a 300-foot buffer around the site and notify the FWC Regional Biologist within 24 hours.

e. The Bird Monitor shall conduct a shorebird education and identification program (and/or provide educational materials) with the on-site staff to ensure protection of precocial (mobile) chicks. All personnel are responsible for watching for shorebirds, nests, eggs and chicks. If the Bird Monitor finds that shorebirds are breeding within the project area, a bulletin board shall be placed and maintained in the construction staging area with the location map of the construction site showing the bird breeding areas and a warning, clearly visible, stating that “NESTING BIRDS ARE PROTECTED BY LAW INCLUDING THE FLORIDA ENDANGERED AND THREATENED SPECIES ACT AND THE STATE and FEDERAL MIGRATORY BIRD ACTS”.

f. **Bird Monitor Requirements.** The Permittee shall ensure that shorebird surveys are conducted by trained, dedicated individuals (Bird Monitor) with proven shorebird identification skills and avian survey experience. Bird Monitors shall review and become familiar with the general information, employ the data collection protocol, and

implement data entry procedures outlined on the FWC's FSD website (http://www.flshorebirddatabase.org or Florida Shorebird Database). The Permittee shall submit a list of Bird Monitors, with their contact information and a summary of qualifications, including bird identification skills and avian survey experience to the FWC Regional Biologist for approval. The Permittee shall submit the names and contact information of the Bird Monitors who have been approved by FWC to JCPCompliance@dep.state.fl.us, prior to any construction or shorebird surveys. In order to be approved, the Bird Monitors must meet the following minimum qualifications:

i. Has previously participated in beach-nesting bird surveys in Florida (provide references or resume). Experience with previous projects must document the ability to 1) identify all species of beach-nesting birds by sight and sound, 2) identify breeding/territorial behaviors, and find nests of shorebirds that occur in the project area, and 3) identify habitats preferred by shorebirds nesting in the project area.

ii. Have a clear working knowledge of, and adhere to, the Breeding Bird Protocol for Florida's Seabirds and Shorebirds.

iii. Have completed full-length webinars: Route-Surveyor Training and Rooftop Monitoring Training, including the annual refresher training. Training resources can be found on the Florida Shorebird Database (FSD) website.

iv. Familiar with FWC beach driving guidelines.

v. Experience posting beach-nesting bird sites, consistent with Florida Shorebird Alliance (FSA) Guidelines.

vi. Has registered as a contributor to the FSD.

21. **Bird Survey Protocols**. Bird survey protocols, including downloadable field data sheets, are available on the FSD website. All breeding activity shall be reported to the FSD website within one week of data collection. If the use of this website is not feasible for data collection, the FWC Regional Biologist must be contacted for alternative methods of reporting. The Permittee shall ensure that the Bird Monitors use the following survey protocols:

a. Surveys shall be conducted by walking the length of all survey routes and visually surveying for the presence of shorebirds exhibiting

breeding behavior, shorebird chicks or shorebird juveniles, as outlined in the FSD Breeding Bird Protocol for Shorebirds and Seabirds. Use of binoculars (minimum 8x40) is required and use of spotting scope may be necessary to accurately survey the area. If an ATV or other vehicle is needed to cover large survey routes, the Bird Monitor shall stop at intervals of no greater than 600 feet to visually inspect for breeding activity.

b. Once breeding is confirmed by the presence of a scrape, eggs or young, the Permittee (or their designee) shall notify the FWC Regional Biologist within 24 hours.

22. **Shorebird Buffer Zones and Travel Corridors**. The Permittee shall require the Bird Monitor(s) and Contractor(s) to meet the following:

a. The Bird Monitor(s) shall establish a disturbance-free buffer zone around any location within the project area where the Bird Monitor has observed shorebirds engaged in breeding behavior, including territory defense. A 300-foot buffer shall be established around each nest or around the perimeter of each colonial nesting area. A 300-foot buffer shall also be placed around the perimeter of areas where shorebirds are seen digging nest scrapes or defending nest territories. All construction activities, movement of vehicles, stockpiling of equipment, and pedestrian traffic are prohibited in the buffer zone**. Smaller, site-specific buffers may be established if approved in writing by the FWC Regional Biologist**. Travel corridors shall be designated and marked outside the buffer areas for pedestrian, equipment or vehicular traffic.

b. The Bird Monitor(s) shall keep breeding sites under sufficient surveillance to determine if birds appear agitated or disturbed by construction or other activities in adjacent areas. If birds do appear to be agitated or disturbed by these activities, then the Bird Monitor(s) shall immediately widen the buffer zone to a sufficient size to protect breeding birds.

c. The Bird Monitor(s) shall ensure that where breeding birds will tolerate pedestrian traffic, traditional pedestrian access will not be blocked. This is generally the case with lateral movement of beach-goers walking parallel to the beach at or below the highest tide line. Pedestrian traffic may also be allowed when breeding was initiated within 300 feet of an established beach access pathway.

d. The Bird Monitor(s) shall ensure that the perimeters of designated buffer zones shall be marked according to FSA Posting Guidelines: (http://flshorebirdalliance.org/resources/instructions-manuals.aspx) with posts, twine and FWC-approved signs stating "Do Not Enter, Important Nesting Area" or similar language around the perimeter (see example of signage for marking designated buffer zones at http://myfwc.com/conservation/you- conserve/wildlife/shorebirds/ . Posts shall not exceed 3 feet in height once installed. Symbolic fencing (twine, string or rope) should be placed between all posts at least 2.5 feet above the ground and rendered clearly visible to pedestrians. If pedestrian pathway and/or equipment travel corridor modifications are approved by the FWC Regional Biologist, these shall be clearly marked. **Posting shall be maintained in good repair until no active nests, eggs, or flightless young are present**. Although solitary nesters may leave the buffer zone temporarily with their chicks, the posted area continues to provide a potential refuge for the family until breeding is complete. Breeding is not considered to be completed until all chicks have fledged.

e. The Permittee shall ensure that the Bird Monitor(s) designate and mark travel corridors outside the buffer areas so as not to cause disturbance to breeding birds. Heavy equipment, other vehicles, or pedestrians may transit past breeding areas in these corridors. Stopping or turning heavy equipment and vehicles shall be prohibited within the designated travel corridors adjacent to the breeding site. When flightless chicks are present within or adjacent to travel corridors, movement of vehicles shall be adequately monitored by the Bird Monitor(s), who shall advise the contractor whose responsibility it is to ensure no chicks are in the path of the moving vehicle. In addition, tracks, ruts, or holes capable of trapping flightless chicks shall be smoothed or leveled after the Bird Monitor(s) inspect them for the presence of flightless young.

f. Any injury or death of a shorebird (including crushing eggs or young) resulting from project activities shall be reported immediately to the FWC Regional Biologist.

SPECIFIC CONDITIONS - PHYSICAL MONITORING REQUIRED:

23. The approved Physical Monitoring Plan can be revised at any later time by written request of the Permittee and with the written approval of the Department. If subsequent to approval of the Monitoring Plan there is a request for modification of the permit, the Department may require revised or additional monitoring requirements as a condition of approval of the permit modification.

24. If the collection of profile surveys were to be conducted as part of the county-wide monitoring program, there would be no need to duplicate the monitoring effort and those county-generated profile surveys would be acceptable in meeting this specific physical monitoring requirement, provided they satisfy the general requirements specified below in sub-item (a).

    As guidance for obtaining Department approval, the plan shall generally contain the following items:

    a. Topographic and bathymetric profile surveys of the beach and offshore shall be conducted prior to commencement of construction, immediately following completion of construction, and biennially thereafter beginning one or two years following completion of construction. A pre-construction survey of the project area to receive beach fill may use surveys conducted for purposes of construction bidding, contracting or construction management. The post-construction survey of the beach fill may use surveys and other information collected periodically during construction for purposes of construction management and payment. Alternatively, the post-construction survey may consist of a single beach-offshore profile survey event of the project monitoring area conducted within 60 days after completion of beach fill placement.

       Thereafter, monitoring surveys shall be conducted biennially beginning approximately one year following completion of construction until the next beach nourishment event or the expiration of the project design life, whichever occurs first. The monitoring surveys shall be conducted during a spring or summer month and repeated as close as practicable during that same month of the year. If the time period between the post-construction survey and the first biennial monitoring survey is less than six months, then the Permittee may at their discretion postpone the first monitoring survey until the following spring/summer.

       The monitoring area shall include profile surveys at each of the Department of Environmental Protection's reference monuments within the bounds of the beach fill area and along at least 5,000 feet of the adjacent shoreline on both sides of the beach fill area. All work activities and deliverables for the biennial monitoring surveys shall be conducted in accordance with the latest update of the Department's *Monitoring Standards for Beach Erosion Control Projects, Sections 01000 and 01100.*

b. The Permittee shall submit an engineering report and the monitoring data to the Department within 90 days following completion of the construction and each biennial monitoring survey.

The report shall summarize and discuss the data, the performance of the beach fill project, and identify erosion and accretion patterns within the monitored area. Results shall be analyzed for patterns, trends, or changes between annual surveys and cumulatively since project construction. In addition, the report shall include a comparative review of project performance to performance expectations and identification of adverse effects attributable to the project.

The report shall specifically include:

- A record of the volume and location of all beach fill or inlet sand bypassing material placed within the project area;
- The volume and percentage of advance nourishment lost since the last beach nourishment project as measured landward of the MHW line of the most recent survey;
- The most recent MHW shoreline positions (feet) in comparison with the design profile at each individual monument location;
- The MHW shoreline position changes (feet) relative to the pre-construction survey at each individual monument location for all the monitoring periods;
- The total measured remaining volume (cubic yards) in comparison with the total predicted remaining volume (cubic yards) above the MHW line and above the Depth of Closure for the entire project area over the successive monitoring periods; and,
- Other shoreline position and volumetric analysis the Permittee or Engineer deem useful in assessing, with quantitative measurements, the performance of the project.

The report shall include computations, tables and graphic illustrations of volumetric and shoreline position changes for the monitoring area. An appendix shall include superimposed plots of the two most recent beach profile surveys, the design profile, and pre- and post-construction beach profile at each individual monument location.

c. An electronic copy of the monitoring report and the survey data shall be submitted to the Department's JCP Compliance Officer. Failure to submit reports and data in a timely manner constitutes grounds for revocation of the permit. When submitting any monitoring information to the Department, please include a transmittal cover letter clearly labeled with the following at the top of each page: **This monitoring information is submitted in accordance with the approved Monitoring Plan for Permit No. 0363427-001- JC for the monitoring period [XX].**

SPECIFIC CONDITIONS – WATER QUALITY MONITORING:

25. In order to assure that turbidity levels do not exceed the compliance standards established in this permit, construction at the project site shall be monitored closely by an independent third party with formal training in water quality monitoring and professional experience in turbidity monitoring for coastal construction projects. Also, an individual familiar with beach construction techniques and turbidity monitoring shall be present at all times when fill material is placed on the beach. This individual shall have authority to alter construction techniques or shut down the beach construction operations if turbidity levels exceed the compliance standards established in this permit. The names and qualifications of those individuals performing these functions, along with 24-hour contact information, shall be submitted for approval pursuant to Specific Condition 3.

26. Water Quality - Turbidity shall be monitored as follows:

Units: Nephelometric Turbidity Units (NTUs).

Frequency: Monitoring at the placement site shall be conducted 3 times daily, approximately 4 hours apart, and at any other time that there is a likelihood of an exceedance of the turbidity standard, during all operations.

All turbidity sampling shall be conducted while the highest project-related turbidity levels are crossing the edge of the mixing zone. The compliance samples and the corresponding background samples shall be collected at approximately the same time, i.e., one shall immediately follow the other.

Location: ***Background:*** Sampling shall occur at surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above the bottom, clearly outside the influence of any artificially generated turbidity plume or the influence of an outgoing inlet plume.

Beach Site: Samples shall be collected at least 300 meters up-current from any portion of the beach that has been, or is being, filled during the current construction event, at the same distances offshore as the associated compliance samples.

Compliance: Sampling shall occur at surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above the bottom.

Beach Site: Samples shall be collected where the densest portion of the turbidity plume crosses the edge of the mixing zone polygon, which measures up to 150 meters offshore and up to 1,000 meters alongshore or at the edge of the nearest hardbottom in the down- current direction, whichever is closest to the discharge point into the Atlantic Ocean.

Note: If the plume flows parallel to the shoreline, the densest portion of the plume may be close to shore, in shallow water. In that case, it may be necessary to access the sampling location from the shore, in water that is too shallow for a boat.

Intermediate Monitoring (required when using a mixing zone that exceeds 150 meters in size): At surface, mid-depth, and (for sites with depths greater than 25 feet) 2 meters above bottom. At points approximately 250, 500 and 750 meters down-current from the discharge point, within the densest portion of any visible turbidity plume generated by this project. These measurements will be used to calibrate the size of the mixing zone for future events.

Calibration: The instruments used to measure turbidity shall be fully calibrated with primary standards within one month of the commencement of the project, and at least once a month throughout the project. Calibration with secondary standards shall be verified each morning prior to use, after each time the instrument is turned on, and after field sampling using two secondary turbidity "standards" that bracket the anticipated turbidity samples. If the post-sampling calibration value deviates more than 8% from the previous calibration value, results shall be reported as estimated and a description of the

problem shall be included in the field notes.

Analysis of turbidity samples shall be performed in compliance with DEP- SOP-001/01 FT 1600 Field Measurement of Turbidity: http://publicfiles.dep.state.fl.us/dear/sas/sopdoc/2008sops/ft1600.pdf

If the turbidity monitoring protocol specified above prevents the collection of accurate data, the person in charge of the turbidity monitoring shall contact the JCP Compliance Officer to establish a more appropriate protocol. Once approved in writing by the Department, the new protocol shall be implemented through an administrative permit modification.

27. The **compliance** locations given above shall be considered the limits of the temporary mixing zone for turbidity allowed during construction. If monitoring reveals turbidity levels at the **compliance** sites that are greater than 29 NTUs above the corresponding background turbidity levels, construction activities shall **cease immediately** and not resume until corrective measures have been taken and turbidity has returned to acceptable levels. Any such occurrence shall also be immediately reported to the JCP Compliance Officer via email at JCPCompliance@dep.state.fl.us and include in the subject line, "TURBIDITY EXCEEDANCE", and the Project Name and Permit Number. Also notify the Department's Central District office.

    a. When reporting a turbidity exceedance, the following information shall also be included:

        i. the Project Name;

        ii. the Permit Number (0363427-001-JC);

        iii. location and level (NTUs above background) of the turbidity exceedance, (shown on a map with GPS coordinates);

        iv. the time and date that the exceedance occurred; and

        v. the time and date that construction ceased.

    b. Prior to re-commencing the construction, a report shall be emailed to the Department with the same information that was included in the "Exceedance Report", plus the following information:

i. turbidity monitoring data collected during the shutdown documenting the decline in turbidity levels and achievement of acceptable levels;

ii. corrective measures that were taken; and

iii. cause of the exceedance.

28. **Turbidity Reports:** All turbidity monitoring data shall be submitted within one week of analysis. The data shall be presented in tabular format, indicating the measured turbidity levels at the compliance sites for each depth, the corresponding background levels at each depth and the number of NTUs over background at each depth. Any exceedances of the turbidity standard (29 NTUs above background) shall be highlighted in the table. In addition to the raw and processed data, the reports shall also contain the following information:

a. Time of day samples were taken;

b. Dates of sampling and analysis;

c. GPS location of sample. When possible, coordinates should be provided in decimal degrees with a 5 decimal level of precision (i.e., 0.000001). Please also indicate the datum;

d. Depth of water body;

e. Depth of each sample;

f. Antecedent weather conditions, including wind direction and velocity;

g. Tidal stage and direction of flow;

h. Water temperature;

i. A geo-referenced map, overlaid on an aerial photograph, indicating the sampling locations (background and compliance), the visible plume pattern within the applicable mixing zone and direction of flow. The turbidity sampling map shall also include the boundaries of the benthic resources within 150 meter of the construction activities for which turbidity was sampled. A sample map shall be reviewed and approved by the Department prior to construction;

j. A statement describing the methods used in collection, handling, storage and analysis of the samples;

k. A statement by the individual responsible for implementation of the sampling program concerning the authenticity, precision, limits of detection, calibration of the meter, accuracy of the data and precision of the GPS measurements;

l. When samples cannot be collected, include an explanation in the report. If unable to collect samples due to severe weather conditions, include a copy of a current report from a reliable, independent source, such as an online weather service.

Weekly turbidity monitoring reports shall be submitted electronically to the JCP Compliance Officer at JCPCompliance@dep.state.fl.us. Reports shall be submitted under a cover letter containing the following statement: "This information is provided in partial fulfillment of the monitoring requirements in Permit No. 0363427-001-JC." The cover letter shall summarize any significant compliance issues. Also, please clearly reference the permit number and project name on each page of the report.

Failure to submit monitoring reports in a timely manner constitutes a violation of the permit pursuant to Chapter 403.161, F.S.,

SPECIFIC CONDITIONS - BIOLOGICAL MONITORING:

29. No impacts to hardbottom resources are authorized by this permit. Biological monitoring of nearshore hardbottom areas shall be conducted to provide the Department with reasonable assurance that any unpermitted, project-related, persistent or temporary, negative impacts (direct or indirect) to hardbottom resources will be documented, if they occur (see Specific Condition 30). Unpermitted project related impacts documented during the course of monitoring shall be mitigated for. Impacts and their mitigation will be handled through compliance and enforcement action, and the amount of mitigation may be determined according to the Department's UMAM assessment.

30. The Permittee shall adhere to the current, Department approved **Biological Monitoring Plan** (dated November 2018), which is a binding part of this permit. The Permittee is responsible for ensuring that their selected monitoring firm is knowledgeable of all permit conditions pertaining to monitoring requirements (including the approved Monitoring Plan); not just the scope of work in the contract prepared by the Permittee/contractor.

The aim of hardbottom biological monitoring is to identify any unpermitted direct and / or secondary adverse impacts to nearshore hardbottom resources due to the spreading of project sand further than permitted (i.e., seaward of the permitted ETOF) should they occur. As such, nearshore hardbottom adjacent to, updrift, and downdrift of the fill template, beyond the ETOF, shall be monitored. A single pre-construction monitoring event shall be conducted prior to the initial fill placement event (beach restoration) conducted under this Permit. This pre-construction monitoring event shall serve as the baseline for all post-construction (beach restoration or nourishment) monitoring conducted under this Permit. An immediate post-construction monitoring event (within six months of project completion) and three annual post-construction monitoring events (Years 1, 2, and 3 post-construction) shall be conducted following each fill placement event (beach restoration or nourishment) (i.e., each fill placement event shall trigger a complete round of post-construction monitoring). Unless otherwise approved by FDEP staff, all monitoring events shall be conducted during summer months (May through September), as close as practicable to the date the baseline survey was conducted. Standard operating procedures shall be used during each monitoring event to provide consistent and repeatable collection of data.

Surveys conducted during each monitoring event will document sediment depth and cover as well as the abundance, distribution, condition, and function of hardbottom resources (biotic assemblages). **Table 2** (below), titled “Hardbottom Monitoring Summary”, summarizes surveys and tasks required in the Biological Monitoring Plan; these are described in detail in the Plan itself. Reports are required to be submitted following each survey, according to the Plan. The Permittee shall acquire written approval from the Department prior to implementing any revisions to the approved Biological Monitoring Plan.

Table 2. Hardbottom Monitoring Summary

Survey Unit	**Survey**	**Frequency**	**Deliverables**
Permanent Transects (N=20); 9 Biological Transects and 11 Sediment Only Transects	Line-Intercept: along all 20 transects	**Pre-construction (N=1):** Once prior to initial fill placement event. **Post-construction (N=4 per fill placement event):** Immediately (within 6 months) and annually for 3 years (years 1, 2, and 3) following each fill placement event.	Excel spreadsheet, PDF of field sheets
	Interval Sediment Depth Measurements: along all 20 transects		Excel spreadsheet, PDF of field sheets
	Qualitative Video: along all 9 Biological transects		Video
	Quadrat Sampling: within all 0.5 m^2 quadrats along all 9 Biological transects		Excel spreadsheet, PDF of field sheets
Hardbottom Edge	Mapping of Landward Hardbottom Edge: between R-69.5 and R-87		Shapefiles

Reporting requirements for biological monitoring are as follows:

a. The biological monitoring firm shall notify the Department (JCP Compliance Officer) when biological monitoring has begun and when biological monitoring has been completed. Additionally, the biological monitoring firm shall submit brief, weekly progress reports to the Department during each monitoring period.

   All raw data that are collected shall be submitted simultaneously to the JCP Compliance Officer, the contractor and the Permittee as collected in the field and as entered into spreadsheets for analysis, beginning with the pre-construction (baseline) monitoring event. Raw data associated with post-construction monitoring shall be provided to the JCP Compliance Officer within 45 days of completing each post-construction monitoring event. Raw data shall be provided to the JCP Compliance Officer in electronic format, preferably on a single portable hard drive or via an FTP site. All data shall be provided in a standardized format, as specified in the approved Biological Monitoring Plan. The monitoring agent shall confirm that all data submitted in Excel workbooks (transect monitoring data) are consistent with the field datasheets to ensure accuracy and shall correct any errors or inconsistencies prior to the 45-day deadline. Data provided to the JCP Compliance Officer shall consist of the following: aerial photographs

(if required), video and in situ photographs; hardbottom edge survey data; raw transect survey data, and field datasheets (see **Table 2**. "Hardbottom Monitoring Summary", above). Descriptions of all raw data materials (and their formats) to be provided to the JCP Compliance Officer are detailed in the attached approved Biological Monitoring Plan.

c. Within 90 days of completing each post-construction monitoring event, the monitoring agent shall provide a biological monitoring report to the JCP Compliance Officer in electronic format. The report will be submitted by the monitoring firm directly and concurrently to the DEP/Permittee/Agent. The content and format of the monitoring report shall meet the criteria set forth in the approved Biological Monitoring Plan.

SPECIFIC CONDITIONS – POST CONSTRUCTION:

31. Within 90 days after completion, of construction of the permitted or authorized activity, the Permittee shall submit a notice of completion to the JCP Compliance Officer that includes the following information:
    a. The permit number (0363427-001-JC) and the project name (Indian River County Sector 5 Beach and Dune Restoration Project).

    b. A statement of full compliance with the requirements and specifications of this permit

NOTICE OF RIGHTS

FLAWAC Review
The applicant, or any party within the meaning of Section 373.114(1)(a) or 373.4275, F.S., may also seek appellate review of this order before the Land and Water Adjudicatory Commission under Section 373.114(1) or 373.4275, F.S. Requests for review before the Land and Water Adjudicatory Commission must be filed with the Secretary of the Commission and served on the Department within 20 days from the date when this order is filed with the Clerk of the Department.

Judicial Review
Once this decision becomes final, any party to this action has the right to seek judicial review pursuant to Section 120.68, F.S., by filing a Notice of Appeal pursuant to Rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, M.S. 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of

Appeal. The Notice of Appeal must be filed within 30 days from the date this action is filed with the Clerk of the Department.

Attachments:

1. Approved Permit Drawings (15 pages)
2. Biological Monitoring Plan (approved November 2018)
3. Physical Monitoring plan
4. Sediment QA/QC Plan

EXECUTION AND CLERKING:

Executed in Tallahassee, Florida.
STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

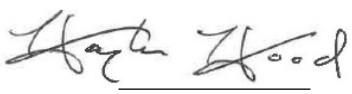
Gregory W. Garis
Program Administrator
Beaches, Inlets and Ports
Program Division of Water
Resource Management

CERTIFICATE OF SERVICE
The undersigned duly designated deputy clerk hereby certifies that this permit and all copies were sent on the filing date below

cc: Robert Brantly, FDEP, DWRM, Robert.Brantly@dep.state.fl.us; Jennifer K Steele, FDEP, DWRM, Jennifer.K.Steele@dep.state.fl.us ; Brendan Biggs, FDEP, DWRM; Brendan.Biggs@dep.state.fl.us ; Rob Buda, FDEP, DWRM, Rob.Buda@dep.state.fl.us; Catherine Florko, FDEP, DWRM, Catherine.Florko@dep.state.fl.us

JCP Compliance Officer
BIPP Permit File
MarineTurtle@MyFWC.com
ConservationPlanningServices@myfwc.com

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to Section 120.52, F. S., with the designated Department Clerk, receipt of which is hereby acknowledged.



Clerk

February 1, 2019
Date

SEDIMENT QUALITY CONTROL/QUALITY ASSURANCE PLAN
FOR BEACH OR DUNE RESTORATION USING AN UPLAND SAND SOURCE

FDEP Permit No. 0363427-001-JC

Indian River County, FL

Sector 5 Beach and Dune Restoration Project

August 30, 2018

APPROVED
Permit No: 0363427-001-JC
Beaches Inlets and Ports Program

A. INTRODUCTION

Pursuant to Fla. Admin. Code r. 62B-41.008 (1) (k) 4.b., permit applications for inlet excavation, beach restoration, or nourishment shall include a quality control/assurance plan that will ensure that the sediment from the borrow areas to be used in the project will meet the standard in Fla. Admin. Code r. 62B-41.007(2)(j). To protect the environmental functions of Florida's beaches, only 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.

The Permittee has conducted geotechnical investigations that provide adequate data concerning the character of the sediment and the quantities available within the spatial limits of the upland sand source(s). The Permittee has provided an analysis of the existing or native sediment and the sediment within the permitted upland sand source(s), including the methods of mining and post-mining processing, that demonstrates its compatibility with the naturally occurring beach sediment in accordance with Fla. Admin. Code r. 62B-41.007(2)(j). The sediment analysis and beach volume calculations were performed using established industry standards, and are certified by a Professional Engineer or a Professional Geologist registered in the State of Florida.

Based upon this information, the Department of Environmental Protection (Department) has determined that use of the sediment from the upland sand source(s) will maintain the general character and functionality of the sediment occurring on the beach and in the adjacent dune and coastal system. Furthermore, this information provides sufficient quality control/quality assurance (QC/QA) that the sediment from the upland sand source(s) will comply with the requirements of Fla. Admin. Code r. 62B-41.007(2)(j); hence, additional QC/QA procedures beyond those described in this permit are not required for these sediment parameters during construction.

This plan outlines the responsibilities of each stakeholder in the project as they relate to the placement of beach compatible material on the beach. These responsibilities are in response to the possibility that non-beach compatible sediments may exist within the upland sand source(s) and could be unintentionally placed on the beach. The QC Plan specifies the minimum construction management, inspection and reporting requirements placed on the Contractor and enforced by the Permittee, to ensure that the sediment from the upland sand source(s) to be used in the project meet the compliance specifications. The QA Plan specifies the minimum construction oversight, inspection and reporting requirements to be undertaken by the Permittee or the Permittee's On-Site Representative to observe, sample, and test the placed sediments to verify the sediments are in compliance.

B. SEDIMENT QUALITY SPECIFICATIONS

The sediment from the upland sand source(s) is similar in grain size distribution and Munsell color to the material in the existing coastal system at the beach placement site. The Department and the Permittee acknowledge that it is possible that discrete occurrences of non-beach compatible sediments may exist within the permitted upland sand source(s) that do not comply with the limiting parameters of Fla. Admin. Code r. 62B-41.007(2)(j) 1. – 5., or vary in Munsell color from the composite value. Furthermore, the Department may consider more restrictive values for the sediment parameters to ensure that the sediment from the upland sand source(s) is similar in grain size distribution and color to the sediment in the existing coastal system at the beach placement site. Therefore, fill material compliance specifications for the sediment from the upland sand source(s) proposed for this project are provided in Table 1.

The compliance specifications take into account the variability of sediment on the native or existing beach, and are values which may reasonably be attained given what is known about the upland sand source(s). Beach fill material which falls outside of these limits will be considered unacceptable and subject to remediation, as described in Section E.

Table 1- Sediment Compliance Specifications

Sediment Parameter	Parameter Definition	Compliance Value
Median Grain Size	50% larger/smaller by weight*	**0.30 mm - 0.55 mm**
Mean Grain Size	Calculated by moment method*	**0.33 mm - 0.55 mm**
Max. Silt Content	passing #230 sieve	**2%**
Max. Gravel Content	retained above #4 sieve	**2%**
Munsell Color	moist Hue	**10YR, 2.5Y, or 5Y**
	moist Value	**≥ 7**
	moist Chroma	**≤ 2**
The beach fill material shall not contain coarse gravel or rocks, construction debris, toxic material, or other foreign matter.		

*Determined using the sieves listed in Section D.7.b.

C. QUALITY CONTROL PLAN

The contract documents shall incorporate the following technical requirements, or equivalent language that addresses the sediment quality monitoring on the beach, and, if necessary, remedial actions. The Permittee will seek to enforce these contract requirements during the execution of work. For each construction event, the Contractor shall submit a Quality Control Plan for review and acceptance by the Permittee. This Plan shall comply with the quality control measures set forth in this permit, and address sediment quality assurance by including: (1) the specific sampling frequency and testing methodology to be provided by the Contractor, (2) the name, address and point of contact for the Licensed Testing Laboratory to be used for the required collection of samples and laboratory testing, and (3) how the Contractor intends to assess compliance with the Sediments Compliance Specifications as shown in Table 1.

The characteristics of the in-situ materials in the upland sand source(s) are indicated by geotechnical data. The Contractor should be aware that it is possible for in-situ material of differing characteristics to be present and that the mining process may correspondingly require revisions during construction to produce beach compatible sand consistent with the Sediment Compliance Specifications in Table 1.

1. **Assessment at Upland Sand Source.** The material shall be observed by the Contractor while the material is being loaded into the trucks for transport to the Construction Access/Staging Area. Both the Contractor and the Permittee will have benchmark samples labeled with the permit number, "Benchmark Sample", date collected, site name and information on where the sample was attained. The benchmark sample shall be material that has been deemed beach compatible in accordance with the Sediment Compliance Specifications in Table 1 and shall serve as the minimum requirement for the material being placed on the beach. If any material appears to be non-compliant, it shall be set aside for testing and/or further processing and not transported to the beach.

a. **For conventional hydraulic excavation and stockpiling.** The Contractor will collect a sediment sample at not less than 1 sample for each 3,000 cubic yards of stockpiled material no less than 6 inches below the surface to visually assess grain size, silt content, gravel content, and Munsell color, against the benchmark sample. The sample shall be a minimum of 1 U.S. pint (approximately 200 grams). Each sample will be archived with the date, time, and location of the sample. This assessment will consist of handling the fill material to ensure that it is predominantly sand and to evaluate if the physical characteristics of the material meets the Sediment Compliance Specifications in Table 1. If deemed that the material may not be in compliance, the sample shall be tested at a Licensed Testing Laboratory using the criteria outlined in Section D.7.b. Sediment testing results shall be provided to the Permittee and Project Engineer prior to any portion of the 3,000 cubic yards of material

represented by that sample being transported to the Construction Access/Staging Area. Sediment testing results shall reference a specific stockpile name and GPS location within the mine. The results of daily inspections, regardless of the quality of the sediment, will be appended to or notated on the Contractor's Daily Report. All samples will be stored for at least 120 days after project completion and shall be made available to the Permittee upon request.

b. **For material requiring special handling and material processing.** If special handling and material processing are necessary to produce beach compatible material consistent with the Sediment Compliance Specifications in Table 1, then sampling and laboratory testing of the processed sand shall be conducted at the upland mine(s) from the stockpiled material before the material is transported to the Construction Access/Staging Areas. The Contractor will collect not less than 1 representative sample from every 3,000 cubic yards of material in the stockpile no less than 6 inches below the surface from the middle of the stockpile. The sample shall be a minimum of 1 U.S. pint (approximately 200 grams). Each sample will be archived with the stockpile name, date, time, and GPS location of the sample. The samples shall be tested at a Licensed Testing Laboratory using the criteria outlined in Section D.7.b. Sediment testing results shall be provided to the Permittee and Project Engineer prior to any portion of the 3,000 cubic yards of material represented by that sample being transported to the Construction Access/Staging Area. The laboratory testing results will be appended to or notated on the Contractor's Daily Report. All samples will be stored for at least 120 days after project completion and shall be made available to the Permittee upon request.

If a sample does not meet the Sediment Compliance Specifications in Table 1, then the 3,000 cubic yards of material represented by that sample shall not be transported to the Construction Access/Staging Area. The material may undergo further processing to meet the Sediment Compliance Specifications with additional laboratory testing to verify the additional processing produces material that meets the Sediment Compliance Specifications, or the material shall be set aside and not used.

2. **Beach Observation**. The Contractor will continuously visually monitor the sediment being placed on the beach to assess grain size, silt content, gravel content, and Munsell color. This assessment will consist of handling the fill material to ensure that it is predominantly sand and to note the physical characteristics, and assure the material meets the Sediment Compliance Specifications in Table 1. If deemed necessary, quantitative assessments of the sand will be conducted for grain size, silt content, gravel content and Munsell color using the methods outlined in section D.7.b. If noncompliant sediment is placed on the beach, the Contractor will immediately cease placement until any stockpiled material at the beach construction staging area can be verified as beach compatible. The Contractor will notify the Permittee, providing the time, location, and description of the noncompliant sediment. The noncompliant sediment will be subject to remediation, as described in Section E. The Contractor will take the appropriate actions to remediate the noncompliant material to achieve and document compliance with the Sediment Compliance Specifications. The Contractor, in cooperation with the Permittee or Project Engineer, will utilize the sampling records at the upland source(s) to determine where the material originated from to avoid additional placement of noncompliant sediment.

D. QUALITY ASSURANCE PLAN

The Permittee will seek to enforce the construction contract and Department permits related to sediment quality. In order to do so, the following steps shall be followed:

1. **Construction Observation and Sampling for Visual Assessment.** Construction observation by the Permittee's On-Site Representative will be performed on a daily basis during periods of active construction. The Permittee's On-Site Representative will collect a sediment sample to visually assess grain size, silt content, gravel content, and Munsell color. The observation will include handling the fill material to ensure that it is predominantly sand and to evaluate if the physical characteristics of the material meets the Sediment Compliance Specifications in Table 1. If the Permittee or Project Engineer determines that the beach fill material does not comply with the Sediment Compliance Specifications, the Permittee or Project Engineer will immediately instruct the Contractor to cease placement and take the necessary actions to avoid further placement of noncompliant sediment. If deemed necessary, quantitative assessments of the sand will be conducted for grain size, silt content, gravel content, and Munsell color using the methods outlined in section D.7.b. If noncompliant sediment is placed on the beach, the Permittee or Project Engineer will document the time, location, and description of the noncompliant sediment. The noncompliant sediment will be subject to remediation, as described in Section E. The Permittee or Project Engineer, in cooperation with the

Contractor, will utilize the sampling records at the upland source(s) to determine where the material originated from to avoid additional placement of noncompliant sediment.

2. **On-Site Representative.** The Permittee will provide on-site observation by individuals with training or experience in beach nourishment and construction inspection and testing, and who are knowledgeable of the project design and permit conditions. The Project Engineer will actively coordinate with the Permittee's On-Site Representative, who may be an employee or sub-contractor of the Permittee or the Project Engineer. Communications will take place between the Project Engineer and the Permittee's On-Site Representative on a daily basis during periods of active construction.

3. **Pre-Construction Meeting.** The project QC/QA Plan will be discussed as a matter of importance at the pre-construction meeting. The Contractor will be required to acknowledge the goals and intent of the above described QC/QA Plan, in writing, prior to commencement of construction.

4. **Contractor's Daily Reports.** The Permittee's On-Site Representative or Project Engineer will review the Contractor's Daily Reports which will characterize the nature of the sediments encountered at the upland sand source and placed along the project shoreline with specific reference to sand color and the occurrence of rock, rubble, gravel, silt or debris.

5. **On Call.** The Project Engineer will be continuously on call during the period of construction for the purpose of making decisions regarding issues that involve QC/QA Plan compliance.

6. **Addendums.** Any addendum or change order to the Contract between the Permittee and the Contractor will be evaluated to determine whether or not the change in scope will potentially affect the QC/QA Plan.

7. **Post-Construction Sampling for Laboratory Testing.** To assure that the fill material placed on the beach was adequately assessed by the borrow area investigation and design, the Project Engineer or Permittee's On-Site Representative will conduct assessments of the sediment as follows:

a. Post-construction sampling and testing of the fill material will be conducted to verify that the sediment placed on the beach meets the expected criteria/characteristics provided during the geotechnical investigation and borrow area design process. Upon completion of sections of constructed beach, two (2) duplicate sand samples will be collected at each FDEP Reference Monument profile line to assess the grain size, silt content, gravel content, and Munsell color for compliance. The collected sediment samples shall be a minimum of 1 U.S. pint (at least 200 grams) each and obtained from the bottom of a test hole a minimum of 12 inches deep within the limits of the constructed berm. If the constructed section was filled only at the dune, then the sediment sample will be obtained from the dune. The samples will be visually assessed for grain size, silt content, gravel content, and Munsell color. The observation will include handling the fill material to ensure that it is predominantly sand, and to further note the physical characteristics. The existence of any layering or rocks within the test hole will be noted. One sample will be sent for testing at a Licensed Testing Laboratory while the other sample will be archived by the Permittee for 120 days after project completion. All samples and laboratory test results will be labeled with the Project name, FDEP Reference Monument profile line, date sample was obtained, and "Construction Fill Sample."

b. Samples collected for laboratory testing will be evaluated for visual attributes (Munsell color), sieved in accordance with the applicable sections of ASTM D422-63 (Standard Test Method for Particle-Size Analysis of Soils), ASTM D1140 (Standard Test Method for Amount of Material in Soils Finer than No. 200 Sieve), and ASTM D2487 (Classification of Soils for Engineering Purposes), and analyzed for carbonate content. The samples will be sieved using the following U.S. Standard Sieve Numbers: 3/4", 5/8", 7/16", 5/16", 3.5, 4, 5, 7, 10, 14, 18, 25, 35, 45, 60, 80, 120, 170, 200, and 230.

c. Laboratory testing results will include a cumulative grain size distribution table and curve for each sample tested. A summary table of the sediment samples and test results for the sediment compliance parameters shall accompany the complete set of laboratory testing results. The column headings will include: Sample Number; Mean Grain Size (mm, calculated by moment method); Median Grain Size (mm); Sorting Value (phi); Silt Content (% passing #230 sieve); Gravel Content (% retained above #4 sieve); Carbonate Content (%); Munsell

Color Value; and a column stating whether each sample MET or FAILED the compliance values found in Table 1. The sediment testing results will be certified by a Professional Engineer or Professional Geologist registered in the State of Florida. A statement of how the placed fill material compares to the sediment analysis from the sand search investigation shall be included in the sediment testing results report. The Permittee will submit post-construction sediment testing results and analysis report to the Department within 90 days following beach construction.

d. In the event that a section of beach contains fill material that is not in compliance with the Sediment Compliance Specifications, then the Department will be notified. Notification will indicate the volume, aerial extent and location of any unacceptable beach areas and remediation planned.

E. REMEDIATION

1. **Compliance Area.** If a sample does not meet the compliance requirement to not contain coarse gravel or rocks, construction debris, toxic material, or other foreign matter, the Permittee shall determine the aerial extent of the noncompliant beach fill material and remediate regardless of the extent of the noncompliant material. If a sample is noncompliant for the grain size, silt content, gravel content, or Munsell color, and the aerial extent exceeds 10,000 square feet of beach berm or 100 linear feet of dune for dune-only projects, the Permittee shall remediate.

2. **Notification.** If an area of newly constructed beach or dune does not meet the Sediment Compliance Specifications, then the Department (JCPCompliance@dep.state.fl.us) will be notified. Notification will indicate the aerial extent and location of any areas of noncompliant beach fill material and remediation planned. As outlined in Section E.4 below, the Permittee will immediately undertake remediation actions without additional approvals from the Department. The results of any remediation will be reported to the Department following completion of the remediation activities and shall indicate the volume of noncompliant fill material removed and replaced.

3. **Sampling to determine extent.** In order to determine if an area greater than 10,000 square feet of beach berm or 100 linear feet of dune for dune-only projects is noncompliant, the following procedure will be performed by the Permittee's On-site Representative or Project Engineer:

a. Upon determination that the first sediment sample is noncompliant, at minimum, five (5) additional sediment samples will be collected at a maximum 25-foot spacing in all directions and assessed. If the additional samples are also noncompliant, then additional samples will be collected at a 25-foot spacing in all directions until the aerial extent is identified.
b. The samples will be visually assessed to evaluate compliance with the Sediment Compliance Specifications. If deemed necessary by the Project Engineer, quantitative assessments of the sand will be conducted for grain size, silt content, gravel content, and Munsell color using the methods outlined in Section D.7.b. Samples will be archived by the Permittee.
c. A site map will be prepared depicting the location of all samples and the boundaries of all areas of noncompliant fill.
d. The total square footage will be determined.
e. The site map and analysis will be included in the Contractor's Daily Report.

4. **Actions.** The Permittee or Project Permittee's Engineer shall have the authority to determine whether the material placed on the beach is compliant or noncompliant. If placement of noncompliant material occurs, the Contractor will be directed by the Permittee or Project Engineer on the necessary corrective actions. Should a situation arise during construction that cannot be corrected by the remediation methods described within this QC/QA Plan, the Department will be notified. The remediation actions for each sediment parameter are as follows:

a. Mean grain size: blending the noncompliant fill material with compliant fill material within the adjacent construction berm or dune sufficiently to meet the compliance value, or removing the noncompliant fill material and replacing it with compliant fill material.
b. Silt content: blending the noncompliant fill material with compliant fill material within the adjacent construction berm or dune sufficiently to meet the compliance value, or removing the noncompliant fill material and replacing it with compliant fill material.

c. Gravel content: blending the noncompliant fill material with compliant fill material within the adjacent construction berm or dune sufficiently to meet the compliance value, or removing the noncompliant fill material and replacing it with compliant fill material.
d. Munsell color: blending the noncompliant fill material with compliant fill material within the adjacent construction berm or dune sufficiently to meet the compliance value or removing the noncompliant fill material and replacing it with compliant fill material.
e. Coarse gravel or rocks: screening and removing the noncompliant fill material and replacing it with compliant fill material.
f. Construction debris, toxic material, or other foreign matter: removing the noncompliant fill material and replacing it with compliant fill material.

All noncompliant fill material removed from the beach will be transported to an appropriate upland disposal facility located landward of the Coastal Construction Control Line or returned to the upland mine.

5. **Post-Remediation Testing.** Re-sampling shall be conducted following any remediation actions in accordance with the following protocols:

a. Within the boundaries of the remediation actions, samples will be taken at maximum of 25-foot spacing.
b. The samples will be visually assessed to evaluate compliance with the Sediment Compliance Specifications. If deemed necessary by the Project Engineer, quantitative assessments of the sand will be conducted for grain size, silt content, gravel content, and Munsell color using the methods outlined in Section D.7.b. Samples will be archived by the Permittee.
c. A site map will be prepared depicting the location of all samples and the boundaries of all areas of remediation actions.

6. **Reporting.** A post-remediation report containing the site map, sediment analysis, and volume of noncompliant fill material removed and replaced will be submitted to the Department within 7 days following completion of remediation activities.

All reports or notices relating to this permit shall be emailed or sent to the Department at:
FDEP Division of Water Resource Management
JCP Compliance Officer
Mail Station 3544
2600 Blair Stone Road
Tallahassee, Florida 32399
phone: (850) 414-7716
e-mail: JCPCompliance@dep.state.fl.us

End of Plan

FDEP Version dated April 26, 2010

APPROVED

Permit No: 0363427-001-JC

Beaches Inlets and Ports Program

APPROVED
Permit No: 0363427-001-JC
Beaches Inlets and Ports Program

PHYSICAL MONITORING PLAN

Indian River County, FL
Sector 5 Beach and Dune Restoration Project

FDEP Permit No. TBD
Permittee: Indian River County

April 12, 2018

1. Project Description

The beach restoration project includes sand nourishment in the form of a dune and narrow berm feature that intersects the existing beach near the waterline. The project is located along 3.1 miles of Atlantic Ocean coastline between FDEP reference monuments R-70 and R-86. The project location includes the municipalities of the City of Vero Beach, the Town of Indian River Shores, and portions of unincorporated Indian River County. Initial construction of the project will require approximately 155,000 cubic yards of in-place fill sand. The source of sand for the project will be from upland mine(s) and truck hauled to the beach fill site. Dune vegetation will be planted on constructed segments following beach fill activities.

2. Purpose

Pursuant to Rule 62B-41.005, F.A.C., physical monitoring of the Sector 5 Beach and Dune Restoration Project requires acquisition of project specific data to include topographic and bathymetric surveys of the beach, offshore, and borrow site areas, aerial photography, and engineering analysis. The physical monitoring data is necessary in order for Indian River County and the FDEP to regularly observe and assess, the performance of the project and adjacent shorelines with quantitative measurements. The general objectives of this Physical Monitoring Plan are to:

- Evaluate the post-construction performance of the project area and adjacent shorelines;
- Identify the need for any adjustment, modifications, or mitigation due to unexpected adverse effects
- Provide design guidance for future beach maintenance activities; and
- Function as a database for future beachfront planning, development, and management.

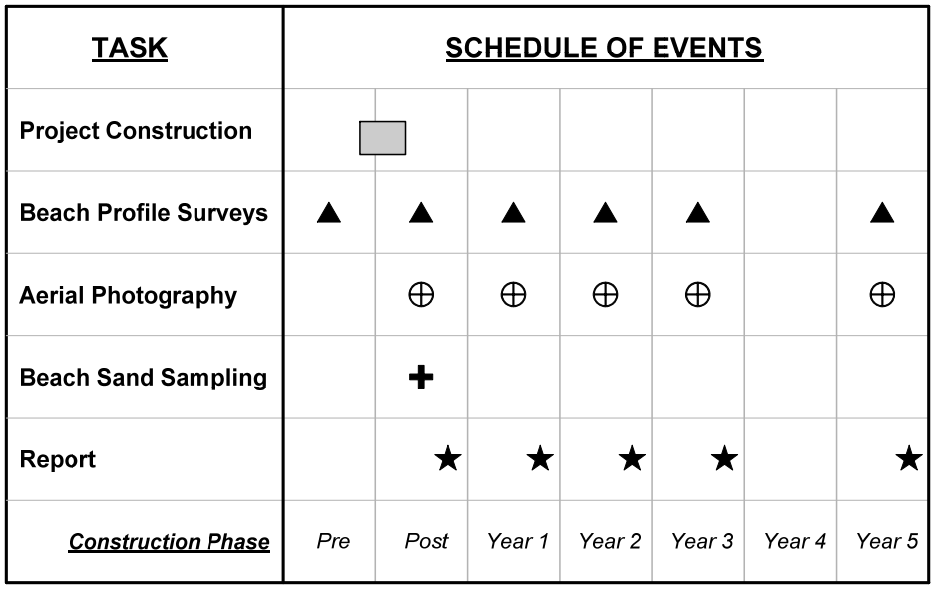
3. Monitoring Plan Elements

The primary components of the Physical Monitoring Plan include:

- Beach profile surveys
- Aerial photography
- Beach sand sampling
- Engineering analysis and reporting

These activities shall be carried out in the Project Area and along the adjacent shorelines as described in this Plan. This monitoring plan may be revised at a later date by written request of Indian River County and with written approval of the FDEP. **Figure 1** summarizes the schedule for physical monitoring with respect to initial construction. Renourishment of the Project shall require the physical monitoring schedule to begin again at the construction event indicated in the figure.

Figure 1. Physical Monitoring Schedule



This schedule continues biennially until the next beach nourishment event or the expiration of the project design life, whichever comes first.

3.1 Beach Profile Surveys

Topographic and bathymetric profile surveys of the beach and offshore shall be conducted within 90 days prior to commencement of construction, and within 60 days following the completion of the project. Thereafter, monitoring surveys will be conducted annually for a period of three years, then biennially until the next beach nourishment event or the expiration of the project life, whichever comes first (Figure 1). The monitoring surveys shall be conducted between late April and July and repeated as close as practicable during the same month of the year. If the time period between the immediate post-construction and the first annual monitoring survey is less than six months, the County can request a postponement of the first monitoring survey until the following April-July timeframe.

Beach profile surveys shall be collected at each of the published FDEP reference monuments within the beach fill area and the approximate 5,000 feet of adjacent shoreline on both sides of the beach fill area. As such, profile surveys shall include Indian River County FDEP reference monuments R-65 through R-91, inclusive. Profile surveys will be conducted along published azimuths extending a minimum of 3,000 feet offshore (from the mean high water line at the time of survey) or to the -22 ft NAVD contour, whichever is closer to shore.

All work activities and deliverables regarding beach profile surveys shall be conducted in accordance with the latest update of the *Division of Water Resource Management Monitoring Standards for Beach Erosion Control Projects, Sections 01000 and 0110.*

3.2 Aerial Photography

Aerial photography of the beach and nearshore area shall be collected following the completion of the project and then annually for a period of three years, then biennially until the next beach nourishment event or the expiration of the project life, whichever comes first (Figure 1). Aerial photography shall be collected concurrently with beach profile surveying, or as close a timeframe as reasonably possible. Aerial

photography shall include the beach and nearshore region from Indian River County FDEP reference monuments R-65 through R-91, inclusive.

Aerial photographs of the study area will be taken for the primary purpose of mapping and quantifying exposed nearshore hardbottom. All work activities and deliverables regarding aerial photography shall be conducted in accordance with the latest update of the *Division of Water Resource Management Monitoring Standards for Beach Erosion Control Projects, Sections 02100 – Environmental Aerial Photography Acquisition.*

3.3 Beach Sand Sampling

Per the project's Quality Control/Quality Assurance Plan, beach sand sample collection and analysis shall be performed following the completion of the project. Sand sample collection and laboratory analysis shall be performed as described in the project's Quality Control/Quality Assurance Plan.

3.4 Engineering Analysis and Reporting

An engineering monitoring report and the monitoring data will be submitted to the Division of Water Resource Management within 90 days following the completion of the post-construction survey and each subsequent annual or biennial monitoring survey (Figure 1). The report shall summarize and discuss the survey data, the performance of the project, and identify erosion and accretion patterns within the monitoring area. The report shall include plots of beach profile surveys, tables and graphic illustrations of volumetric and shoreline position changes. Results will be analyzed for patterns, trends, changes between monitoring surveys, and cumulatively since project construction. Geotechnical data and analysis of beach sand sampling, including a comparison to the native sand characteristics, shall be included in the post-construction report. The aerial photographs (when collected) shall be included in the report as an appendix.

Hardbottom Biological Monitoring Plan

Indian River County Sector 5 Beach and Dune Restoration Project

FDEP Permit No. 363427-001-JC

APPROVED

Permit No: 0363427-001-JC

Beaches Inlets and Ports Program

September 2018

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1.0 INTRODUCTION

The Indian River County Sector 5 Beach and Dune Restoration Project authorized by Florida Department of Environmental Protection (FDEP) Permit No. 363427-001-JC includes the restoration and subsequent nourishment of approximately 3.1 miles of the shoreline (between R-70 and R-86 in Indian River County) using sand from upland sources (Figure 1). The Permittee and the agent of record have stated that the project has been designed to avoid impacts to hardbottom resources. Permit No. 363427-001-JC does not authorize direct and/or secondary project related impacts to hardbottom resources and requires that biological monitoring be conducted to ensure such impacts would be documented, should they occur. This Plan sets forth the biological monitoring protocols for the Indian River County Sector 5 Beach and Dune Restoration Project.

2.0 NEARSHORE HARDBOTTOM MONITORING

Biological monitoring for beach fill placement (restoration or nourishment) under this permit shall include a pre-construction (baseline) monitoring event during the summer prior to construction, an initial post-construction monitoring event (within six months of project completion), and three annual post-construction monitoring events (Years 1, 2, and 3 post-construction). All surveys shall be conducted during summer months (May through September), unless otherwise approved by FDEP staff. The pre-construction monitoring event conducted under this permit shall serve as the baseline for all subsequent monitoring events. Each subsequent nourishment conducted under this permit will initiate a complete round of post-construction monitoring (i.e., initial post-construction event and three annual post-construction events). Standard operating procedures shall be used during each monitoring event to provide consistent and repeatable collection of data. The aim of biological monitoring is to identify any unpermitted direct and / or secondary adverse impacts to nearshore hardbottom resources due to the spreading of project sand further than permitted (i.e., seaward of the permitted ETOF). As such, surveys will document sediment depth and cover as well as the abundance, distribution, condition, and function of hardbottom resources (biotic assemblages). Nearshore hardbottom updrift, adjacent to, and downdrift of the fill template (but outside of the ETOF) will be monitored (Figures 2a and 2b). Hardbottom monitoring will consist of nearshore hardbottom edge mapping and transect monitoring, as described below.

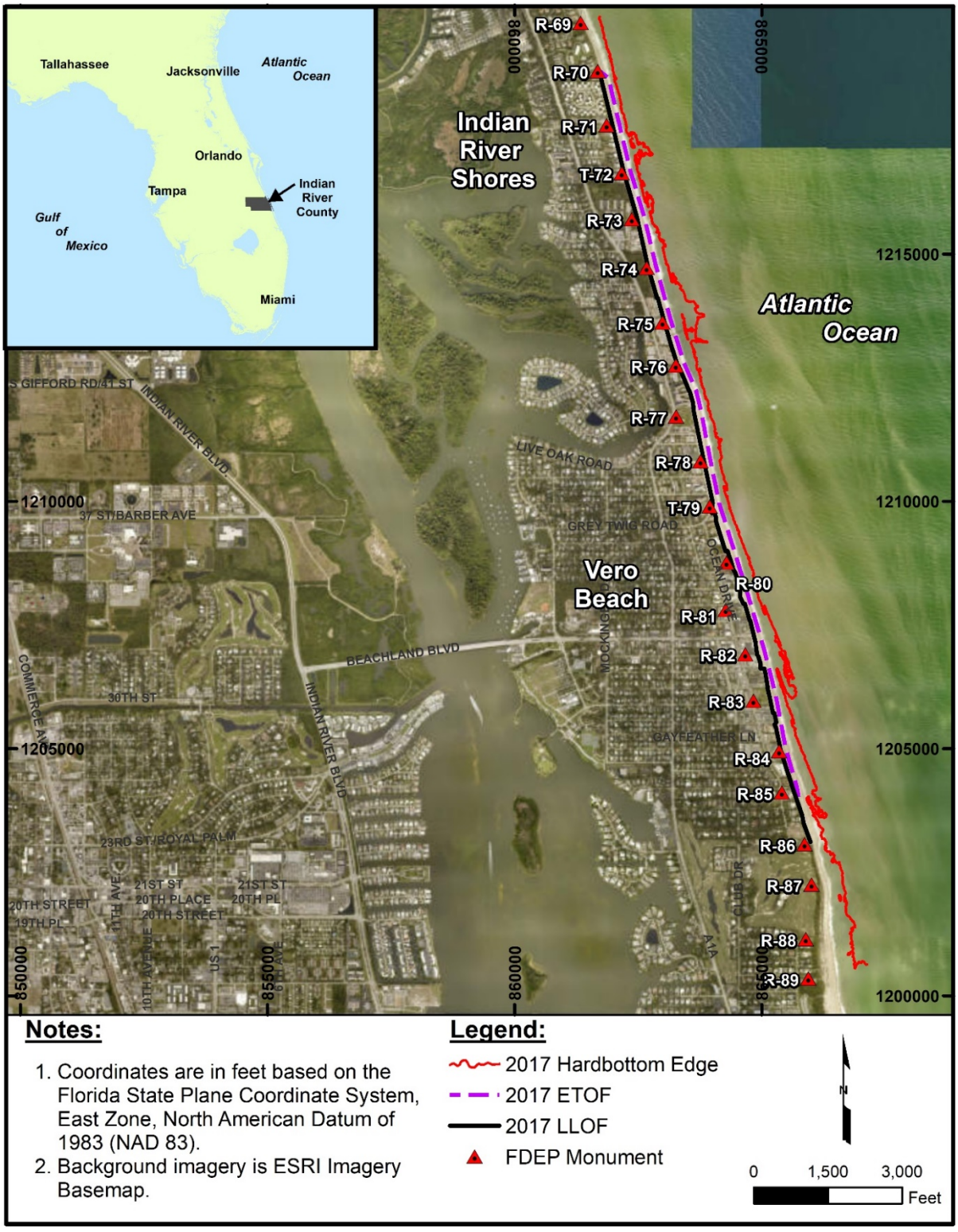

Figure 1. Indian River County Sector 5 Beach and Dune Restoration Project location.

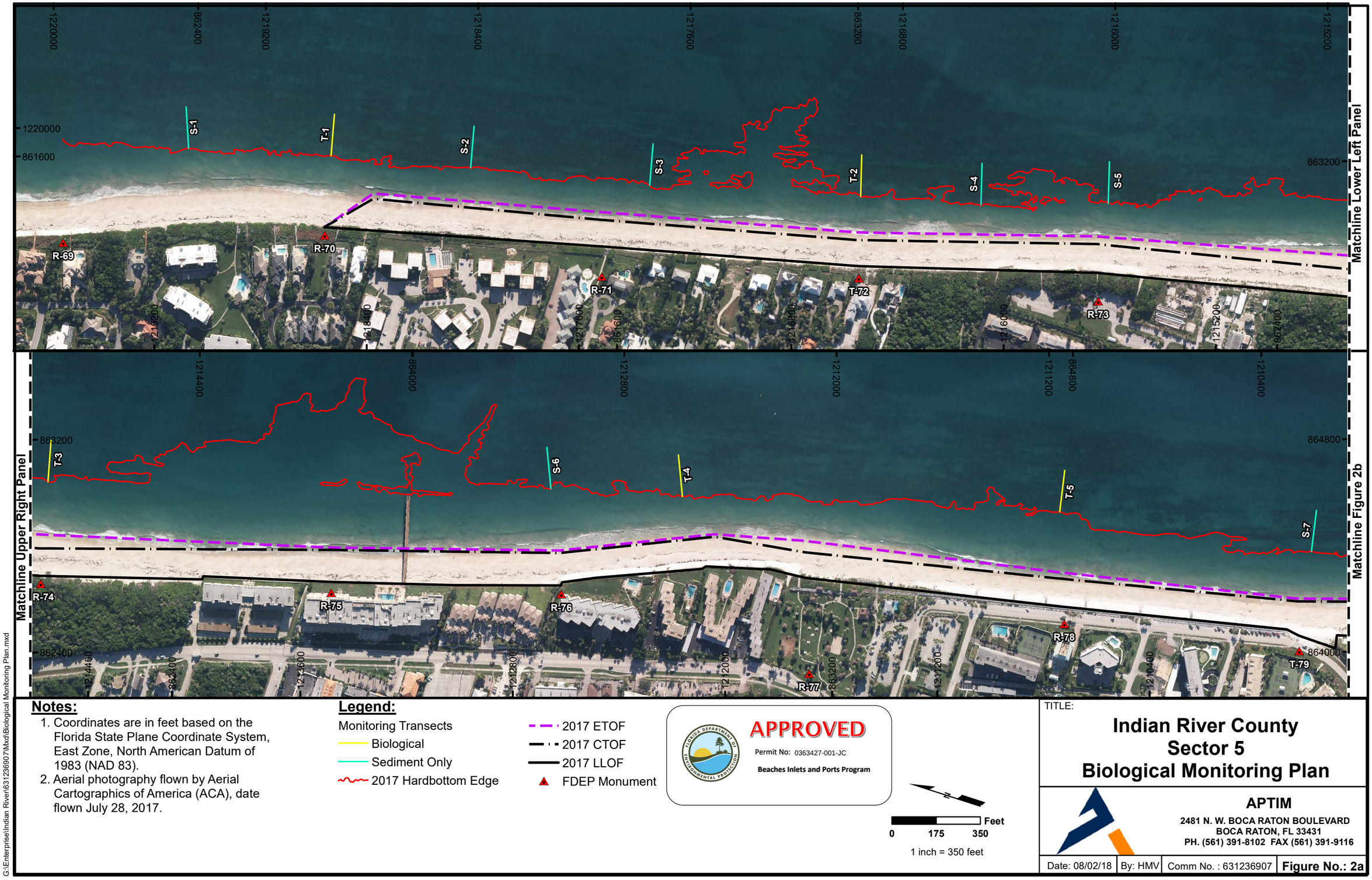

Figure 2a. Locations of biological (T) and sediment only (S) transects in the north project area.

Figure 2b. Locations of biological (T) and sediment only (S) transects in the south project area.

2.1 Nearshore Hardbottom Edge Mapping and Monitoring

In situ delineation of the nearshore hardbottom edge will provide information on hardbottom exposure within the project area and allow for determination of direct impacts, when occurring, due to hardbottom burial by project fill. The entire length of the nearshore hardbottom edge between DEP reference monuments R-69.5 and R-87 shall be mapped in the pre-construction monitoring event and in all subsequent post-construction monitoring events. The nearshore hardbottom edge is defined as the visible border between sand and hardbottom. Bounce dives shall not be used to delineate the hardbottom edge unless authorization is granted by FDEP staff. If necessary, requests will be submitted to resource review staff in the Department's Beaches, Inlets, and Ports program.

For *in situ* hardbottom edge mapping, at least two divers shall, together, swim the entire length of the hardbottom edge. One diver shall tow a DGPS antenna transmitting continuous positions to HYPACK hydrographic survey software on board a survey vessel. To accurately map the edge, the towing-diver will swim at a speed conducive to maintaining the buoy on as short a tether as possible. The non-towing diver will record qualitative digital video to document the nearshore hardbottom edge for descriptive analysis (e.g., of the dominant benthic communities, vertical relief, and sand cover). To allow for visual characterization of the hardbottom edge, the recording diver shall position the camera at an oblique angle to the seafloor. Positions of breaks (sand gaps) in the hardbottom edge greater than 5 meters in length will be noted during the survey.

2.2 Establishment and Monitoring of Permanent Transects

Hardbottom monitoring adjacent to, updrift, and downdraft of the fill template (outside of the permitted ETOF) will occur along permanent shore-perpendicular transects of two types — biological and sediment only (Figures 2a and 2b). All survey methods described below apply to the biological transects, while only line-intercept and interval sediment depth surveys apply to sediment only transects. To obtain the most accurate information on sediment depth and the location of sediment and hardbottom, line-intercept and interval sediment depth surveys shall be conducted first along each transect during each monitoring event. For biological transects, line-intercept and interval sediment depth surveys will be followed by qualitative video collection and benthic quadrat surveys.

2.2.1 Transect Establishment

A total of 20 permanent monitoring transects will be surveyed for this project during each monitoring event (Figure 2). Nine (9) permanent shore-perpendicular biological monitoring transects will be established in the area adjacent to the fill template and eleven (11) permanent shore-perpendicular sediment only transects will be established in the area updrift, adjacent to, and downdrift of the fill template (Table 1). The length of all transects, both biological and sediment

only, will be 50 meters. Each transect will start at the nearshore hardbottom edge and extend 50 meters offshore. The positions of transects are permanent once established (during the initial pre-construction/baseline survey); thus, the positions of transects shall not change over time, and the entire 50-meter length of each transect shall be surveyed in full during each monitoring event. To ensure repeatability in transect placement during monitoring events, permanent markers (pins, iron rods, etc.) will be installed at the start (meter 0), in the middle (meter 25), and at the end (meter 50) of each transect at the time of establishment.

Table 1. Transect information including name, project area (location relative to fill template), nearest R-monument, type, and length.

Transect Name	Project Area	Nearest R-Monument	Transect Type	Transect Length (m)
S-1	Updrift	69.5	Sed Only	50
T-1	Adjacent	70	Bio	50
S-2	Adjacent	70.5	Sed Only	50
S-3	Adjacent	71.5	Sed Only	50
T-2	Adjacent	72	Bio	50
S-4	Adjacent	72.5	Sed Only	50
S-5	Adjacent	73	Sed Only	50
T-3	Adjacent	74	Bio	50
S-6	Adjacent	76	Sed Only	50
T-4	Adjacent	76.5	Bio	50
T-5	Adjacent	78	Bio	50
S-7	Adjacent	79	Sed Only	50
T-6	Adjacent	80	Bio	50
S-8	Adjacent	80.5	Sed Only	50
S-9	Adjacent	82	Sed Only	50
T-7	Adjacent	82.5	Bio	50
T-8	Adjacent	84	Bio	50
T-9	Adjacent	85.5	Bio	50
S-10	Downdrift	86	Sed Only	50
S-11	Downdrift	87	Sed Only	50

2.2.2 Quadrat Establishment

A total of nine (9) 0.5-m^2 quadrats will be established along the length of each biological transect (N = 9 transects). The first permanent quadrat along each biological transect shall be installed at meter zero (0) (nearshore hardbottom edge). The distribution of the remaining permanent quadrats will be such that numbers are weighted towards the nearshore region; for example, after placement at meter 0, quadrats would be established at roughly the 5, 10, 15, 20, 25, 30, 40, and 50 meter marks. During establishment, quadrats will be positioned such that areas covered by sand are avoided (i.e., quadrat placement during establishment will be biased to include hardbottom). The

distribution of hardbottom along each transect during the baseline survey will therefore influence the positions at which quadrats are established. All quadrats are permanent once established, and post-construction surveys will use the same quadrat locations as the pre-construction survey, regardless of the exposure or burial condition of each location after initial quadrat establishment. To ensure repeatability in quadrat placement during monitoring events, pins (or nails or eye-bolts) will be installed to permanently mark the location of each quadrat. The quadrats shall be placed on the north side of the transect line so that the pin marking the quadrat location represents the southwest corner of the quadrat. The permanent location of each quadrat will be recorded and reported for each survey; post-construction survey quadrat positions shall match baseline quadrat positions.

2.2.3 Line-Intercept Survey

In order to document larger areas of uninterrupted sand (physical transitions along the monitoring transects between sand and hardbottom), and to track changes in sediment cover on the hardbottom, line-intercept surveys will be conducted along each permanent transect (biological and sediment only). During each monitoring event, the landward and seaward position of each sand patch / trough larger than 0.5 m in length will be recorded along each transect by reference to transect tape meter marks. Meter mark references will be to one decimal place (e.g., patch from 2.4 to 3.2 m).

2.2.4 Interval Sediment Depth Measurements

In order to track changes in sediment depth associated with changes in sediment cover, each monitoring event will include collection of interval sediment depth measurements along each permanent transect (biological and sediment only). Sediment depth will be measured at 1-m intervals along the entire length of each transect, inclusive of sand patches. For each measurement, a stainless-steel ruler graduated in centimeters (0 to 30 cm) will be pressed through the sediment until the ruler reaches the surface of hard substrata or is totally immersed in sand. Depth measurements will be rounded to the nearest cm (i.e., sediment thickness of less than 0.5 cm will be recorded as “0 cm”, while thickness greater than 0.5 cm but equal or less than 1 cm will be recorded as “1 cm”, etc.). Measurements greater than 30 cm will be recorded as “> 30 cm”.

2.2.5 Quadrat Sampling

Benthic communities and their habitats will be characterized quantitatively using the quadrat method, which includes sampling habitat and assemblages within permanently positioned quadrats along each biological transect. This method ensures that the same quadrats (same location, same size) are sampled in each monitoring event in order to document changes in sediment and benthic communities over time. The sampling protocol is similar to that used in the Benthic Ecological Assessment for Marginal Reefs (BEAMR) (Lybolt and Baron, 2006). As described below, three

main benthic characteristics will be assessed in each quadrat during sampling: physical structure, planar percent cover of sessile benthos, and coral (scleractinian and octocoral) size and density.

For physical structure, maximum topographic relief and mean sediment depth (average of three depth measurements) will be measured (cm) within each quadrat. As with all non-consumptive surveys, BEAMR is necessarily constrained to visually conspicuous organisms with well-defined, discriminating characteristics for identification. For functional groups, planar percent cover estimates of all sessile benthos and substratum features will be made within each quadrat; the following 20 functional groups will be assessed: sediment (e.g. sand, shell-hash, or mud), bare hardbottom, rubble, macroalgae, encrusting red algae, turf algae, sponge, octocoral, scleractinian coral, anemone, zoanthid, hydroid, hydrocorals (e.g., *Millepora* spp.), sessile annelid (not including *Phragmatopoma* spp.), wormrock, barnacle, bivalve, bryozoan, echinoderm (crinoids only), and tunicate. Each functional group will be assigned a percent cover value from 0 to 100%, with the total of all functional groups in each quadrat equaling 100%. Percent cyanobacteria cover shall also be assessed but will be recorded separately from other cover estimates. Cyanobacteria cover will be reported as cover over sand (most often as mats) and cover over benthic organisms. Macroalgae will be identified to genus level and the percent cover of each genus with cover greater than 1% will be recorded; unattached or floating macroalgae will be disregarded. Scleractinian coral colonies will be identified to species and octocoral colonies will be identified to genus. The identities of known common sponge species/genera will be listed (e.g., *Pione lampa*, *Cliona deletrix*, *C. varians*, *Cinachyrella apion*, and *Desmapsamma anchorata*, etc.).

Monitoring staff will also measure and record to the nearest centimeter (cm) the maximum dimension (height or width) of each scleractinian coral and octocoral colony within each quadrat. The smallest size recorded will be one (1) cm; for colonies less than one (1) cm in size, the measurement recorded will be "< 1 cm". Each colony within each quadrat will also be enumerated and identified (by species for scleractinians, by genus for octocorals) to determine coral density and composition.

2.2.6 Qualitative Video Recording

Qualitative video survey data collected as part of beach nourishment project biological monitoring functions as an archival data set that can be used for general reference purposes or to help resolve potential impacts suggested by quadrat and sediment survey data. As such, video data could be reviewed and compared between surveys in order to document qualitative changes along transects over time for the purpose of refining impact area assessment. Qualitative video surveys will be conducted along all permanent biological (not sediment only) monitoring transects using a digital video camera in a waterproof housing. Video of the seafloor along each transect will progress no faster than 5 meters per minute over hardbottom, and 10 m per minute over large sand patches.

During the survey, a convergent laser guidance system will be used to precisely maintain the height of the camera so that 30 cm of substrate are visible from top to the bottom of the frame. The transect line will be clearly visible in all video so that locations may be accurately referenced. A 360° panoramic view at an angle of roughly 30° to the horizon will be recorded both at the beginning and end of each transect from an elevation of roughly 1 m above the bottom. At the beginning and end of each transect, a standard underwater display will also be recorded and integrated directly onto the digital video track. The standard display will report: 1) the project code/permit number (standard DEP/JCP project number) (e.g., 0555555-001-JC); 2) the transect number; 3) the survey date (e.g., 06/25/2019); 4) the water depth in meters for both the beginning (transect meter 0) and end (final meter) of the transect (e.g., start depth = 2 m, end depth = 4.5 m); and 5) any pertinent notes (e.g., poor visibility, large swell, etc.). Video data (files) will be supplied to FEDP during raw data submittal.

3.0 MONITORING TEAM AND MONITORING SCHEDULE

The names and qualifications of the monitoring staff performing the monitoring will be submitted by the Permittee or their Agent to the FDEP for approval. Written agency approval of personnel will be required prior to proceeding with the yearly monitoring. Biological monitoring surveys shall be conducted by staff with previous experience in monitoring hardbottom communities and with scientific knowledge of local benthic marine ecosystems and flora and fauna. All in-water crew members responsible for *in situ* quadrat data collection shall participate in cross training to verify correct species identification and survey practices as Quality Assurance/Quality Control (QA/QC) procedures at the beginning of each monitoring event. QA/QC results shall reflect consistency of 90% for percent cover and identification of functional groups between observers.

Biological monitoring for beach fill placement (nourishment) under this permit shall include a pre-construction (baseline) survey during the summer prior to construction, an initial post-construction survey (within six months of project completion), and three annual post-construction surveys (Years 1, 2, and 3 post-construction) (Table 2). Each subsequent nourishment event conducted under this permit will initiate a complete round of post-construction monitoring (i.e., initial post-construction survey and three annual post-construction surveys).

Table 2. Monitoring Schedule.

Survey Area	Survey Type	Survey Period	Number of Surveys
Nearshore Hardbottom	Biological Monitoring	* Pre-construction	1
		** Post-construction	4

* Single pre-construction survey prior to first nourishment event; serves as baseline survey.

** Four (4) post-construction nearshore hardbottom surveys per nourishment event.

4.0 REPORTING REQUIREMENTS

4.1 Notification of Commencement, Progress, and Completion of Work

Commencement dates of surveys will be reported via email to the JCP Compliance Officer (JCPCompliance@dep.state.fl) and to staff in the Beaches, Inlets, and Ports program roughly seven (7) days prior to the start of monitoring and the day that monitoring begins. Brief monitoring progress reports will be submitted (emailed) weekly to the JCP Compliance Officer until completion of the monitoring event. As soon as monitoring activities have ended, the JCP compliance officer will be notified that the monitoring event has been completed.

4.2 Post-Monitoring Data Submission

All pre-construction monitoring data shall be submitted to the FDEP JCP Compliance Officer in electronic format (e.g., on a single portable hard drive or via an FTP site) at least 30 days prior to construction. Within 45 days of completing each post-construction monitoring event all raw data will similarly be supplied to the JCP Compliance Officer in electronic format. For each submission, data will be provided directly and concurrently from the monitoring firm to the FDEP/Permittee/Agent. Data will be submitted in a standardized format, as specified below. All transect monitoring data submitted will have been checked against field datasheets and corrected (if necessary) to ensure accuracy. Raw data provided to the FDEP will consist of the following, each of which are described in greater detail in the following sections: video and photographs, hardbottom edge survey data, raw transect survey data, and field datasheets.

4.2.1 Video and Photographs

Qualitative digital video and digital photographs will be provided in separate folders on a hard drive submitted to FDEP. Main folders will be identified by a descriptive name, so that data may be easily differentiated (e.g., video, photographs). Each of these folders will contain separate labeled subfolders for each transect.

4.2.2 Hardbottom Edge Survey Data

Hardbottom edge data will be supplied as a collection of shapefiles (e.g., as an ESRI file geodatabase). Lines or polygons shall represent the *in situ* mapped landward edge of hardbottom or landward hardbottom patches for data obtained from each survey. Data may be depicted as a single line representing the nearshore edge, two lines representing the nearshore and offshore edges, or polygons representing hardbottom patches, depending on the distribution of hardbottom.

Hardbottom edge data will have attributes indicating the portion of each line or polygon

representing hardbottom. If sand patches greater than 2 meters in length are crossed during the edge survey, these portions of lines/polygons will, as attributes, be indicated as sand. Lines/polygons representing the pre-construction (baseline) *in situ* mapped hardbottom edge and a line(s) representing the predicted (permitted) ETOF will also be provided with each collection of shapefiles submitted to FDEP following each post-construction monitoring event.

A separate collection of shapefiles (e.g., as an ESRI file geodatabase) will be provided for any *in situ* artificial reef mapping conducted. Similar attributes as in the hardbottom monitoring will be provided with these data.

4.2.3 Transect Survey Data

Interval sediment depth measurements, line-intercept data, and BEAMR quadrat data collected along transects will be supplied in Excel format. If multiple workbooks are submitted, each workbook will be named so that the information it contains is easily identified.

4.2.4 Field Datasheets and Survey Logs

Copies (photographs or scans) of field datasheets will be submitted in pdf format.

4.3 Monitoring Report Submissions

Within 90 days of completing monitoring (for each aspect of the project), a written report will be supplied to the FDEP JCP Compliance Officer in electronic format. The report will be submitted by the monitoring firm directly and concurrently to the FDEP/Permittee/Agent. Along with each monitoring report, the data analyzed to produce the report will also be submitted and will include tables used in the analysis of data, tables used to construct figures, and tables and figures provided in the report (in Excel format). The table entered into Primer and the Primer analysis file will also be submitted. Each monitoring report will clearly describe methods used in monitoring and data analysis and explain any deviations from the monitoring plan or conditions of permit. Reports will also provide results in appropriate graphical, tabular and text formats.

Beginning with the initial post-construction survey, annual post-construction monitoring reports will be submitted to the FDEP for review following each annual monitoring event. Monitoring reports will be cumulative, thus data (in the form of summary tables and figures) from all previous monitoring efforts will be provided in each report, in an updated fashion. Not all data sets will be analyzed and compared statistically. Temporal comparisons by way of univariate and multivariate tests will be confined to data collected during the most recent monitoring event (current survey) and the baseline survey; thus, statistical tests should not be

used to compare results between different post-construction monitoring events. Annual monitoring reports should clearly describe methods and any deviations from the monitoring plan/conditions of permit. Noteworthy explanatory observations and other ancillary information should be provided at the end of the report, in an Appendix.

5.0 References

Lybolt M. and R.M. Baron. 2006. BEAMR (Benthic Ecological Assessment for Marginal Reefs): a preferred replacement for AGRRA and similar benthic assessment methods tailored for marginal reefs. Proceedings from the 2006 ISRS European Meeting, Bremen, Germany.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

Service Log Number: 41910-2011-F-0170

March 13, 2015

Alan M. Dodd, Colonel
District Commander
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Dear Colonel Dodd:

This letter transmits the U.S. Fish and Wildlife Service's revised Statewide Programmatic Biological Opinion (SPBO) for the U.S. Army Corps of Engineers (Corps) Civil Works and Regulatory sand placement activities in Florida and their effects on the following sea turtles: Northwest Atlantic Ocean distinct population segment (NWAO DPS) of loggerhead (*Caretta caretta*) and its designated terrestrial critical habitat; green (*Chelonia mydas);* leatherback (*Dermochelys coriacea*); hawksbill (*Eretmochelys imbricata*); and Kemp's ridley (*Lepidochelys kempii*) ; and the following beach mice: southeastern (*Peromyscus polionotus niveiventris*); Anastasia Island (*Peromyscus polionotus phasma*); Choctawhatchee (*Peromyscus polionotus allophrys*); St. Andrews (*Peromyscus polionotus peninsularis*); and Perdido Key (*Peromyscus polionotus trissyllepsis*) and their designated critical habitat. It does not address effects of these activities on the non-breeding piping plover (*Charadrius melodus*) and its designated critical habitat or for the red knot (*Calidris canutus rufa*). Effects of Corps planning and regulatory shore protection activities on the non-breeding piping plover and its designated critical habitat within the North Florida Ecological Services office area of responsibility and the South Florida Ecological Services office area of responsibility are addressed in the Service's May 22, 2013, Programmatic Piping Plover Biological Opinion. Effects of shore protection activities for the piping plover in the Panama City Ecological Services office area of responsibility will be addressed on a project by project basis.

Each proposed project will undergo an evaluation process by the Corps to determine if it properly fits within a programmatic approach. The project description will determine if the project is appropriate to apply to this programmatic consultation. If it is determined that the minimization measures, Reasonable and Prudent Measures, and Terms and Conditions in the SPBO are applicable to the project, it will be covered by this programmatic consultation. If not, the Corps will consult separately on individual projects that do not fit within this programmatic approach.

We will meet annually during the fourth week of August to review the sand placement projects, assess new data, identify information needs, and scope methods to address those needs, including, but not limited to, evaluations and monitoring specified in this SPBO, reviewing results, formulating or amending actions that minimize take of listed species, and monitoring the effectiveness of those actions.

The entire programmatic consultation will be reviewed every five years or sooner if new information concerning the projects or protected species occurs. Reinitiation of formal consultation is also required 10 years after the issuance of this SPBO.

We are available to meet with agency representatives to discuss the remaining issues with this consultation. If you have any questions, please contact Peter Plage at the North Florida Ecological Services Office at (904) 731-3085, Jeffrey Howe at the South Florida Ecological Services Office at (772) 469-4283, or Lisa Lehnhoff at the Panama City Ecological Services Office at (850) 769-0552, extension 241.

Sincerely,

for Larry Williams
State Supervisor

Shore Protection Activities along the Coast of Florida

Statewide Programmatic Biological Opinion

(Revised)

February 27, 2015

Prepared by:
U.S. Fish and Wildlife Service

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Acronyms

ABM	Alabama Beach Mouse
Act	Endangered Species Act
AFB	Air Force Base
AIBM	Anastasia Island Beach Mouse
ASP	Anastasia State Park
BO	Biological Opinion
CBM	Choctawhatchee Beach Mouse
CBRA	Coastal Barrier Resources Act
CCAFS	Cape Canaveral Air Force Station
CFR	Code of Federal Regulations
CH	Critical Habitat
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
Corps	U.S. Army Corps of Engineers
DOI	U.S. Department of the Interior
DTRU	Dry Tortugas Recovery Unit
F	Fahrenheit
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FMNM	Fort Matanzas National Monument
FR	*Federal Register*
FWC	Florida Fish and Wildlife Conservation Commission

FWC/FWRI	Florida Fish and Wildlife Conservation Commission's Florida Fish and Wildlife Research Institute
GCRU	Greater Caribbean Recovery Unit
GINS	Gulf Islands National Seashore
GTMNERR	Guana Tolomato Matanzas National Estuarine Research Reserve
HCP	Habitat Conservation Plan
IMA	Important Manatee Areas
INBS	Index Nesting Beach Survey
IPCC	Intergovernmental Panel on Climate Change
ITP	Incidental Take Permit
K	Carrying Capacity
MANLAA	May Affect, but is Not Likely to Adversely Affect
MHW	Mean High Water
MHWL	Mean High Water Line
MMPA	Marine Mammal Protection Act
mtDNA	Mitochondrial Deoxyribonucleic Acid
NGMRU	Northern Gulf of Mexico Recovery Unit
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRU	Northern Recovery Unit
NWAO DPS	Northwest Atlantic Ocean Distinct Population Segment
NWR	National Wildlife Refuge
PBA	Programmatic Biological Assessment
PCE	Primary Constituent Elements

PFRU	Peninsular Florida Recovery Unit
PHVA	Population and Habitat Viability Analysis
PKBM	Perdido Key Beach Mouse
PKSP	Perdido Key State Park
PSI	Per Square Inch
PVA	Population Viability Analysis
SABM	St. Andrews Beach Mouse
SAJ	South Atlantic Jacksonville
SAM	South Atlantic Mobile
SAV	submerged aquatic vegetation
SEBM	Southeastern Beach Mouse
Service	U.S. Fish and Wildlife Service
SNBS	Statewide Nesting Beach Survey
SPBO	Statewide Programmatic Biological Opinion
SR	State Road
TED	Turtle Excluder Device
TEWG	Turtle Expert Working Group
U.S.C.	United States Code
U.S.	United States

March 13, 2015

Alan M. Dodd, Colonel
District Commander
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Service Federal Activity No:	41910-2010-F-0284
Applicant:	U.S. Army Corps of Engineers
Date Started:	May 30, 2007
Project Title:	Shore Protection Activities
Ecosystem:	Florida Coastline
Counties:	Nassau, Duval, St. Johns, Flagler, Volusia, Brevard, Indian River, St. Lucie, Martin, Palm Beach, Broward, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, Escambia.

Dear Colonel Dodd:

This document is the U.S. Fish and Wildlife Service's (Service) Statewide Programmatic Biological Opinion (SPBO) for the U.S. Army Corps of Engineers (Corps) planning and regulatory shore protection activities in Florida and their effects on the Northwest Atlantic Ocean distinct population (NWAO DPS) of loggerhead (*Caretta caretta*) and its designated terrestrial critical habitat, green (*Chelonia mydas),* leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), and Kemp's ridley (*Lepidochelys kempii*) sea turtles, and southeastern (*Peromyscus polionotus niveiventris*), Anastasia Island (*Peromyscus polionotus phasma*), Choctawhatchee (*Peromyscus polionotus allophrys*), St. Andrews (*Peromyscus polionotus peninsularis*), and Perdido Key (*Peromyscus polionotus trissyllepsis*) beach mice and designated critical habitat (CH) for the Perdido Key beach mouse (PKBM), Choctawhatchee beach mouse (CBM), and St. Andrews beach mouse (SABM) **(Table 1)**. This SPBO is provided in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq*.). We have assigned Service Federal Activity number 41910-2010-F-0284 for this consultation.

The Corps determined that the proposed project "may affect and is likely to adversely affect the above listed species (**Table 1)**. The Corps also has determined that the proposed project "may affect, but is not likely to adversely affect" (MANLAA) the West Indian (Florida) manatee (*Trichechus manatus latirostris*), the roseate tern (*Sterna dougallii dougallii*), the beach jacquemontia (*Jacquemontia reclinata*), and the Garber's spurge (*Chamaesyce garberi*) **(Table 2)**. Based on our review of the project plans and the incorporation of the minimization measures listed

in the final Programmatic Biological Assessment (PBA) as conditions of the projects where these species are known to exist, we concur with these determinations.

Table 1. Status of federally listed species within the Action Area that may be adversely affected by the shore protection activities.

SPECIES COMMON NAME	SPECIES SCIENTIFIC NAME	STATUS/CH
Mammals		
Choctawhatchee beach mouse	*Peromyscus polionotus allophrys*	Endangered(CH)
Southeastern beach mouse	*Peromyscus polionotus niveiventris*	Threatened
Anastasia Island beach mouse	*Peromyscus polionotus phasma*	Endangered
St. Andrews beach mouse	*Peromyscus polionotus peninsularis*	Endangered (CH)
Perdido Key beach mouse	*Peromyscus polionotus trissyllepsis*	Endangered (CH)
Birds		
Piping Plover*	*Charadrius melodus*	Threatened
Red Knot*	*Calidris canutus rufa*	Proposed
Reptiles		
Green sea turtle	*Chelonia mydas*	Endangered
Hawksbill turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Loggerhead sea turtle (Northwest Atlantic Ocean population)	*Caretta caretta*	Threatened (CH)

* Not covered by the revised SPBO

Table 2. Species and critical habitat evaluated for effects and those where the Service has concurred with a "may affect, not likely to adversely affect (MANLAA)" determination.

SPECIES COMMON NAME	SPECIES SCIENTIFIC NAME	STATUS/CH	PRESENT IN ACTION AREA	MANLAA
Florida manatee	*Trichechus manatus latirostris*	Endangered (CH)	Yes	Yes
Roseate tern	*Sterna dougallii dougallii*	Threatened	Yes	Yes
Beach jacquemontia	*Jacquemontia reclinata*	Endangered	Yes	Yes
Garber's spurge	*Chamaesyce garberi*	Threatened	Yes	Yes

Florida Manatee

For all dredging activities, including offshore dredging activities associated with submerged borrow areas and navigational channel maintenance:

The Corps has determined that the proposed projects "may affect, but are not likely to adversely affect" the Florida manatee. The Service has reviewed the draft PBA and concurs that, if the 2011 Standard Manatee In-water Construction Conditions are made a condition of the issued permit or Corps project plan and implemented, 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. The web link to these conditions: http://www.fws.gov/northflorida/Manatee/Manate_Key_Programmatic/20130425_gd_Appendix%20B_2011_Standard%20Manatee%20Construction%20Conditions.pdf.

For all dredging activities within estuaries and adjacent to the shore, inlets, and/or inshore areas including channels associated with submerged borrow areas and navigational channels:

If the 2011 Standard Manatee In-water Construction Conditions and the following additional conditions are made a condition of the issued permit or Corps project plan and implemented, the Service would be able to concur with a determination by the Corps that 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.

Additional conditions:

1. Barges shall install mooring bumpers that provide a minimum 4-foot standoff distance under maximum compression between other moored barges and large vessels, when in the vicinity of inlets, river mouths, and large estuaries where manatees are known to congregate.

2. Pipelines shall be positioned such that they do not restrict manatee movement to the maximum extent possible. Plastic pipelines shall be weighted or floated. Pipelines transporting dredged material within the vicinity of inlets, river mouths, and large estuaries where manatees are known to congregate shall be weighted or secured to the bottom substrate as necessary to prevent movement of the pipeline and to prevent manatee entrapment or crushing.

3. In the event that such positioning has the potential to impact submerged aquatic vegetation (SAV) or nearshore hardbottom, the pipeline may be elevated or secured to the bottom substrate to minimize impacts to SAV.

For dredging activities located within Important Manatee Areas (IMAs), including Warm Water Aggregation Areas (WWAAs):

Important Manatee Areas (IMAs) are areas where large numbers of manatees occur because of the presence of warm water sites (including power plants, springs, etc.), feeding sites, drinking water sites, and other attractants. Manatees congregate at these sites to shelter from the cold, rest, feed and drink, travel, and engage in other activities. Current IMA maps, including maps of Warm Water Aggregation Areas (WWAAs) and areas of inadequate protection (AIPs), can be found at the Corps' weblink: http://www.saj.usace.army.mil/Missions/Regulatory/SourceBook.aspx.

Dredging activities that occur within the IMA sites (including WWAAs) are not included in this SPBO. For dredging activities within IMAs, the Corps shall contact the appropriate FWS Ecological Services Office for project-specific conditions. See Table 3.

Table 3. FWS Ecological Services (ES) offices and areas of responsibility (counties).

County	Service ES Office	Address	Telephone
Brevard, Citrus, Dixie, Duval, Flagler, Hernando, Hillsborough, Levy, Manatee, Nassau, Pasco, Pinellas, St Johns, Taylor, Volusia	North Florida ES Office	7915 Baymeadows Way Jacksonville, FL 32256	(904) 731-3336
Broward, Charlotte, Collier, Indian River, Lee, Martin, Miami-Dade, Monroe, Palm Beach, St Lucie, Sarasota	South Florida ES Office	1339 20th Street Vero Beach, FL 32960	(772) 562-3909
Bay, Escambia, Franklin, Gulf, Jefferson, Okaloosa, Santa Rosa, Taylor, Wakulla, Walton,	Panama City ES Office	1601 Balboa Avenue Panama City, FL 32405	(850) 769-0552

Although this does not represent a biological opinion for the manatee as described in section 7 of the Act, it does fulfill the requirements of the Act and no further action is required regarding manatees. It also fulfills the requirements of the MMPA. If modifications are made in the programmatic action or additional information becomes available, re-initiation of consultation may be required.

Loggerhead Terrestrial Critical Habitat

The Corps has determined that the proposed projects "may affect, but are not likely to adversely affect" the terrestrial critical habitat of the Northwest Atlantic Ocean loggerhead sea turtle population. The Service concurs with the Corps' determination and furthermore concludes that the proposed projects will not adversely modify the terrestrial critical habitat of the Northwest Atlantic Ocean loggerhead sea turtle population.Designated Critical Habitat: The Service has designated terrestrial critical habitat for Northwest Atlantic loggerhead population on July 10, 2014. NOTE: The proposed rule was dated March 25, 2013 (78 FR 18000) and the notice of availability of the economic analysis for the proposed rule (78 FR 42921) was dated July 18, 2013. The final rule of terrestrial critical habitat includes 88 units encompassing approximately 1,102 kilometers (685 miles) of mapped shoreline along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, and Mississippi: http://www.fws.gov/northflorida/SeaTurtles/2014_Loggerhead_CH/Maps/2014_NWA_Loggerhead_Terrestrial_CH_index_maps.pdf.

Table 4. List of NWAO DPS loggerhead critical habitat in the terrestrial habitat Florida and ownership.

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-01: South Duval County Beaches–County line at Duval and St. Johns Counties	11.5 (7.1)	0 (0)	0 (0)	11.5 (7.1)
LOGG-T-FL-02: Fort Matanzas National Monument, St. Johns County	1.4 (0.9)	1.4 (0.9)	0 (0)	0 (0)
LOGG-T-FL-03: River to Sea Preserve at Marineland — North Peninsula State Park, Flagler and Volusia Counties	31.8 (19.8)	0 (0)	6.1 (3.8) North Peninsula State Park, Washington Oaks Garden State Park (in Guana Tolomato Matanzas NERR), and Gamble Rogers Memorial State Recreation Area at Flagler Beach	25.7 (16.0)
LOGG-T-FL-04: Canaveral National Seashore North, Volusia County	18.2 (11.3)	18.2 (11.3) Canaveral National Seashore	0 (0)	0 (0)

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-05: Canaveral National Seashore South — Merritt Island NWR-Kennedy Space, Brevard County	28.4 (17.6)	28.4 (17.6) includes Canaveral National Seashore (Brevard portion) and Merritt Island NWR/KSC	0 (0)	0 (0)
LOGG-T-FL-06: Central Brevard Beaches, Brevard County	19.5 (12.1)	0 (0)	0 (0)	19.5 (12.1)
LOGG-T-FL-07: South Brevard Beaches, Brevard County	20.8 (12.9)	4.2 (2.6) Archie Carr NWR	1.5 (1.0) Sebastian Inlet State Park	15.0 (9.3)
LOGG-T-FL-08: Sebastian Inlet — Indian River Shores, Indian River County	4.1 (2.5)	0.9 (0.6) Archie Carr NWR	3.2 (2.0) Sebastian Inlet State Park	0 (0)
LOGG-T-FL-09: Fort Pierce Inlet — St. Lucie Inlet, St. Lucie and Martin Counties	35.2 (21.9)	0 (0)	0 (0)	35.2 (21.9)
LOGG-T-FL-10: St. Lucie Inlet — Jupiter Inlet, Martin and Palm Beach Counties	24.9 (15.5)	4.8 (3.0) Hobe Sound NWR	3.7 (2.3) St. Lucie Inlet Preserve State Park	16.4 (10.2)
LOGG-T-FL-11: Jupiter Inlet — Lake Worth Inlet, Palm Beach County	18.8 (11.7)	0 (0)	2.5 (1.5) John D. MacArthur Beach State Park	16.3 (10.1)

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-12: Lake Worth Inlet — Boynton Inlet, Palm Beach County	24.3 (15.1)	0 (0)	0 (0)	24.3 (15.1)
LOGG-T-FL-13: Boynton Inlet — Boca Raton Inlet, Palm Beach County	22.6 (14.1)	0 (0)	0 (0)	22.6 (14.1)
LOGG-T-FL-14: Boca Raton Inlet — Hillsboro Inlet, Palm Beach and Broward Counties	8.3 (5.2)	0 (0)	0 (0)	8.3 (5.2)
LOGG-T-FL-15: Long Key, Monroe County	4.2 (2.6)	0 (0)	4.2 (2.6) Long Key State Park	0 (0)
LOGG-T-FL-16: Bahia Honda Key, Monroe County	3.7 (2.3)	0 (0)	3.7 (2.3) Bahia Honda Key State Park	0 (0)
LOGG-T-FL-17: Longboat Key, Manatee and Sarasota Counties	16.0 (9.9)	0 (0)	0 (0)	16.0 (9.9)
LOGG-T-FL-18: Siesta and Casey Keys, Sarasota County	20.8 (13.0)	0 (0)	0 (0)	20.8 (13.0)
LOGG-T-FL-19: Venice Beaches and Manasota Key, Sarasota and Charlotte Counties	26.0 (16.1)	0 (0)	1.9 (1.2) Stump Pass Beach State Park	24.1 (15.0)

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-20: Knight, Don Pedro, and Little Gasparilla Islands, Charlotte County	10.8 (6.7)	0 (0)	1.9 (1.2) Don Pedro Island State Park	8.9 (5.5)
LOGG-T-FL-21: Gasparilla Island, Charlotte and Lee Counties	11.2 (6.9)	0 (0)	1.5 (1.0) Gasparilla Island State Park	9.6 (6.0)
LOGG-T-FL-22: Cayo Costa, Lee County	13.5 (8.4)	0 (0)	13.2 (8.2) Cayo Costa State Park	0.3 (0.2)
LOGG-T-FL-23: Captiva Island, Lee County	7.6 (4.7)	0 (0)	0 (0)	7.6 (4.7)
LOGG-T-FL-24: Sanibel Island West, Lee County	12.2 (7.6)	0 (0)	0 (0)	12.2 (7.6)
LOGG-T-FL-25: Little Hickory Island, Lee and Collier Counties	8.7 (5.4)	0 (0)	0 (0)	8.7 (5.4)
LOGG-T-FL-26: Wiggins Pass — Clam Pass, Collier County	7.7 (4.8)	0 (0)	2.0 (1.2) Delnor-Wiggins Pass State Park	5.7 (3.6)
LOGG-T-FL-27: Clam Pass — Doctors Pass, Collier County	4.9 (3.0)	0 (0)	0 (0)	4.9 (3.0)
LOGG-T-FL-28: Keewaydin Island and Sea Oat Island, Collier County	13.1 (8.1)	0 (0)	12.4 (7.7) Rookery Bay NERR	0.7 (0.5)
LOGG-T-FL-29: Cape Romano, Collier County	9.2 (5.7)	0 (0)	7.2 (4.5) Rookery Bay NERR	2.0 (1.2)

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-30: Ten Thousand Islands North, Collier County	7.8 (4.9)	2.9 (1.8) Ten Thousand Islands NWR	4.9 (3.1) Rookery Bay NERR	0 (0)
LOGG-T-FL-31: Highland Beach, Monroe County	7.2 (4.5)	7.2 (4.5) Everglades National Park	0 (0)	0 (0)
LOGG-T-FL-32: Graveyard Creek — Shark Point, Monroe County	0.9 (0.6)	0.9 (0.6) Everglades National Park	0 (0)	0 (0)
LOGG-T-FL-33: Cape Sable, Monroe County	21.3 (13.2)	21.3 (13.2) Everglades National Park	0 (0)	0 (0)
LOGG-T-FL-34: Dry Tortugas, Monroe County	5.7 (3.6)	5.7 (3.6) Dry Tortugas National Park	0 (0)	0 (0)
LOGG-T-FL-35: Marquesas Keys, Monroe County	5.6 (3.5)	5.6 (3.5) Key West NWR	0 (0)	0 (0)
LOGG-T-FL-36: Boca Grande Key, Monroe County	1.3 (0.8)	1.3 (0.8) Key West NWR	0 (0)	0 (0)
LOGG-T-FL-37: Woman Key, Monroe County	1.3 (0.8)	1.3 (0.8) Key West NWR	0 (0)	0 (0)
LOGG-T-FL-38: Perdido Key, Escambia County	20.2 (12.6)	11.0 (6.8) Gulf Islands National Seashore	2.5 (1.6) Perdido Key State Park	6.7 (4.2)
LOGG-T-FL-39: Mexico Beach and St. Joe Beach, Bay and Gulf Counties	18.7 (11.7)	0 (0)	0 (0)	18.7 (11.7)

Critical Habitat Unit	Length of Unit in kilometers (miles)	Federal Lands	State Lands	Private and Other (counties and municipalities)
LOGG-T-FL-40: St. Joseph Peninsula, Gulf County	23.5 (14.6)	0 (0)	15.5 (9.7) T.H. Stone Memorial St. Joseph Peninsula State Park and St. Joe Bay State Buffer Preserve	8.0 (4.9)
LOST-T-FL-41: Cape San Blas, Gulf County	11.0 (6.8)	0 (0)	0.1 (0.1) St. Joseph Bay State Buffer Preserve	10.8 (6.7)
LOGG-T-FL-42: St. Vincent Island, Franklin County	15.1 (9.4)	15.1 (9.4) St. Vincent NWR	0 (0)	0 (0)
LOGG-T-FL-43: Little St. George Island, Franklin County	15.4 (9.6)	0 (0)	15.4 (9.6) Apalachicola NERR	0 (0)
LOGG-T-FL-44: St. George Island, Franklin County:	30.7 (19.1)	0 (0)	14.0 (8.7) Dr. Julian G. Bruce St. George Island State Park	16.7 (10.4)
LOGG-T-FL-45: Dog Island, Franklin County	13.1 (8.1)	0 (0)	0 (0)	13.1 (8.1)
Florida State Totals	**637.1 (396.4)**	**130.3 (81.0)**	**117.4.0 (72.9)**	**390.3 (242.6)**

The primary constituent elements (PCEs) for loggerhead terrestrial critical habitat are those specific elements of the biological and physical features (BPF) that provide for the species' life-history processes and are essential to the conservation of the species. PBFs include those habitat components that support foraging, roosting, and sheltering and the physical features necessary for maintaining the natural processes that support these habitat components. The PBFs and PCEs are described as follows:

Physical and Biological Features (PBF):

PBF 1: Sites for Breeding, Reproduction, or Rearing (or Development) of Offspring

PBF 2: Habitats Protected from Disturbance or Representative of the Historical, Geographic, and Ecological Distributions of the Species

Primary Constituent Elements (PCE):

(1) Suitable nesting beach habitat that has (a) relatively unimpeded nearshore access from the ocean to the beach for nesting females and from the beach to the ocean for both post-nesting females and hatchlings and (b) is located above MHW to avoid being inundated frequently by high tides.

(2) Sand that (a) allows for suitable nest construction, (b) is suitable for facilitating gas diffusion conducive to embryo development, and (c) is able to develop and maintain temperatures and a moisture content conducive to embryo development.

(3) Suitable nesting beach habitat with sufficient darkness to ensure nesting turtles are not deterred from emerging onto the beach and allows hatchlings and post-nesting females to orient successfully to the sea.

(4) Natural coastal processes or artificially created or maintained habitat mimicking natural conditions.

Substantial amounts of sand are deposited along Gulf of Mexico and Atlantic Ocean beaches to protect coastal properties in anticipation of preventing erosion and to mimic what otherwise would be natural processes of overwash and island migration. Constructed beaches tend to differ from natural beaches in several important ways for sea turtles. They are typically wider, flatter, and more compacted, and the sediments are moister than those on natural beaches (Nelson *et al*. 1987; Ackerman *et al.* 1991; Ernest and Martin 1999).

Regarding PCE 1 and PCE 4 for sand placement projects, construction on the beach during sea turtle nesting and hatching season can obstruct nesting females from accessing the beach and hatchlings from entering the water unimpeded. To minimize these impacts, the Corps has agreed to avoid construction during peak nesting and hatching season in the higher density beaches within the entire NWAO DPS of the loggerhead sea turtle as described. This SPBO includes required terms and conditions that minimize incidental take of turtles and reduces the impacts to the PCE 3 by limiting activities at night and placing equipment and staging areas off the nesting beach.

More nests are washed out on the wide, flat beaches resulting from sand placement than narrower steeply sloped natural beaches. This phenomenon may persist through the second postconstruction year and results from the placement of nests near the seaward edge of the beach berm where dramatic profile changes, caused by erosion and scarping occur as the beach equilibrates to a more natural contour.

A study performed for the Florida Department of Environmental Protection (FDEP) promoted the test construction of a more “turtle-friendly” beach. The Service, along with the National Fish and Wildlife Foundation and the Florida Fish and Wildlife Conservation Commission (FWC), began a study to determine if statistically significant improvements in nesting success, nest densities, and/or hatchling production can be achieved through modifications to the traditional construction template for beach nourishment projects. It is anticipated that a more natural beach profile will reduce the incidence of scarping, improve nesting success, and reduce the proportion of nests placed along the seaward portion of the berm (those at increased risk of being lost to erosion

during profile equilibration), relative to a traditionally built beach. The Corps remains committed to incorporating the results of this study into future design templates.

A significantly larger proportion of turtles emerging on engineered beaches abandon their nesting attempts than turtles emerging on natural or prenourished beaches, even though more nesting habitat is available (Trindell *et al*. 1998; Ernest and Martin 1999; Herren 1999), with nesting success approximately 10 to 34 percent lower on nourished beaches than on control beaches during the first year post-nourishment. 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 (beach profile, sediment grain size, beach compaction, frequency and extent of escarpments) associated with the nourishment project (Ernest and Martin 1999). This directly impacts PCE 2 above; however, on severely eroded sections of beach, where little or no suitable nesting habitat exists, and sand placement can result in increased nesting (Ernest and Martin 1999). The placement of sand on a beach with reduced dry foredune 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 the eroding beach it replaces.

Regarding PCE 3, during construction, any lights directly visible on the beach during the nesting and hatching seasons are minimized by shielding and directing the lights downward and away from the nesting beach as required in the Terms and Conditions of this SPBO.

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 sand placement activity leading to a higher probability of hatchling mortality due to disorientation. Changing to sea turtle compatible lighting can be accomplished at the local level through voluntary compliance or by adopting appropriate regulations. The Terms and Conditions in the Biological Opinion require a lighting survey prior to construction and post construction to determine the additional level of impacts as a result of the proposed project. The Terms and Conditions include working with the local sponsor to minimize the impacts of lighting as a result of the proposed project.

The Service has determined that with the incorporation of the conservation measures as described above, that the proposed projects will not adversely affect nor adversely modify the terrestrial critical habitat of the Northwest Atlantic Ocean loggerhead sea turtle population.

Migratory Birds

In order to comply with the Migratory Bird Treaty Act (16 U.S.C. 701 *et seq*.) and reduce the potential for this project to impact nesting shorebirds, the Corps or the Applicant should follow the latest Florida Fish and Wildlife Conservation Commission (FWC) standard guidelines to protect

against impacts to nesting shorebirds during implementation of this project during the periods from February 15 to August 31.

Consultation History

1980s and 1990s — Beach nourishment projects in Florida began to occur frequently in the late 1980s and early 1990s. During that time, sea turtle protection measures were developed based on research findings available at that time. These measures addressed sand compaction, escarpment formation, and timing restrictions for projects in six south Florida counties with high nesting densities. In the mid-1990s, a sea turtle Biological Opinion (BO) template was developed that included protection measures and information on the status of sea turtles. In 1995, an expanded version of the sea turtle template BO was developed to incorporate new guidance on the required format for BOs and a biological rationale for the Terms and Conditions to be imposed. This document underwent review by four State conservation agencies and the Corps, and was subsequently revised. The primary purposes of the template BO were to: (1) incorporate a standardized format and language required for use in all BOs based on guidance from the Service's Washington Office, (2) assist Service biologists in the preparation of BOs, (3) increase consistency among Service field offices, and (4) increase consistency between the Service and the State agencies.

March 7 and 8, 2006 — The Corps met with the Services' three Florida field office representatives, a representative of the FWC, and a representative of the FDEP. The purpose of that meeting was to begin discussions about a regional consultation for sand placement activities along the coast of Florida and preparation of a PBA for sand placement activities in Florida. In addition to sea turtles, other Federal and state protected species were included in the discussions. At that meeting, the following topics were discussed:

1. Sand placement activities;
2. Sand source and placement methods;
3. Species and habitat;
4. Geographic scope;
5. Information availability; and
6. Minimization of impacts.

July 13, 2006 — A second meeting was held to further discuss the draft PBA. The Service provided the Corps with copies of the latest BO templates for each species to be considered. The Service held conference calls with the species recovery leads during August 2006.

October 16, 2006 The Service received the draft PBA via email from the Corps for sand placement activities along the coast of Florida.

October 27, 2006 The Service provided the Corps with draft comments on the PBA via email.

October 31, 2006 The Corps provided a response to the Service's comments on the PBA via email.

November 9, 2006 The Service and the Corps held a conference call to discuss the comments.

December 20, 2006 The Service sent the Corps a letter with the final comments on the draft PBA.

September 18 and 19, 2007
The Corps met with the Services' three Florida field office representatives, a representative of the FWC, and a representative of the FDEP. The purpose of this meeting was to discuss the Terms and Conditions to be included in the BO.

October 5, 2007 The Service sent the Corps, via email, the modifications to the draft Reasonable and Prudent Measures and Terms and Conditions for the sea turtles and beach mice as discussed in the previous meeting.

November 1, 2007 The Corps provided the Service with comments via email on the revised Reasonable and Prudent Measures and Terms and Conditions for the sea turtles and beach mice.

March 31, 2008 The Service revised the Reasonable and Prudent Measures and Terms and Conditions for the sea turtles and beach mice. The Service also revised the minimization measures for the manatee. The revisions were sent to the Corps.

September 16, 2008 The Service sent the Corps via mail the draft SPBO.

October 2, 2008 The Corps provided the Service via email with a summary of the remaining issues concerning the Reasonable and Prudent Measures and Terms and Conditions for the sea turtles and beach mice.

October 15, 2008 The Service sent the Corps, via email, the modifications to the draft Reasonable and Prudent Measures and Terms and Conditions for the sea turtles and beach mice as discussed in the previous email.

March 11, 2009	The Service received via email examples of previous agreements between the Corps and the local sponsor to carry out the Terms and Conditions in previous BOs.
April 7, 2009	The Service sent an email to the Corps with an update of the progress of our analysis of including piping plovers in the SPBO.
August 26, 2009	The Service sent to the Corps via email the latest Terms and Conditions for sea turtles and beach mice.
September 17, 2009	The Corps sent an email to the Service describing the actions to be taken for the completion and submittal of the PBA.
January 6, 2010	The Corps and the Service participated in a meeting to finalize the draft SPBO.
January 21, 2010	The Corps sent to the Service via email the revised draft PBA.
March 25, 2010	The Corps and the Service participated in an implementation meeting and submittal of the final PBA.
February 22, 2011	The Corps submitted the final PBA to the Service.
April 18, 2011	The Service sent the final Statewide PBO to the Corps.
June 21, 2010	The Corps provided written concerns with the final Statewide PBO
June 30, 2011	The Service revised the final Statewide PBO.
July 18, 2011	The Corps provided written agreement with the changes that were made and asked for additional changes.
July 22, 2011	The Service made additional revisions per the Corps request.
July 25, 2011	The Corps provided written agreement with the additional revisions.
March 25, 2013	The Service published the proposed rule for loggerhead terrestrial critical habitat.
March 3, 2014	The Corps contacted the Service on revising the SPBO to include loggerhead critical habitat in the terrestrial environment.
August 25, 2014	The Service provided the Corps with a Draft Revised SPBO

September 4, 2014	The Corps and Service met and discussed the Draft Revised SPBO at the annual SPBO meeting.
October 23, 2014	The Service received a letter from the Corps requesting the SPBO be revised to include loggerhead critical habitat.
November 3, 2014	The Service sent a draft Revised SPBO to the Corps for review and comment
November 20, 2014	The Corps agreed with the changes made to the draft Revised SPBO
November 24, 2014	The Corps submitted proposed section 7(a)(1) conservation recommendations
January 30, 2014	The Corps and Service agreed on proposed section 7(a)(1) conservation recommendations and finalized draft revised SPBO

This SPBO is based on the PBA, and information provided during meetings and discussions with the Corps' representatives and information from the Florida Fish and Wildlife Conservation Commission's Florida Fish and Wildlife Research Institute (FWC/FWRI) sea turtle databases. A complete administrative record of this consultation is on file in the Service's North Florida, Panama City, and South Florida Ecological Services Offices.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action includes all activities associated with the placement of compatible sediment on beaches of the Atlantic and Gulf coasts of Florida encompassing both South Atlantic Jacksonville (SAJ) and South Atlantic Mobile (SAM) Corps Districts. Additionally, the proposed action includes the replacement and rehabilitation of groins that are included as design components of beach projects for longer retention time and stabilization of associated sediment placed on the beach. This SPBO includes projects authorized through the Corps Regulatory Program, and funded or carried out as part of its Civil Works program. Corps Regulatory activities may include the involvement of other Federal agencies, such as the Department of Defense, Bureau of Ocean Energy Management, and the Federal Emergency Management Agency (FEMA). The shore protection activities covered in the SPBO encompass the following shore protection activities:

1. Sand placement originating from Dredged Material Management Areas (DMMAs), offshore borrow sites, and other compatible sand sources;
2. Sand placement as an associated authorization of sand extraction from the outer continental shelf by the Bureau of Ocean Energy Management;

3. Sand washed onto the beach from being placed in the swash zone;
4. Sand by-passing/back-passing (sand discharge on beach);
5. Current Operations and Maintenance (O&M) dredging of navigation channels with beach disposal (does not include new navigation projects or expansion (deepening or widening) of existing authorized navigation projects); and
6. Groins and jetty repair or replacement.

For nearshore borrow sites, the Corps must provide information to the Service on the sand flow when this sand is removed from these nearshore areas. If removal of sand from these nearshore areas is shown to cause increased erosion on the adjacent beach, a separate consultation will be required.

A detailed description of each activity is found in the final PBA. The history of shore protection activities throughout the Atlantic and Gulf Coasts of Florida is extensive and consists of a myriad of actions performed by local, State, and Federal entities. Future beach placement actions addressed in this SPBO may include maintenance of these existing projects or beaches that have not experienced a history of beach placement activities.

The Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) share Federal jurisdiction for sea turtles under the Act. The Service has responsibility for sea turtles on the nesting beach. NMFS has jurisdiction for sea turtles in the marine environment. This SPBO only addresses activities that may impact nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. NMFS will assess and consult with the Corps concerning potential impacts to sea turtles in the marine environment and the shoreline updrift and downdrift area of the project.

Corps Commitments as listed in the final PBA

The following paragraph from the final PBA summarizes the Corps' Commitments as listed below:

"For Corps projects, please note that "fish and wildlife enhancement" activities (which are beyond mitigation of project impacts) must be authorized as a project purpose or project feature or must be otherwise approved through Corps headquarters (Engineer Regulation ER 1105-2-100 Appendix G, Amendment #1, 30 Jun 2004). At the present time, no beach fill placement or shore protection activity in Florida has fish and wildlife enhancement as a project purpose or project feature. Since adding fish and wildlife enhancement as a project purpose or feature is not a budgetary priority (ER 1105-2-100 22 Apr 2000, Appendix C, part C-3b.(3)), authorization and funding for such is not expected."

<u>Sea Turtles</u>

1. Avoid construction during the peak nesting and hatching season in the higher density beaches, and to the maximum extent practicable during all other nesting times and locations;

2. Except for O&M disposal actions, implement sea turtle nest monitoring and relocation plan during construction if nesting window cannot be adhered to;

3. Except for O&M disposal actions, escarpments that are identified prior to or during the nesting season that interfere with sea turtle nesting (exceed 18 inches in height for a distance of 100 feet) can be leveled to the natural beach for a given area. If it is determined that escarpment leveling is required during the nesting or hatching season, leveling actions should be directed by the Service. For Corps Civil Works projects, leveling of escarpments would be limited to the term of the construction or as otherwise may be authorized and funded;

4. Placement of pipe parallel to the shoreline and as far landward as possible so that a significant portion of available nesting habitat can be utilized, nest placement is not subject to inundation or washout, and turtles do not become trapped landward of the pipe;

5. Temporary storage of pipes and equipment will be located off the beach to the maximum extent possible;

6. The Corps will continue to work with the FDEP to identify aspects of beach nourishment construction templates that negatively impact sea turtles and develop and implement alternative design criteria that may minimize these impacts;

7. Except for O&M disposal actions, Service compaction assessment guidelines will be followed and tilling will be performed where appropriate. For Corps Civil Works projects, assessment of compaction and tilling will be limited to the term of the construction or as otherwise may be authorized and funded; and

8. All lighting associated with project construction will be minimized to the maximum extent possible, through reduction, shielding, angling, etc., while maintaining compliance with all Corps, U.S. Coast Guard, and OSHA safety requirements.

Beach Mice

1. Pipeline routes for beach construction projects will avoid identified primary constituent elements for beach mouse critical habitat to the maximum extent practicable;

2. Implementation of a trapping and relocation plan if avoidance alternatives of occupied habitat are not practical; and

3. Implementation of a lighting plan to reduce, shield, lower, angle, etc. light sources in order to minimize illumination impacts on nocturnal beach mice during construction.

Action Area

The Service has described the action area to include sandy beaches of the Atlantic Coast of Florida (Key West to Fernandina/Kings Bay) and the Gulf Coast (Ten Thousand Islands to Alabama State

Line) for reasons that will be explained and discussed in the "EFFECTS OF THE ACTION" section of this consultation.

Underlying Dynamics of a Barrier Island

Of all the states and provinces in North America, Florida is most intimately linked with the sea. Florida's 1,200-mile coastline (exclusive of the Keys) is easily the longest in the continental U.S. Of the 1,200 miles, 745 miles are sandy and mostly in the form of barrier islands. The coastline is dynamic and constantly changing as a result of waves, wind, tides, currents, sea level change, and storms. The entire state lies within the coastal plain, with a maximum elevation of about 400 feet, and no part is more than 60 miles from the Atlantic Ocean or Gulf of Mexico.

The east coast of Florida consists of a dynamic shoreline, with a relatively sloped berm, coarse-grained sand, and moderate to high surf (Witherington 1986). The southeast coast of Florida consists of continuous, narrow, sandy barrier islands bordering a narrow continental shelf (Wanless and Maier 2007). The dynamics of the east coast shoreline are due to the occurrence of storm surges and seas from tropical storms that occur mainly during August through early October. More erosion events can also occur during late September through March due to nor'easters. The impacts of these two types of storms may vary from event to event and year to year.

Northwest (panhandle) and Southwest Florida beaches are considered to be low energy beaches with a gradual offshore slope and low sloped fine grained quartz sand beaches. As along the east coast of Florida, the shoreline dynamics are shaped by tropical storms and hurricanes. Although Gulf beaches may experience winter erosion, they are largely protected from the severe nor'easters.

Coasts with greater tidal ranges are more buffered against storm surges than are those with low tidal ranges, except when the storm strikes during high tide. Mean tidal ranges decrease southward along the Atlantic coast from a mean of seven feet at the Florida-Georgia line to less than two feet in Palm Beach County. The mean tidal range along the Gulf Coast is less than three feet (microtidal) except in the extreme south where it ranges from three to four feet. Because of its lower elevation and lower wave energy regime, the West Coast of the peninsula is subject to greater changes during storm events than is the east coast.

Microtidal coasts have a high vulnerability to sea level rise and barrier islands respond by migrating landward. Migration occurs as a result of overwash from extreme storms that flatten topography and deposit sand on the backside of the island, extending the island landward (Young 2007). Significant widening can occur from a single storm event. For example, Dauphin Island, a barrier island in Alabama, has nearly doubled its width following Hurricanes Ivan and Katrina in 2004 and 2005, respectively.

Sea level has risen globally approximately 7.1 inches in the past century (Douglas 1997). Climate models predict a doubling of the rate of sea level rise over the next 100 years (Pendleton *et al.* 2004). Recent studies indicate a trend toward increasing hurricane number and intensity (Emanuel

2005, Webster *et al.* 2005). Barrier islands need to be able to move and respond to these conditions. By locking in a barrier island's location with infrastructure, the island loses its ability to migrate to higher elevations which can lead to its eventual collapse (Moore 2007).

Overwash from less intense storms can positively affect island topography. Low natural berms can develop along beach fronts, but generally can be exceeded by overwash from frontal storms. The berm is an accretionary feature at the landward extreme of wave influence. Sediment is transported over the berm crest and is deposited in a nearshore overwash fan and in breach corridors. Overwash deposition provides source sand for re-establishing dunes. Onshore winds transport the sediment from overwash fans to the dunes, gradually building back dune elevation during storm-free periods.

The interaction between the biology and geomorphology of barrier islands is complex. Just as the barrier island undergoes a process of continual change, so do the ecological communities present. Vegetation zones gradually re-establish following storms, and in turn affect physical processes such as sand accretion, erosion, and overwash. The beach front, dunes, and overwash areas all provide important habitat components. Many barrier island species are adapted to respond positively to periodic disturbance. As the island widens, new feeding habitat (sand/mud flats) is created for shorebirds such as the piping plover. The beaches provide nesting habitat for sea turtles. Early colonizer plants are favored as a food source by beach mice. These barrier island habitats are becoming increasingly rare as our Nation's coastlines rapidly develop and are stabilized.

SEA TURTLES

STATUS OF THE SPECIES/CRITICAL HABITAT

The Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) share Federal jurisdiction for sea turtles under the Act. The Service has responsibility for sea turtles on the nesting beach. NMFS has jurisdiction for sea turtles in the marine environment. This SPBO addresses nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. Five species of sea turtles are analyzed in this SPBO: the loggerhead, green, leatherback, hawksbill, and Kemp's ridley.

Loggerhead Sea Turtle

The loggerhead sea turtle was federally listed as a threatened species on July 28, 1978 (43 *Federal Register* [*FR*] 32800). The Service and the National Marine Fisheries Service (NMFS) listed the Northwest Atlantic Ocean distinct population segment (DPS) of the loggerhead sea turtle as threatened on September 22, 2011 (76 *FR* 58868). 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 2009a). The loggerhead feeds on mollusks, crustaceans, fish, and other marine animals.

The loggerhead 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 Service 2008).

Critical habitat has been designated for the NWAO DPS of the loggerhead sea turtle. **Table 4** has the list of the critical habitat units within the project area.

Green Sea Turtle

The green sea turtle was federally listed 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 four 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 2009b). 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 1991). Nesting also has been documented along the Gulf coast of Florida from Escambia County through Santa Rosa County in northwest Florida and from Pinellas County through Collier County in southwest Florida (FWC 2009a).

Most green turtles spend the majority of their lives in coastal foraging grounds. These areas include fairly shallow waters both open coastline and protected bays and lagoons. While in these

areas, green turtles rely on marine algae and seagrass as their primary diet constituents, although some populations also forage heavily on invertebrates. These marine habitats are often highly dynamic and in areas with annual fluctuations in seawater and air temperatures, which can cause the distribution and abundance of potential green turtle food items to vary substantially between seasons and years (Carballo *et al.*, 2002). Many prey species that are abundant during winter and spring periods become patchy during warm summer periods. Some species may altogether vanish during extreme temperatures, such as those that occur during El Niño Southern Oscillation events (Carballo *et al.*, 2002).

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.

Leatherback Sea Turtle

The leatherback sea turtle was federally listed as an endangered species on June 2, 1970 (35 *FR* 8491). Leatherbacks have the widest distribution of the sea turtles; nonbreeding animals have been recorded as far north as the British Isles and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard 1992). Foraging leatherback excursions have been documented into higher-latitude subpolar waters. They have evolved physiological and anatomical adaptations (Frair *et al.* 1972, Greer *et al.* 1973) that allow them to exploit waters far colder than any other sea turtle species would be capable of surviving.

The adult leatherback can reach four to eight feet in length and weigh 500 to 2,000 pounds. The carapace is distinguished by a rubber-like texture, about 1.6 inches thick, made primarily of tough, oil-saturated connective tissue. Hatchlings are dorsally mostly black and are covered with tiny scales; the flippers are edged in white, and rows of white scales appear as stripes along the length of the back (NMFS 2009c). Jellyfish are the main staple of its diet, but it is also known to feed on sea urchins, squid, crustaceans, tunicates, fish, blue-green algae, and floating seaweed. This is the largest, deepest diving of all sea turtle species.

Leatherback turtle nesting grounds are distributed worldwide in the Atlantic, Pacific and Indian Oceans on beaches in the tropics and sub-tropics. The Pacific Coast of Mexico historically supported the world's largest known concentration of nesting leatherbacks.

The leatherback turtle regularly nests in the U.S. Caribbean in Puerto Rico and the U.S. Virgin Islands. Along the U.S. Atlantic coast, most nesting occurs in Florida (NMFS and Service 1992). Leatherback nesting has also been reported on the northwest coast of Florida (LeBuff 1990, FWC 2009a); and in southwest Florida a false crawl (nonnesting emergence) has been observed on Sanibel Island (LeBuff 1990). Nesting has also been reported in Georgia, South Carolina, and North Carolina (Rabon *et al.* 2003) and in Texas (Shaver 2008).

Adult females require sandy nesting beaches backed with vegetation and sloped sufficiently so the distance to dry sand is limited. Their preferred beaches have proximity to deep water and generally rough seas.

Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of St. Croix, U.S. Virgin Islands (50 Code of Federal Regulations (CFR) 17.95).

Hawksbill Sea Turtle

The hawksbill sea turtle was federally listed as an endangered species on June 2, 1970 (35 *FR* 8491). The hawksbill is found in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean.

Data collected in the Wider Caribbean reported that hawksbills typically weigh around 176 pounds or less; hatchlings average about 1.6 inches straight length and range in weight from 0.5 to 0.7 ounces. The carapace is heart shaped in young turtles, and becomes more elongated or egg-shaped with maturity. The top scutes are often richly patterned with irregularly radiating streaks of brown or black on an amber background. The head is elongated and tapers sharply to a point. The lower jaw is V-shaped (NMFS 2009d).

Within the continental U.S., hawksbill sea turtle nesting is rare and is restricted to the southeastern coast of Florida (Volusia through Miami-Dade Counties) and the Florida Keys (Monroe County) (Meylan 1992, Meylan *et al.* 1995). However, hawksbill tracks are difficult to differentiate from those of loggerheads and may not be recognized by surveyors. Therefore, surveys in Florida likely underestimate actual hawksbill nesting numbers (Meylan *et al.* 1995). In the U.S. Caribbean, hawksbill nesting occurs on beaches throughout Puerto Rico and the U.S. Virgin Islands (NMFS and Service 1993).

Critical habitat for the hawksbill sea turtle has been designated for selected beaches and/or waters of Mona, Monito, Culebrita, and Culebra Islands, Puerto Rico.

Kemp's Ridley Sea Turtle

The Kemp's ridley sea turtle was federally listed as endangered on December 2, 1970 (35 *FR* 18320). The Kemp's ridley, along with the flatback sea turtle (*Natator depressus*), has the most geographically restricted distribution of any sea turtle species. The range of the Kemp's ridley includes the Gulf coasts of Mexico and the U.S., and the Atlantic coast of North America as far north as Nova Scotia and Newfoundland.

Adult Kemp's ridleys, considered the smallest sea turtle in the world, weigh an average of 100 pounds with a carapace measuring between 24-28 inches in length. The almost circular carapace has a grayish green color while the plastron is pale yellowish to cream in color. The carapace is often as wide as it is long. Their diet consists mainly of swimming crabs, but may also include fish, jellyfish, and an array of mollusks.

The majority of nesting for the entire species occurs on the primary nesting beach at Rancho Nuevo, Mexico (Marquez-Millan 1994). Outside of nesting, adult Kemp's ridleys are believed to spend most of their time in the Gulf of Mexico, while juveniles and subadults also regularly occur along the eastern seaboard of the U.S. (Service and NMFS 1992). There have been rare instances when immature ridleys have been documented making transatlantic movements (Service and NMFS 1992). It was originally speculated that ridleys that make it out of the Gulf of Mexico might be lost to the breeding population (Hendrickson 1980), but data indicate that many of these

turtles are capable of moving back into the Gulf of Mexico (Henwood and Ogren 1987). In fact, there are documented cases of ridleys captured in the Atlantic that migrated back to the nesting beach at Rancho Nuevo (Schmid and Witzell 1997, Schmid 1998, Witzell 1998).

Hatchlings, after leaving the nesting beach, are believed to become entrained in eddies within the Gulf of Mexico, where they are dispersed within the Gulf and Atlantic by oceanic surface currents until they reach about 7.9 inches in length, at which size they enter coastal shallow water habitats (Ogren 1989).

No critical habitat has been designated for the Kemp's ridley sea turtle.

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 (200 meters). 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).

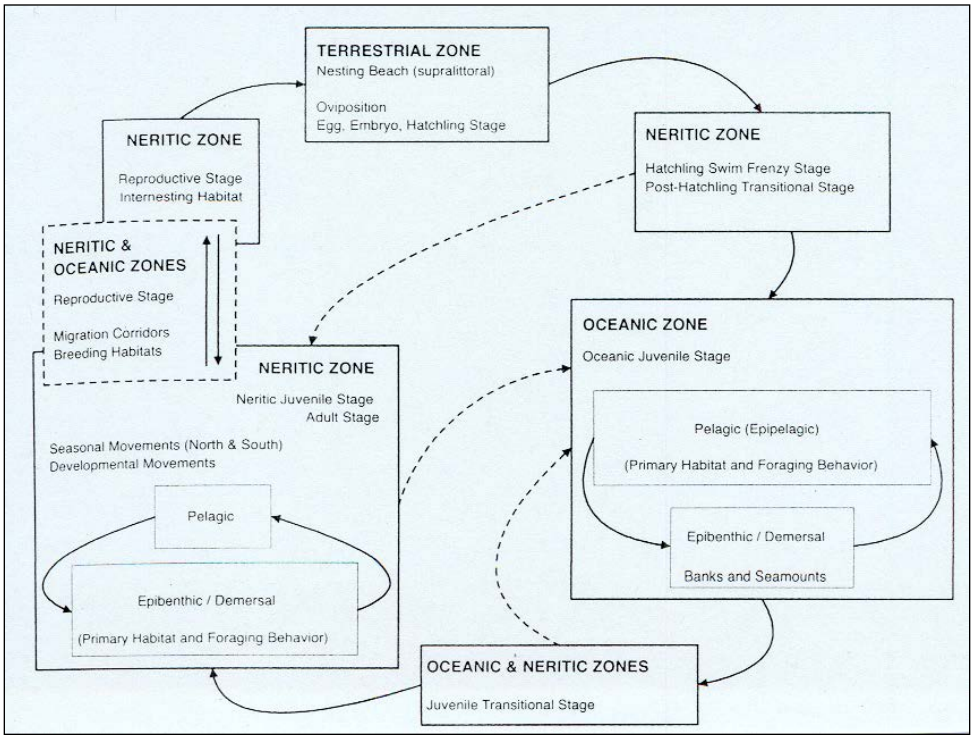

Figure 1. Life history stages of a loggerhead turtle. The boxes represent life stages and the corresponding ecosystems, solid lines represent movements between life stages and ecosystems, and dotted lines are speculative (Bolten 2003).

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 4** summarizes key life history characteristics for loggerheads nesting in the U.S.

Table 5. 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)	84˚F[5]
Nest productivity (emerged hatchlings/total eggs) x 100 (varies depending on site specific factors)	45-70 percent[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 (<34 inches Curved Carapace Length) sex ratio	65-70 percent 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 Witherington (2006) (information based on nests monitored throughout Florida beaches in 2005, n = 865).
4 National Marine Fisheries Service (2001); Foley (2005).
5 Mrosovsky (1988).
6 Witherington (2006) (information based on nests monitored throughout Florida beaches in 2005, n = 1,680).
7 Murphy and Hopkins (1984); Frazer and Richardson (1985); Hawkes *et al*. 2005; Scott 2006.
8 Caldwell (1962), Dodd (1988).
9 Richardson *et al.* (1978); Bjorndal *et al.* (1983).
10 Snover (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 (Mortimer 1982; 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 one to three day interval and move upward and out of the nest over a two to four day interval (Christens 1990). The time from pipping to emergence ranges from four to seven 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 and Martin 1996, Witherington 1997, Stewart and Wyneken 2004).

Loggerheads in the Northwest Atlantic display complex population structure based on life history stages. Based on mitochondrial deoxyribonucleic acid (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 sea 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 or more years intervene between breeding seasons (NMFS and Service 1991). Age at sexual maturity is believed to be 20 to 50 years (Hirth 1997).

Leatherback Sea Turtle

Leatherbacks nest an average of five to seven times within a nesting season, with an observed maximum of 11 nests (NMFS and Service 1992). The interval between nesting events within a season is about nine to 10 days. Clutch size averages 80 to 85 yolked eggs, with the addition of usually a few dozen smaller, yolkless eggs, mostly laid toward the end of the clutch (Pritchard 1992). Nesting migration intervals of two to three years were observed in leatherbacks nesting on the Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands (McDonald and Dutton 1996). Leatherbacks are believed to reach sexual maturity in six to 10 years (Zug and Parham 1996).

Hawksbill Sea Turtle

Hawksbills nest on average about 4.5 times per season at intervals of approximately 14 days (Corliss *et al.* 1989). In Florida and the U.S. Caribbean, clutch size is approximately 140 eggs, although several records exist of over 200 eggs per nest (NMFS and Service 1993). On the basis of limited information, nesting migration intervals of two to three years appear to predominate. Hawksbills are recruited into the reef environment at about 14 inches in length and are believed to begin breeding about 30 years later. However, the time required to reach 14 inches in length is unknown and growth rates vary geographically. As a result, actual age at sexual maturity is unknown.

Kemp's Ridley Sea Turtle

Nesting occurs from April into July during which time the turtles appear off the Tamaulipas and Veracruz coasts of Mexico. Precipitated by strong winds, the females swarm to mass nesting emergences, known as "arribadas or arribazones," to nest during daylight hours. The period between Kemp's ridley arribadas averages approximately 25 days (Rostal *et al.* 1997), but the precise timing of the arribadas is highly variable and unpredictable (Bernardo and Plotkin 2007). Clutch size averages 100 eggs and eggs typically take 45 to 58 days to hatch depending on temperatures (Marquez-Millan 1994, Rostal 2007).

Some females breed annually and nest an average of one to four times in a season at intervals of 10 to 28 days. Analysis by Rostal (2007) suggested that ridley females lay approximately 3.1 nests per nesting season. Interannual remigration rate for female ridleys is estimated to be

approximately 1.8 (Rostal 2007) to 2.0 years (Marquez-Millan *et al.* 1989). Age at sexual maturity is believed to be between 10 to 17 years (Snover *et al*. 2007).

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 Florida, where 90 percent of nesting occurs, has fluctuated between 52,374 and 98,602 nests per year from 2009-2013 (FWC 2014, http://myfwc.com/media/2786250/loggerheadnestingdata09-13.pdf). 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 (Possardt 2005). The loggerhead nesting aggregations in Oman and the U.S. account for the majority of nesting worldwide.

Green Sea Turtle

The majority of nesting occurs along the Atlantic coast of eastern central Florida, with an average of 10,377 each year from 2008 to 2012 (B. Witherington, Florida Fish and Wildlife Conservation Commission, pers. comm., 2013). 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 1998b). 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).

Leatherback Sea Turtle

A dramatic drop in nesting numbers has been recorded on major nesting beaches in the Pacific. Spotila *et al.* (2000) have highlighted the dramatic decline and possible extirpation of leatherbacks in the Pacific.

The East Pacific and Malaysia leatherback populations have collapsed. Spotila *et al.* (1996) estimated that only 34,500 females nested annually worldwide in 1995, which is a dramatic decline from the 115,000 estimated in 1980 (Pritchard 1982). In the eastern Pacific, the major nesting beaches occur in Costa Rica and Mexico. At Playa Grande, Costa Rica, considered the most important nesting beach in the eastern Pacific, numbers have dropped from 1,367 leatherbacks in 1988-1989 to an average of 188 females nesting between 2000-2001 and 2003-2004. In Pacific Mexico, 1982 aerial surveys of adult female leatherbacks indicated this area had become the most important leatherback nesting beach in the world. Tens of thousands of nests were laid on the beaches in 1980s, but during the 2003-2004 seasons a total of 120 nests was recorded. In the western Pacific, the major nesting beaches lie in Papua New Guinea, Papua, Indonesia, and the Solomon Islands. These are some of the last remaining significant nesting assemblages in the Pacific. Compiled nesting data estimated approximately 5,000 to 9,200 nests annually with 75 percent of the nests being laid in Papua, Indonesia.

However, the most recent population size estimate for the North Atlantic alone is a range of 34,000 to 94,000 adult leatherbacks (TEWG 2007). In Florida, the number of nests has been increasing since 1979 (Stewart *et al.* 2011). The average annual number of nests in the 1980s was 63 nests, which rose to 263 nests in the 1990s and to 754 nests in the 2000s (Stewart *et al.* 2011). In 2012, 1,712 nests were recorded statewide (http://myfwc.com/research/wildlife/sea-turtles/nesting/).

Nesting in the Southern Caribbean occurs in the Guianas (Guyana, Suriname, and French Guiana), Trinidad, Dominica, and Venezuela. The largest nesting populations at present occur in the western Atlantic in French Guiana with nesting varying between a low of 5,029 nests in 1967 to a high of 63,294 nests in 2005, which represents a 92 percent increase since 1967 (TEWG 2007). Trinidad supports an estimated 6,000 leatherbacks nesting annually, which represents more than 80

percent of the nesting in the insular Caribbean Sea. Leatherback nesting along the Caribbean Central American coast takes place between Honduras and Colombia. In Atlantic Costa Rica, at Tortuguero, the number of nests laid annually between 1995 and 2006 was estimated to range from 199 to 1,623.

In Puerto Rico, the main nesting areas are at Fajardo on the main island of Puerto Rico and on the island of Culebra. Between 1978 and 2005, annual population growth rate was estimated to be 1.10 percent (TEWG 2007). Recorded leatherback nesting on the Sandy Point National Wildlife Refuge on the island of St. Croix, U.S. Virgin Islands between 1990 and 2005, ranged from a low of 143 in 1990 to a high of 1,008 in 2001 (Garner *et al*. 2005). In the British Virgin Islands, annual nest numbers have increased in Tortola from zero to six nests per year in the late 1980s to 35 to 65 nests per year in the 2000s (TEWG 2007).

The most important nesting beach for leatherbacks in the eastern Atlantic lies in Gabon, Africa. It was estimated there were 30,000 nests along 60 miles of Mayumba Beach in southern Gabon during the 1999-2000 nesting season (Billes *et al*. 2000). Some nesting has been reported in Mauritania, Senegal, the Bijagos Archipelago of Guinea-Bissau, Turtle Islands and Sherbro Island of Sierra Leone, Liberia, Togo, Benin, Nigeria, Cameroon, Sao Tome and Principe, continental Equatorial Guinea, Islands of Corisco in the Gulf of Guinea and the Democratic Republic of the Congo, and Angola. In addition, a large nesting population is found on the island of Bioko (Equatorial Guinea) (Fretey *et al*. 2007). .

Hawksbill Sea Turtle

About 15,000 females are estimated to nest each year throughout the world with the Caribbean accounting for 20 to 30 percent of the world's hawksbill population. Only five regional populations remain with more than 1,000 females nesting annually (Seychelles, Mexico, Indonesia, and two in Australia) (Meylan and Donnelly 1999). Mexico is now the most important region for hawksbills in the Caribbean with about 3,000 nests per year (Meylan 1999). In the U.S. Pacific, hawksbills nest only on main island beaches in Hawaii, primarily along the east coast of the island of Hawaii. Hawksbill nesting has also been documented in American Samoa and Guam (NMFS and Service 1998c).

Kemp's Ridley Sea Turtle

Most Kemp's ridleys nest on the coastal beaches of the Mexican states of Tamaulipas and Veracruz, although a small number of Kemp's ridleys nest consistently along the Texas coast (TEWG 1998). In addition, rare nesting events have been reported in Alabama, Florida, Georgia, South Carolina, and North Carolina. Historical information indicates that tens of thousands of ridleys nested near Rancho Nuevo, Mexico, during the late 1940s (Hildebrand 1963). The Kemp's ridley population experienced a devastating decline between the late 1940s and the mid 1980s. The total number of nests per nesting season at Rancho Nuevo remained below 1,000 throughout the 1980s, but gradually began to increase in the 1990s. In 2009, 16,273 nests were documented along the 18.6 miles of coastline patrolled at Rancho Nuevo, and the total number of nests

documented for all the monitored beaches in Mexico was 21,144 (Service 2009). In 2010, a total of 13,302 nests were documented in Mexico (Service 2010). In addition, 207 and 153 nests were recorded during 2009 and 2010, respectively, in the U.S., primarily in Texas.

Status and distribution

Loggerhead Sea turtle

Five recovery units have been identified in the Northwest Atlantic based on genetic differences and a combination of geographic distribution of nesting densities, geographic separation, and geopolitical boundaries (NMFS and Service 2008). Recovery units are subunits of a listed species that are geographically or otherwise identifiable and essential to the recovery of the species. Recovery units are individually necessary to conserve genetic robustness, demographic robustness, important life history stages, or some other feature necessary for long-term sustainability of the species. The five recovery units identified in the Northwest Atlantic (**Figure 2**) are:

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; and

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).

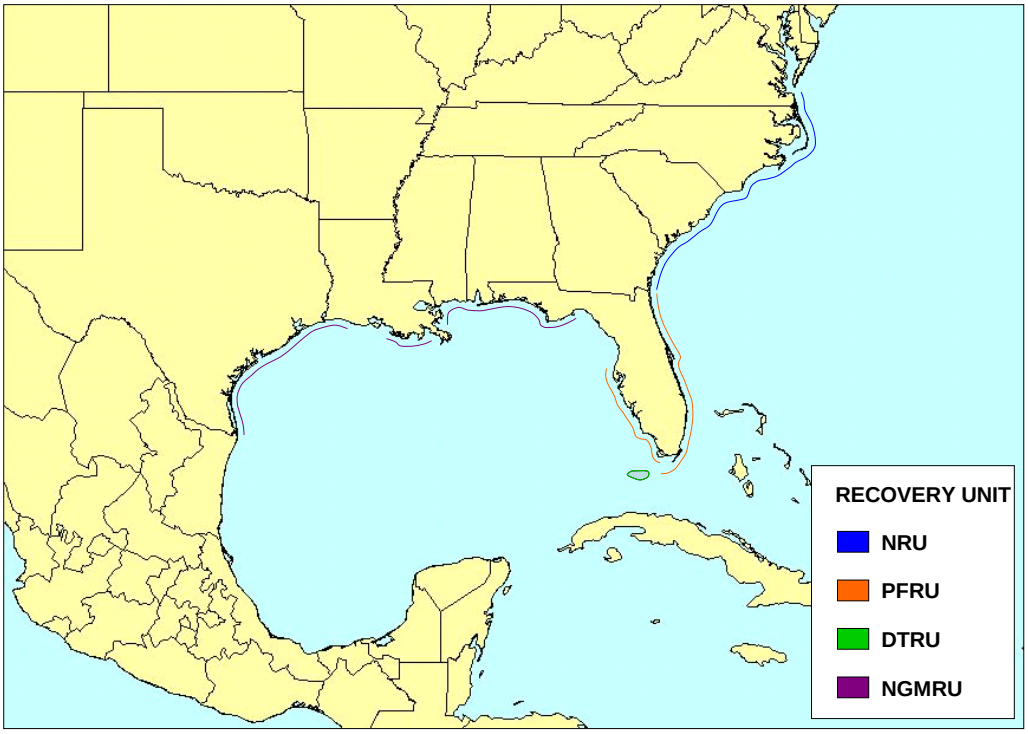

Figure 2. Map of the distribution of the loggerhead recovery units.

The mtDNA analyses show that there is limited exchange of females among these recovery units (Ehrhart 1989, Foote *et al.* 2000, NMFS 2001, Hawkes *et al.* 2005). 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 GCRU that nest at Quintana Roo, Mexico (Encalada *et al.* 1999, Nielsen *et al*. 2012).

Nuclear DNA analyses show that there are no substantial subdivisions across the loggerhead nesting colonies in the southeastern U.S. 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 (NMFS and Service 2008), 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 1.3 percent annually. Nest totals from aerial surveys conducted by the South Carolina Department of Natural Resources showed a 1.9 percent 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 (NMFS and Service 2008).

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) (FWC 2008d). 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 INBS sites surveyed with constant effort over time. In 1979, the Statewide Nesting Beach Survey (SNBS) program was initiated to document the total distribution, seasonality, and abundance of sea turtle nesting in Florida. In 1989, the INBS program was initiated in Florida to measure seasonal productivity, allowing comparisons between beaches and between years (FWC 2009b). Of the 190 SNBS surveyed areas, 33 participate in the INBS program (representing 30 percent of the SNBS beach length).

INBS nest counts from 1989–2010 show a shallow decline. However, recent trends (1998–2010) in nest counts have shown a 25 percent decline, with increases only observed in the most recent 6-year period, 2008–2013 although there was no trend observed (FWC/FWRI 2014). The analysis that reveals this decline uses nest-count data from 345 representative Atlantic-coast index zones (total length = 187 miles) and 23 representative zones on Florida's southern Gulf coast (total length = 14.3 miles). The spatial and temporal coverage (annually, 109 days and 368 zones) accounted for an average of 70 percent of statewide loggerhead nesting activity between 1989 and 2010.

The NGMRU is the third largest nesting assemblage among the four U.S. recovery units. Nesting surveys conducted on approximately 186 miles 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; FWC 2008d). 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 (FWC 2008d). A log-linear regression showed a significant declining trend of 4.7 percent annually (NMFS and Service 2008).

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, (nine 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) (FWC 2008d). 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 SNBS program. There are nine 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 (NMFS and Service 2008).

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 and Yucatán, 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 (NMFS and Service 2008). Other smaller nesting populations have experienced declines over the past few decades (e.g., Amorocho 2003).

Recovery Criteria (only the Demographic Recovery Criteria are presented below; for the Listing Factor Recovery Criteria, please see NMFS and Service 2008)

1. Number of Nests and Number of Nesting Females
    a. Northern Recovery Unit
        i. There is statistical confidence (95 percent) that the annual rate of increase over a generation time of 50 years is 2 percent or greater resulting in a total annual number of nests of 14,000 or greater for this recovery unit (approximate distribution of nests is North Carolina =14 percent [2,000 nests], South Carolina =66 percent [9,200 nests], and Georgia =20 percent [2,800 nests]); and

ii. 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
   i. There is statistical confidence (95 percent) that the annual rate of increase over a generation time of 50 years is statistically detectable (one percent) resulting in a total annual number of nests of 106,100 or greater for this recovery unit; and
   ii. 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
   i. There is statistical confidence (95 percent) that the annual rate of increase over a generation time of 50 years is three percent or greater resulting in a total annual number of nests of 1,100 or greater for this recovery unit; and
   ii. 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
   i. There is statistical confidence (95 percent) that the annual rate of increase over a generation time of 50 years is three percent 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 Florida= 92 percent [3,700 nests] and Alabama =8 percent [300 nests]); and
   ii. 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
   i. 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, Bahamas) has increased over a generation time of 50 years; and
   ii. 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, across the foraging range is established and monitoring is implemented to measure abundance. There is statistical confidence (95 percent) 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.

The Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle was signed in 2008 (NMFS and Service 2008), and the Recovery Plan for U.S. Pacific Populations of the Loggerhead Turtle was signed in 1998 (NMFS and Service 1998e).

Green Sea Turtle

Annual nest totals documented as part of the Florida SNBS program from 1989-2008 have ranged from 435 nests laid in 1993 to 12,752 in 2007. The nest count for 2013 was more than twice the count from 2007 with a total of 36,195 nests recorded (http://myfwc.com/research/wildlife/sea-turtles/nesting/statewide/). Nesting occurs in 26 counties with a peak along the east coast, from Volusia through Broward Counties. Although the SNBS program provides information on distribution and total abundance statewide, it cannot be used to assess trends because of variable survey effort. Therefore, green turtle nesting trends are best assessed using standardized nest counts made at INBS sites surveyed with constant effort over time (1989-2009). Green sea turtle nesting in Florida is increasing based on 19 years (1989-2009) of INBS data from throughout the state (FWC 2009a). 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 Act afforded 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 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 in Endangered Species of Wild Fauna and Flora (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 if, 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 must be based on standardized surveys;

2. At least 25 percent (65 miles) of all available nesting beaches (260 miles) is in public ownership and encompasses 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; and

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

The Recovery Plan for U.S. Population of Atlantic Green Turtle was signed in 1991 (NMFS and Service 1991), the Recovery Plan for U.S. Pacific Populations of the Green Turtle was signed in 1998 (NMFS and Service 1998b), and the Recovery Plan for U.S. Pacific Populations of the East Pacific Green Turtle was signed in 1998 (NMFS and Service 1998a).

Leatherback Sea Turtle

Declines in leatherback nesting have occurred over the last two decades along the Pacific coasts of Mexico and Costa Rica. The Mexican leatherback nesting population, once considered to be the world's largest leatherback nesting population (historically estimated to be 65 percent of the worldwide population), is now less than one percent of its estimated size in 1980. Spotila *et al.* (1996) estimated the number of leatherback sea turtles nesting on 28 beaches throughout the world from the literature and from communications with investigators studying those beaches. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on these beaches with a lower limit of about 26,200, and an upper limit of about 42,900. This is less than one-third the 1980 estimate of 115,000. Leatherbacks are rare in the Indian Ocean and in very low numbers in the western Pacific Ocean. The largest population is in the western Atlantic. Using an age-based demographic model, Spotila *et al.* (1996) determined that leatherback populations in the Indian Ocean and western Pacific Ocean cannot withstand even moderate levels of adult mortality and that the Atlantic populations are being exploited at a rate that cannot be sustained. They concluded that leatherbacks are on the road to extinction and further population declines can be expected unless action is taken to reduce adult mortality and increase survival of eggs and hatchlings.

In the U.S., nesting populations occur in Florida, Puerto Rico, and the U.S. Virgin Islands. In Florida, the SNBS program documented an increase in leatherback nesting numbers from 98 nests in 1988 to between 800 and 900 nests per season in the early 2000s (FWC 2009a, Stewart and Johnson 2006). Although the SNBS program provides information on distribution and total abundance statewide, it cannot be used to assess trends because of variable survey effort. Therefore, leatherback nesting trends are best assessed using standardized nest counts made at INBS sites surveyed with constant effort over time (1989-2009). An analysis of the INBS data has shown a substantial increase in leatherback nesting in Florida since 1989 (FWC 2009b, TEWG Group 2007).

Recovery Criteria

The U.S. Atlantic population of leatherbacks can be considered for delisting if the following conditions are met:

1. The adult female population increases over the next 25 years, as evidenced by a statistically significant trend in the number of nests at Culebra, Puerto Rico, St. Croix, U.S. Virgin Islands, and along the east coast of Florida;

2. Nesting habitat encompassing at least 75 percent of nesting activity in U.S. Virgin Islands, Puerto Rico, and Florida is in public ownership; and.

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

The Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic, and Gulf of Mexico was signed in 1992 (NMFS and Service 1992), and the Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle was signed in 1998 (NMFS and Service 1998d).

Hawksbill Sea Turtle

The hawksbill sea turtle has experienced global population declines of 80 percent or more during the past century and continued declines are projected (Meylan and Donnelly 1999). Most populations are declining, depleted, or remnants of larger aggregations. Hawksbills were previously abundant, as evidenced by high-density nesting at a few remaining sites and by trade statistics.

Recovery Criteria

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

1. The adult female population is increasing, as evidenced by a statistically significant trend in the annual number of nests on at least five index beaches, including Mona Island and Buck Island Reef National Monument;

2. Habitat for at least 50 percent of the nesting activity that occurs in the U.S. Virgin Islands and Puerto Rico is protected in perpetuity;

3. Numbers of adults, subadults, and juveniles are increasing, as evidenced by a statistically significant trend on at least five key foraging areas within Puerto Rico, U.S. Virgin Islands, and Florida; and

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

The Recovery Plan for the Hawksbill Turtle in the U.S. Caribbean, Atlantic, and Gulf of Mexico was signed in 1993 (NMFS and Service 1993), and the Recovery Plan for U.S. Pacific Populations of the Hawksbill Turtle was signed in 1998 (NMFS and Service 1998c).

Kemp's Ridley Sea Turtle

Today, under strict protection, the population appears to be in the early stages of recovery. The recent nesting increase can be attributed to full protection of nesting females and their nests in Mexico resulting from a binational effort between Mexico and the U.S. to prevent the extinction of the Kemp's ridley, and the requirement to use Turtle Excluder Devices (TEDs) in shrimp trawls both in the U.S. and Mexico.

The Mexico government also prohibits harvesting and is working to increase the population through more intensive law enforcement, by fencing nest areas to diminish natural predation, and by relocating most nests into corrals to prevent poaching and predation. While relocation of nests into corrals is currently a necessary management measure, this relocation and concentration of eggs into a "safe" area is of concern since it can reduce egg viability.

Recovery Criteria

The goal of the recovery plan is for the species to be reduced from endangered to threatened status. The Recovery Team members feel that the criteria for a complete removal of this species from the endangered species list need not be considered now, but rather left for future revisions of the plan. Complete removal from the federal list would certainly necessitate that some other instrument of protection, similar to the MMPA, be in place and be international in scope. Kemp's ridley can be considered for reclassification to threatened status when the following four criteria are met:

1. Continuation of complete and active protection of the known nesting habitat and the waters adjacent to the nesting beach (concentrating on the Rancho Nuevo area) and continuation of the bi-national protection project;

2. Elimination of mortality from incidental catch in commercial shrimping in the U.S. and Mexico through the use of TEDs and achievement of full compliance with the regulations requiring TED use;

3. Attainment of a population of at least 10,000 females nesting in a season; and

4. Successful implementation of all priority one recovery tasks in the recovery plan.

The Recovery Plan for the Kemp's Ridley Sea Turtle was signed in 1992 (Service and NMFS 1992). Significant new information on the biology and population status of Kemp's ridley has become available since 1992. Consequently, a full revision of the recovery plan has been completed by the Service and NMFS. The Bi-National Recover Plan for the Kemp's Ridley Sea

turtle (2011) provides updated species biology and population status information, objective and measurable recovery criteria, and updated and prioritized recovery actions.

Common threats to sea turtles in Florida

Anthropogenic 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 (*Solenopsis* spp.), feral hogs (*Sus scrofa*), dogs (*Canis familiaris),* and an increased presence of native species (e.g., raccoons (*Procyon lotor*), armadillos (*Dasypus novemcinctus*), and opossums (*Didelphis virginiana*)), which raid nests 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 or impingement; entanglement in debris; ingestion of marine debris; marina and dock construction and operation; boat collisions; and poaching and fishery interactions. On April 20, 2010, an explosion and fire on the Mobile Offshore Drilling Unit *Deepwater Horizon* MC252 occurred approximately 50 miles southeast of the Mississippi Delta. A broken well head at the sea floor resulted in a sustained release of oil, estimated at 35,000 and 60,000 barrels per day. On July 15, the valves on the cap were closed, which effectively shut in the well and all sub-sea containment systems. Damage assessment from the sustained release of oil is currently ongoing and the Service does not have a basis at the present time to predict the complete scope of effects to sea turtles range-wide.

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.

Analysis of the species/critical habitat likely to be affected

The threatened loggerhead sea turtle, the endangered green sea turtle, the endangered leatherback sea turtle, the endangered hawksbill sea turtle, and the endangered Kemp's ridley sea turtle are currently listed because of their reduced population sizes caused by overharvest and habitat loss with continuing anthropogenic threats from commercial fishing, disease, and degradation of remaining habitat. The proposed action has the potential to adversely affect nesting females of these species, their nests, and hatchlings on all nesting beaches where shore protection activities (including the placement of compatible sediment, repair or replacement of groins and jetties, and navigation channel maintenance on the beaches of the Atlantic and Gulf coasts of Florida) occur.

The Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) share Federal jurisdiction for sea turtles under the Act. The Service has responsibility for sea turtles on the nesting beach. NMFS has jurisdiction for sea turtles in the marine environment.

In accordance with the Act, the Service completes consultations with all Federal agencies for actions that may adversely affect sea turtles on the nesting beach. The Service's analysis only addresses activities that may impact nesting sea turtles, their nests and eggs, and hatchlings as they emerge from the nest and crawl to the sea. NMFS assesses and consults with Federal agencies concerning potential impacts to sea turtles in the marine environment, including updrift and downdrift nearshore areas affected by sand placement projects on the beach.

The proposed action has the potential to adversely affect nesting females, nests, and hatchlings within the proposed project area. Potential effects include destruction of nests deposited within the boundaries of the proposed project, harassment as a result of construction activities in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches; disorientation of hatchling turtles resulting from project lighting on beaches adjacent to the construction area as they emerge from the nest and crawl to the water; disorientation that occurs after project construction due to landward lights impacting the elevated berm; and 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. The effects of the proposed action on sea turtles will be considered further in the remaining sections of this biological opinion.

Some individuals in a population are more "valuable" than others in terms of the number of offspring they are expected to produce. An individual's potential for contributing offspring to future generations is its reproductive value. Because of delayed sexual maturity, reproductive longevity, and low survivorship in early life stages, nesting females are of high value to a population. The loss of a nesting female in a small recovery unit would represent a significant loss to the recovery unit. The reproductive value for a nesting female has been estimated to be approximately 253 times greater than an egg or a hatchling (NMFS and Service 2008). However, the SPBO includes avoidance and minimization measures that reduce the possibility of mortality of a nesting female on the beach as a result of the project. Therefore, we do not anticipate the loss of any nesting females on the beach as a result of the activities listed in this SPBO.

Sand placement projects are anticipated to result in decreased nesting and loss of nests that do get laid within the project area for two subsequent nesting seasons following the completion of the proposed sand placement. However, it is important to note that it is unknown whether nests that would have been laid in a project area during the two subsequent nesting seasons had the project not occurred are actually lost from the population or if nesting is simply displaced to adjacent beaches. Regardless, eggs and hatchlings have a low reproductive value; each egg or hatchling has been estimated to have only 0.004 percent of the value of a nesting female (NMFS and Service

2008). Thus, even if the majority of the eggs and hatchlings that would have been produced on the project beach are not realized for up to 2 years following project completion, the Service would not expect this loss to have a significant effect on the recovery and survival of the species, for the following reasons: 1) some nesting is likely just displaced to adjacent non-project beaches, 2) not all eggs will produce hatchlings, and 3) destruction and/or failure of nests will not always result from a sand placement project. A variety of natural and unknown factors negatively affect incubating egg clutches, including tidal inundation, storm events, and predation.

During project construction, direct mortality of the developing embryos in nests within the project area may occur for nests that are missed and not relocated. The exact number of these missed nests is not known. However, in two separate monitoring programs on the east coast of Florida where hand digging was performed to confirm the presence of nests and thus reduce the chance of missing nests through misinterpretation, trained observers still missed about 6 to 8 percent of the nests because of natural elements (Martin 1992, Ernest and Martin 1993). This must be considered a conservative number, because nests missed during surveys are not always discovered after hatching. In another study, Schroeder (1994) found that even under the best of conditions, about 7 percent of nests can be misidentified as false crawls by highly experienced sea turtle nest surveyors. Missed nests are usually identified by signs of hatchling emergences in areas where no nest was previously documented. Signs of hatchling emergence are very easily obliterated by the same elements that interfere with detection of nests.

In the U.S., consultations with the Service have included military missions and operations, beach nourishment and other shoreline protection projects, and actions related to protection of coastal development on sandy beaches along the coast. Much of the Service's section 7 consultation involves beach nourishment projects. A list of the Service's consultations completed over the last 5 years is included in Appendix A. The Act does not require entities conducting projects with no Federal nexus to apply for a section 10(a)(1)(B) permit. This is a voluntary process and is applicant driven. Section 10(a)(1)(A) permits are scientific permits that include activities that would enhance the survival and conservation of a listed species. Those permits are not listed as they are expected to benefit the species and are not expected to contribute to the cumulative take assessment.

A list of completed NMFS consultations is included in Appendix B.

ENVIRONMENTAL BASELINE

Status of the species/critical habitat within the action area

INBS nest counts represent approximately 69 percent of known loggerhead nesting in Florida, 74 percent of known green turtle nesting, and 34 percent of known leatherback nesting (FWC 2009a). The INBS program was established with a set of standardized data-collection criteria to measure seasonal nesting, and to allow accurate comparisons between both beaches and years. The reliability of these comparisons results from the uniformity of beach-survey effort in space and time, and from the specialized annual training of beach surveyors. Under the core INBS program,

178 miles of nesting beach have been divided into zones, known as core index zones, averaging 0.5 mile in length. These beaches are monitored daily beginning May 15 and ending August 31. On all index beaches, researchers record nests and nesting attempts by species, the location of each nest, and the date each nest was laid.

Nesting surveys begin at or just before sunrise. Turtle crawls are identified as a true nesting crawl or false crawl (*i.e.*, nonnesting emergence). Nests are marked with stakes and some are surrounded with surveyor flagging tape and, if needed, screened or caged to prevent predation. The marked nests are monitored throughout the incubation period for storm damage, predation, hatching activity and hatching and emerging success. Nest productivity surveys may continue into mid-November depending on nest incubation periods. All monitoring is conducted in accordance with the FWC's Marine Turtle Conservation Guidelines.

Loggerhead Sea Turtle

Five loggerhead sea turtle recovery units have been identified in the Northwest Atlantic (NMFS and Service 2008). Mitochondrial DNA analyses show that there is limited exchange of females among these recovery units (Foote *et al*. 2000, NMFS 2001, Hawkes *et al*. 2005). However, nuclear DNA analyses show that there are no substantial subdivisions across the loggerhead nesting colonies in the southeastern U.S. Male-mediated gene flow appears to be keeping the subpopulations genetically similar on a nuclear DNA level (Francisco-Pearce 2001). The NRU and NGMRU are believed to play an important role in providing males to mate with females from the more female-dominated recovery units.

Two (NGMRU and PFRU) of the five nesting subpopulations occur within the proposed Action Area. Northwest Florida, which accounts for 92 percent of the NGMRU in nest numbers, consists of approximately 234 miles of nesting shoreline. The PFRU makes up 1,166 miles of shoreline and consists of approximately was 69,982 nests per year (2008 to 2012)..

Recovery Units	**Nesting Range**
NGMRU	Escambia through Franklin Counties
PFRU	Pinellas through Nassau Counties

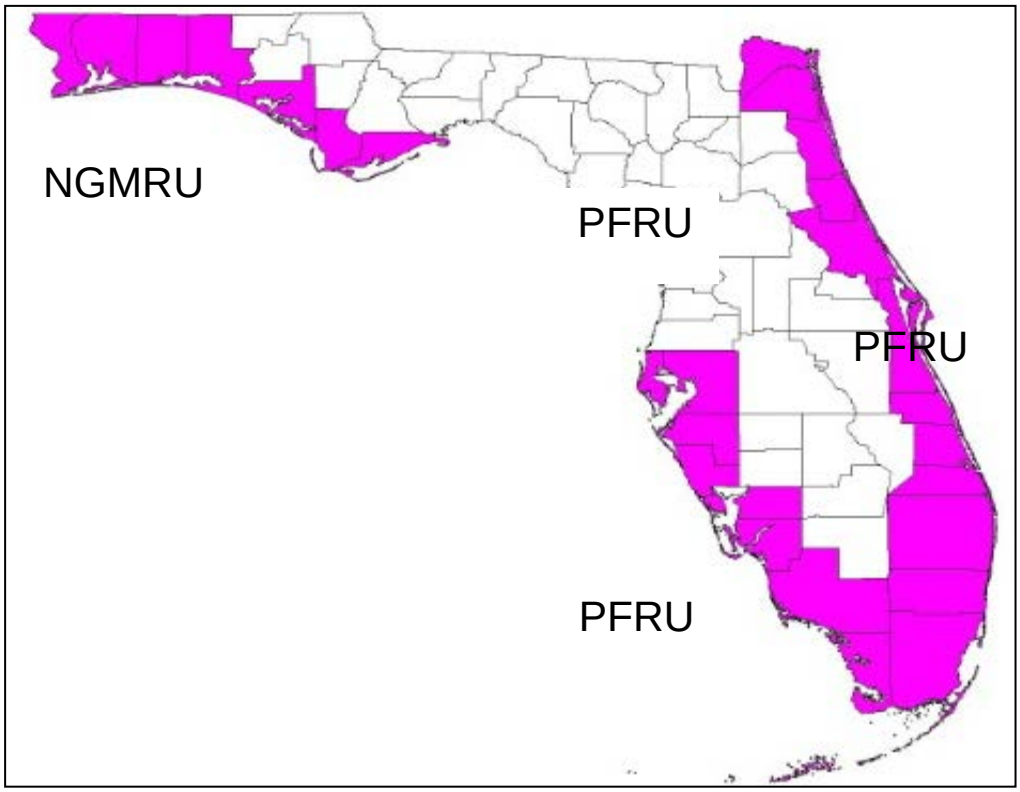

Figure 3. Distribution of loggerhead sea nesting in the PFRU and NGMRU in Florida.

The main loggerhead sea turtle nesting and hatching season throughout Florida is shown in **Table 5.**

Table 6. Loggerhead sea turtle nesting and hatching season for Florida.

AREA	COUNTIES	SEA TURTLE NESTING SEASON THROUGH HATCHING SEASON
Northern Gulf of Mexico	Escambia through Pasco	May 1 through October 31
Southern Gulf of Mexico	Pinellas through Monroe	April 1 through November 30
Southern Florida Atlantic	Brevard through Miami-Dade	March 1 through November 30
Northern Florida Atlantic	Nassau through Volusia	April 15 through November 30

An updated analysis by FWC/FWRI reveals a shallow decline in loggerhead nest numbers around the State of Florida based on INBS nest counts from 1989 through 2010 (FWC/FWRI 2010). Analysis of nest counts over the last six years (2009 through 2013) have found no trend, although when added to the data from 1989, the overall change is an increase in loggerhead nests since 1989 (FWC/FWRI 2014). The five year average (2008 to2012) for the PFRU was 69,982 nests. The five-year average (2008 to 2012) for the NGMRU was 966 nests.

Sea turtles play a vital role in maintaining healthy and productive ecosystems. Nesting sea turtles introduce large quantities of nutrients from the marine ecosystem to the beach and dune system (Bouchard and Bjorndal 2000). In the U.S., loggerheads play a particularly important role in this regard due to their greater nesting numbers. The nutrients they leave behind on the nesting beaches in the form of eggs and eggshells play an important role for dune vegetation and terrestrial predator populations (Bouchard and Bjorndal 2000). In a study at Melbourne Beach, Florida, Bouchard and Bjorndal (2000) estimated that only 25 percent of the organic matter introduced into nests by loggerheads returned to the ocean as hatchlings. They found that 29-40 percent of all nutrients were made available to detritivores, decomposers, and plants, while 26-31 percent of all nutrients were consumed by nest predators. Thus, all loggerhead recovery units play a vital role in the maintenance of a healthy beach and dune ecosystem within their geographic distribution.

Green Sea Turtle

Green turtle nest numbers are increasing in Florida with a record number of nests being recorded during the 2013 season (FWC 2014). The five year average (2008 to 2012) for green turtles within the action area was 10,384 nests. The number of green turtle nests recorded in Florida during the 2013 nesting season was a record high of 36,195.

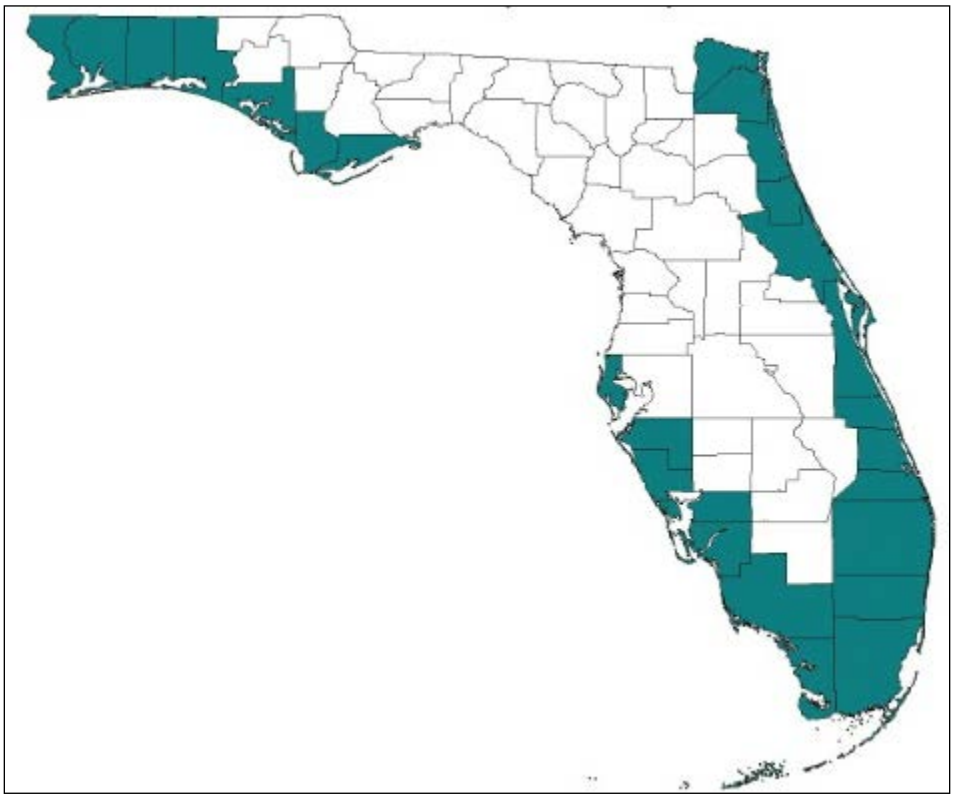

Figure 4. Distribution of green sea turtle nesting in Florida.

The main green sea turtle nesting and hatching season throughout Florida is shown in **Table 6**.

Table 7. Green sea turtle nesting and hatching season for Florida.

AREA	COUNTIES	SEA TURTLE NESTING SEASON THROUGH HATCHING SEASON
Northern Gulf of Mexico	Escambia through Pasco	May 15 through October 31
Southern Gulf of Mexico	Pinellas through Monroe	May 15 through October 31
Southern Florida Atlantic	Brevard through Miami-Dade	May 1 through November 30
Northern Florida Atlantic	Nassau through Volusia	May 15 through November 15

Leatherback Sea Turtle

Leatherback nest numbers are increasing in Florida with a record number of leatherback nests recorded during the 2009 season (FWC 2009a). The five year average (2008 to 2012) for leatherback sea turtles within the action area was 1,435 nests with a total of 896 nests recorded in 2013.

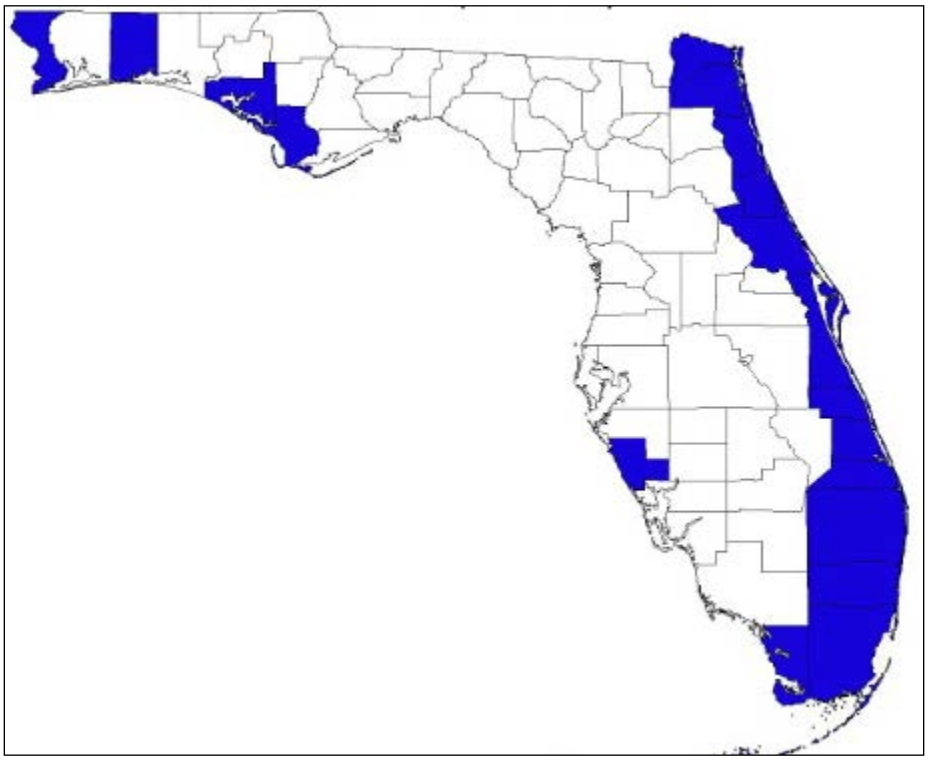

Figure 5. Distribution of leatherback sea turtle nesting in Florida.

The main leatherback sea turtle nesting and hatching season throughout Florida is shown in **Table 7**.

Table 8. Leatherback sea turtle nesting and hatching season for Florida.

AREA	COUNTIES	SEA TURTLE NESTING SEASON THROUGH HATCHING SEASON
Northern Gulf of Mexico	Escambia through Pasco	May 1 through September 30
Southern Florida Atlantic	Brevard through Miami-Dade	February 15 through November 30
Northern Florida Atlantic	Nassau through Volusia	April 15 through September 30

Hawksbill Sea Turtle

Forty-six hawksbill nests have been documented in Florida from 1979-2013 in Volusia, Martin, Palm Beach, Broward, Miami-Dade, Monroe, and Manatee counties (FWC/FWRI 2014a). The hawksbill sea turtle nesting and hatching season throughout Florida is shown in **Table 8**.

Table 9. Hawksbill sea turtle nesting and hatching season for Florida.

AREA	COUNTIES	SEA TURTLE NESTING SEASON THROUGH HATCHING SEASON
Southern tip of Florida	Monroe	June 1 through December 31
Southern Florida Atlantic	Brevard through Miami-Dade	June 1 through December 31
Northeast Florida	Volusia	June 1 through December 31
Southwest Florida	Manatee	June 1 through December 31

Kemp's Ridley Sea Turtle

Eighty Kemp's ridley nests have been documented in Florida from 1979-2013 in Duval, Flagler, Volusia, Brevard, Martin, Palm Beach, Lee, Charlotte, Sarasota, Pinellas, Franklin, Gulf, Walton, Okaloosa, Santa Rosa, and Escambia counties (FWC/FWRI 2014).

Factors affecting species habitat within the action area

In accordance with the Act, the Service completes consultations with all federal agencies for actions that may adversely affect sea turtles. In Florida, consultations have included military missions and operations, beach nourishment and other shoreline protection, and actions related to protection of coastal development on sandy beaches of Florida's Atlantic Coast (Key West to

Fernandina/Kings Bay) and the Gulf Coast (Ten Thousand Islands to Alabama State Line) (**Appendix A**).

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 1990b). 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 of, 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, which 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, 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 in a natural state with no development landward of the sandy beach, 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 predevelopment 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 reestablished after periodic storms. While the beach itself moves landward during such storms, reconstruction or persistence of structures at their prestorm locations can result in a loss of nesting habitat.

The 2004 hurricane season was the most active storm season in Florida since weather records began in 1851. Hurricanes Charley, Frances, Ivan, and Jeanne, along with Tropical Storm Bonnie, damaged the beach and dune system, upland structures and properties, and infrastructure in the

majority of Florida's coastal counties. The cumulative impact of these storms exacerbated erosion conditions throughout the state.

The 2005 hurricane season was a record-breaking season with 27 named storms. Hurricanes Dennis, Katrina, Ophelia, Rita, and Wilma, and Tropical Storms Arlene and Tammy impacted Florida. The cumulative impact of these storms exacerbated erosion conditions in south and northwest Florida.

A common question is whether the 2004 and 2005 hurricane seasons contributed to reduced loggerhead nest numbers observed from 2004-2007. Although Florida has been subject to numerous hurricanes in recent years, these storm events cannot account for the recent decline (1998-2010) observed in the number of loggerhead nests on Florida beaches. The hurricanes have a very limited effect on nesting activity of adult female turtles. Because loggerheads that hatch on Florida beaches require some 20 to 30 years to reach maturity, storm impacts would not manifest themselves for many years. Moreover, hurricane impacts to nests tend to be localized and often occur after the main hatching season for the loggerhead is over (FWC 2008a).

Erosion

The designation of a Critically Eroded Beach is a planning requirement of the State's Beach Management Funding Assistance Program http://www.dep.state.fl.us/beaches/programs/becp/index.htm. 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 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 slightly erosional now, their inclusion is necessary for continuity of management of the coastal system or for the design integrity of adjacent beach management projects (FDEP 2009). 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.

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 (Philibosian 1976, Mann 1977, Witherington and Martin 1996). 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 to 2010 sea turtle nesting seasons in Florida, turtle hatchlings that were documented as being disoriented ranged from 44,828 to more than 64,000 hatchlings per year (**Table 9**) (FWC/FWRI 2014b). 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 (FWC 2007a).

Table 10. Documented disorientations along the Florida coast (FWC 2007a).

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	1,192	49,623	62
2009	1,274	44,828	42
2010	1,513	46,978	82

Predation

Predation of sea turtle eggs and hatchlings by native and introduced species occurs on almost all nesting beaches. Predation by a variety of predators can considerably decrease sea turtle nest hatching success. The most common predators in the southeastern U.S. are ghost crabs (*Ocypode quadrata*), raccoons, feral hogs, foxes (*Urocyon cinereoargenteus* and *Vulpes vulpes*), coyotes (*Canis latrans*), armadillos, and fire ants (Dodd 1988, Stancyk 1995). In the absence of nest protection programs in a number of locations throughout the southeast U.S., raccoons may depredate 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). In response to increasing predation of sea turtle nests by coyotes, foxes, hogs, and raccoons, multi-agency cooperative efforts have been initiated and are ongoing throughout Florida, particularly on public lands.

Driving on the Beach

The operation of motor vehicles on the beach affects sea turtle nesting by interrupting or striking a female turtle on the beach, headlights disorienting or misorienting emergent hatchlings, vehicles running over nests or hatchlings attempting to reach the ocean, and vehicle tracks traversing the beach which interfere with hatchlings crawling to the ocean. Hatchlings appear to 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 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 preemergent hatchlings (Mann 1977, Nelson and Dickerson 1987, Nelson 1988).

The physical changes and loss of plant cover caused by vehicles on dunes can lead to various degrees of instability, and therefore encourage dune migration. As vehicles move either up or down a slope, sand is displaced downward. Since the vehicles also inhibit plant growth, and open the area to wind erosion, dunes may become unstable, and begin to migrate. Unvegetated sand dunes may continue to migrate across stable areas as long as vehicle traffic continues. Vehicular traffic through dune breaches or low dunes on an eroding beach may cause an accelerated rate of overwash and beach erosion (Godfrey *et al.* 1978). If driving is required, the area where the least amount of impact occurs is the beach between the low and high tide water lines. Vegetation on the dunes can quickly reestablish provided the mechanical impact is removed.

In 1985, the Florida Legislature severely restricted vehicular driving on Florida's beaches, except that which is necessary for cleanup, repair, or public safety. This legislation also allowed an exception for five counties to continue to allow vehicular access on coastal beaches due to the availability of less than 50 percent of its peak user demand for off-beach parking. The counties affected by this exception are Volusia, St. Johns, Gulf, Nassau, and Flagler Counties, as well as limited vehicular access on Walton County beaches for boat launching.

Climate Change

The varying and dynamic elements of climate science are inherently long term, complex, and interrelated. Regardless of the underlying causes of climate change, glacial melting and expansion of warming oceans are causing sea level rise, although its extent or rate cannot as yet be predicted with certainty. At present, the science is not exact enough to precisely predict when and where climate impacts will occur. Although we may know the direction of change, it may not be possible to predict its precise timing or magnitude. These impacts may take place gradually or episodically in major leaps.

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 (2007a) describes changes in natural ecosystems with potential widespread 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 U.S. 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 2007c).

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 relative to the effects of global climate change on sea turtles and its designated critical habitat, 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.

Florida is one of the areas most vulnerable to the consequences of climate change. Sea level rise and the possibility of more intense hurricanes are the most serious threats to Florida potentially from climate change. Florida has over 1,350 miles of coastline, low-lying topography, and proximity to the hurricane-prone subtropical mid-Atlantic Ocean and Gulf of Mexico.

One of the most serious threats to Florida's coasts comes from the combination of elevated sea levels and intense hurricanes. Florida experiences more landings of tropical storms and hurricanes than any other state in the U.S. Storm surges due to hurricanes will be on top of elevated sea levels, tides, and wave action. As a result, barrier islands and low-lying areas of Florida will be more susceptible to the effects of storm surge. An important element of adaptation strategy is how to protect beaches, buildings and infrastructure against the effects of rising seas and wind, wave action, and storm surge due to hurricanes while maintaining viable nesting habitat along Florida's coasts.

Temperatures are predicted to rise from 1.6^{o}F to 9°F for North America by the end of this century (IPCC 2007a,b). Alterations of thermal sand characteristics could result in highly female-biased sex ratios because sea turtles exhibit temperature dependent sex determination (e.g., Glen and Mrosovsky 2004, Hawkes *et al*. 2008).

Along developed coastlines, and especially in areas where shoreline protection structures have been constructed to limit shoreline movement, rising sea levels will cause severe effects on nesting females and their eggs. Erosion control structures can result in the permanent loss of dry nesting beach or deter nesting females from reaching suitable nesting sites (National Research Council

1990a). Nesting females may deposit eggs seaward of the erosion control structures potentially subjecting them to repeated tidal inundation or washout by waves and tidal action.

Based on the present level of available information concerning the effects of global climate change on the status of sea turtles and their designated critical habitat, 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 their 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 sand placement activities. Short-term and temporary impacts to sea turtle nesting activities could result from project work occurring on the nesting beach during the nesting or hatching period, from changes in the physical characteristics of the beach from the placement of the sand including the profile and from sediment-induced changes in the nest incubation environment.

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, green, leatherback, hawksbill, and Kemp's ridley nesting females, their nests, nesting habitat, 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, diminish nesting success, and reduce hatching and emerging success. 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 three and seven 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 emergence success that could result from the sand placement activities being conducted at night during one nesting season, or during the earlier or later parts of two nesting seasons. Disturbance due to alterations of the incubation substrate and beach profile could persist for several years, depending on continued presence of placed sand in the nesting beach.

Disturbance intensity and severity: Depending on the amount (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 foredune 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 and sea turtle nests. 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. 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.

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 sand placement activities may increase the potential nesting area, significant negative impacts to sea turtles may result if protective measures are not incorporated during project construction. Sand placement activities 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, 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 seven percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder 1994).

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 emerging success of relocated nests with nests left in their original location, Moody (1998) found that hatching success was lower in relocated nests at nine of 12 beaches evaluated. In addition, emerging 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.

Equipment

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.

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 nesting females or 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 preemergent 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 limited to 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, work areas for the truck transport and bulldozer/bobcat equipment should be designated and marked.

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 2007a). 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 sand placement activity 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 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 the first nesting season after project construction and up to 542 percent the second year compared to prenourishment reports (Trindell *et al.* 2005).

Specific examples of increased lighting disorientations after a sand placement project include Brevard and Palm Beach Counties, Florida. A sand placement 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 (Trindell 2007). This same result was also documented in 2003 when another beach in Brevard County was nourished and the disorientations increased by 480 percent (Trindell 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 66 percent 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, 21 have passed beachfront lighting ordinances in addition to 58 municipalities (http://myfwc.com/media/418420/seaturtle_lightordmap.pdf). 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.

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).

Increased beachfront development

Pilkey and Dixon (1996) stated 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 noted 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 buildings 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.

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. 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 6**).

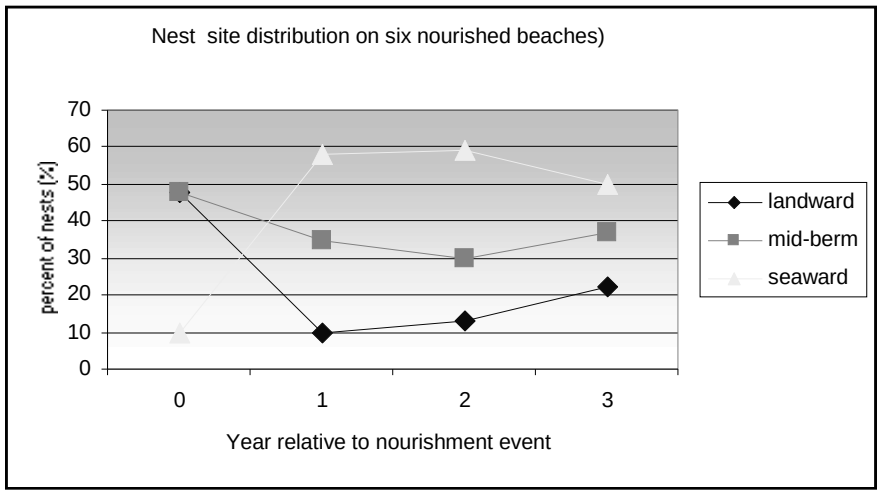

Figure 6. Review of sea turtle nesting site selection following nourishment (Trindell 2005).

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 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 should 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.

Escarpment formation

On nourished beaches, steep escarpments may develop along the water line interface as the beach adjusts 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.

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 miles 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 prenourished 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 result from the placement of nests near the seaward edge of the beach berm where dramatic profile changes, caused by erosion and scarping, occur as the beach equilibrates 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.

BEACH MICE

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/critical habitat description

The formal taxonomic classification of beach mouse subspecies follows the geographic variation in pelage and skeletal measurements documented by Bowen (1968). This peer-reviewed, published classification was also accepted by Hall (1981). Since the listing of the beach mice, further research concerning the taxonomic validity of the subspecific classification of beach mice has been initiated and/or conducted. Preliminary results from these studies support the separation of beach mice from inland forms, and support the currently accepted taxonomy (Bowen 1968) (*i.e.*, each beach mouse group represents a unique and isolated subspecies). Recent research using mitochondrial DNA data illustrates that Gulf Coast beach mouse subspecies form a well-supported and independent evolutionary cluster within the global population of the mainland or inland old field mice (Van Zant and Wooten 2006).

The old-field mouse (*Peromyscus polionotus)* is different in form and structure as well as being genetically diverse throughout its range in the southeastern U.S. (Bowen 1968, Selander *et al.* 1971). Currently there are 16 recognized subspecies of old-field mice (Hall 1981). Eight subspecies occupy coastal rather than inland habitat and are referred to as beach mice (Bowen 1968). Two existing subspecies of beach mouse and one extinct subspecies are known from the Atlantic coast of Florida and five subspecies live along the Gulf coast of Alabama and northwestern Florida.

Rivers and various inlets bisect the Gulf and Atlantic beaches and naturally isolate habitats in which the beach mice live. The outer coastline and barrier islands are typically separated from the mainland by lagoons, swamps, tidal marshes, and flatwood areas with hardpan soil conditions. However, these dispersal barriers are not absolute; sections of sand peninsulas may from time to time be cut off by storms and shift over time due to wind and current action. Human development has also fragmented the ranges of the subspecies. As a consequence of coastal development and the dynamic nature of the coastal environment; beach mouse populations are generally comprised of various disjunct populations.

<u>Atlantic Coast beach mice</u>

The southeastern beach mouse (SEBM) was listed as a threatened species under the Act in 1989 (54 *FR* 20598). Critical habitat was not designated for this subspecies. SEBM is also listed as threatened by the State of Florida. The original distribution of the SEBM was from Ponce Inlet, Volusia County, southward to Hollywood, Broward County, and possibly as far south as Miami in Miami-Dade County. It is currently restricted to Volusia, Brevard, and Indian River Counties. Formerly, this subspecies occurred along about 175 miles of Florida's southeast coast; it now occupies about 50 miles, a significant reduction in range (**Figure 7**).

This subspecies uses both beach dunes and inland areas of scrub vegetation. The most seaward vegetation typically consists of sea oats (*Uniola paniculata*), bitter panicgrass (*Panicum amarum*), railroad vine (*Ipomoea pes-caprae*), beach morning-glory (*Ipomoea stolonifera*), and camphorweed (*Heterotheca subaxillaris*). Further landward, vegetation is more diverse, including beach tea (*Croton punctatus*), pricklypear (*Opuntia humifusa*), saw palmetto (*Serenoa repens)*, wax myrtle (*Myrica cerifera)*, and sea grape (*Coccoloba uvifera*).

Anastasia Island beach mice

The Anastasia Island beach mouse (AIBM), was listed as endangered under the Act in 1989 (54 *FR* 20598). Critical habitat was not designated for the subspecies. AIBM is also listed as an endangered species by the State of Florida. The distribution of the AIBM has declined significantly, particularly in the northern part of its range. AIBM was historically known from the vicinity of the Duval-St. Johns County line southward to Matanzas Inlet, St. Johns County, Florida (Frank and Humphrey 1996). Included in their range, AIBM populations are found along 14.5 miles of Anastasia Island, mainly on 3.5 miles at Anastasia State Park (ASP) and one mile at Fort Matanzas National Monument (FMNM). AIBM have been found at low densities in dunes on the remainder of the island. Beach mice have also been located along sections of the 4.2 miles of dune habitat at Guana Tolomato Matanzas National Estuarine Research Reserve (GTMNERR)-Guana River. Anastasia Island is separated from the mainland of Florida to the west by extensive salt marshes and the Mantazas River, to the north by the St. Augustine Inlet, and to the south by the Matanzas Inlet which are both maintained and open. This has restricted the range of AIBM to 14.5 mile length of Anastasia Island and sections of GTMNERR-Guana River (**Figure 8**).

In 1992 to 1993, the Service funded the reintroduction of AIBM to GTMNERR in St. Johns County where historical habitat for the subspecies existed (Service 1993). GMTNERR-Guana River portion of the Reserve (4.0 miles of undeveloped beach) is nine miles north of the existing population of beach mice at ASP. Fifty-five mice (27 females and 28 males) were trapped at FMNM and ASP from September 24, to November 12, 1992, and placed in soft-release enclosures at the state park on September 27, and November 12, 1992. During follow-up trapping conducted in February 1993, beach mice occupied the entire 4.2-mile length of the park; 34 were captured and it was estimated that the population totaled 220. Quarterly trapping has been conducted since the reintroduction and mice have not been captured since September 2006. This may be a result of habitat loss alteration from storms or habitat conditions. Sneckenberger 2001 indicates that the scrub habitat found in the tertiary dunes provides a more stable level of food resources, which becomes crucial when food is scarce or nonexistent in the primary and secondary dunes. This suggests that access to primary, secondary, and scrub dune habitat is essential to beach mice at the individual level, which may be an issue for this population as A1A Highway separates/bisects the primary dune from the secondary dunes and scrub dune habitats.

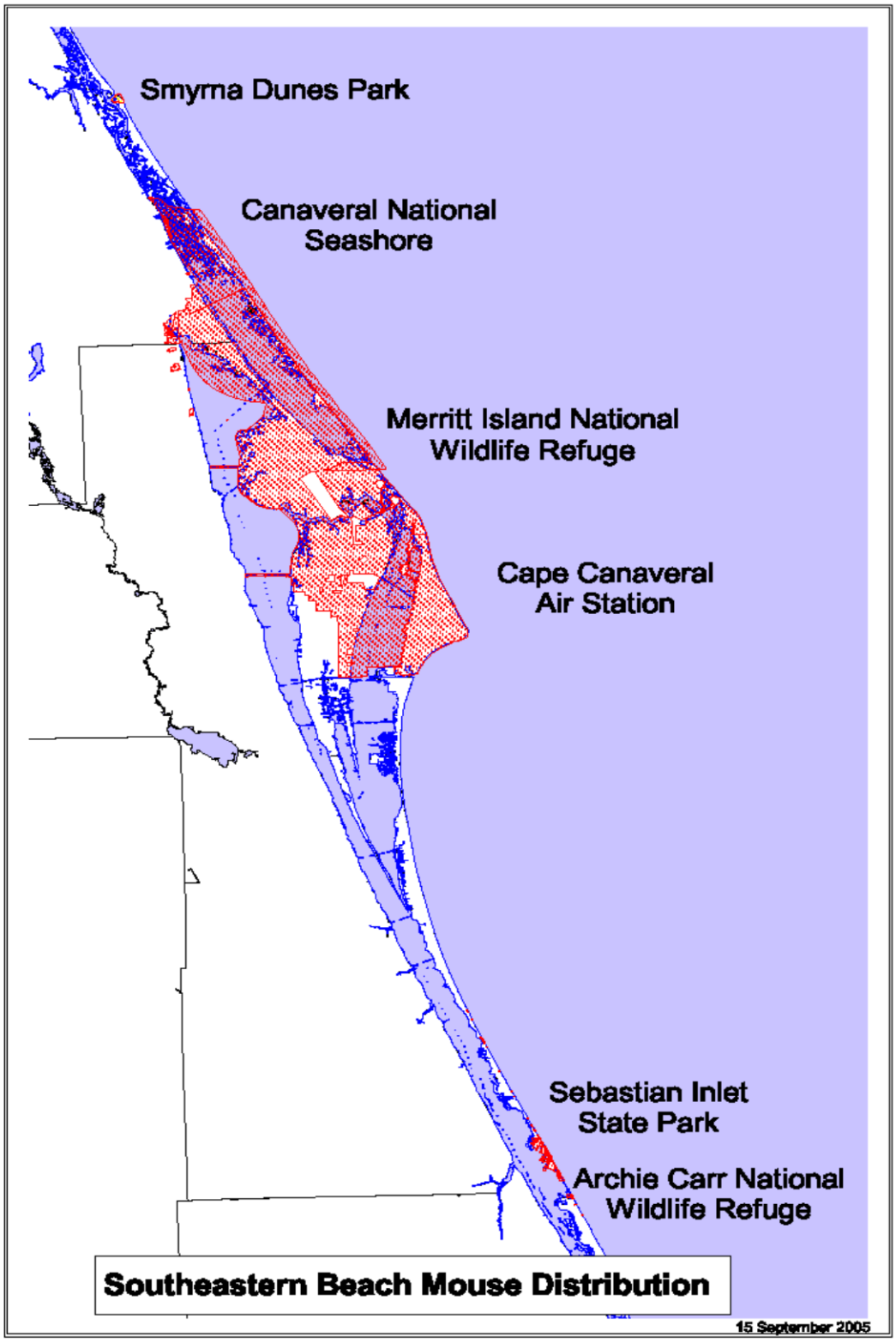

Figure 7. The distribution of the southeastern beach mouse.

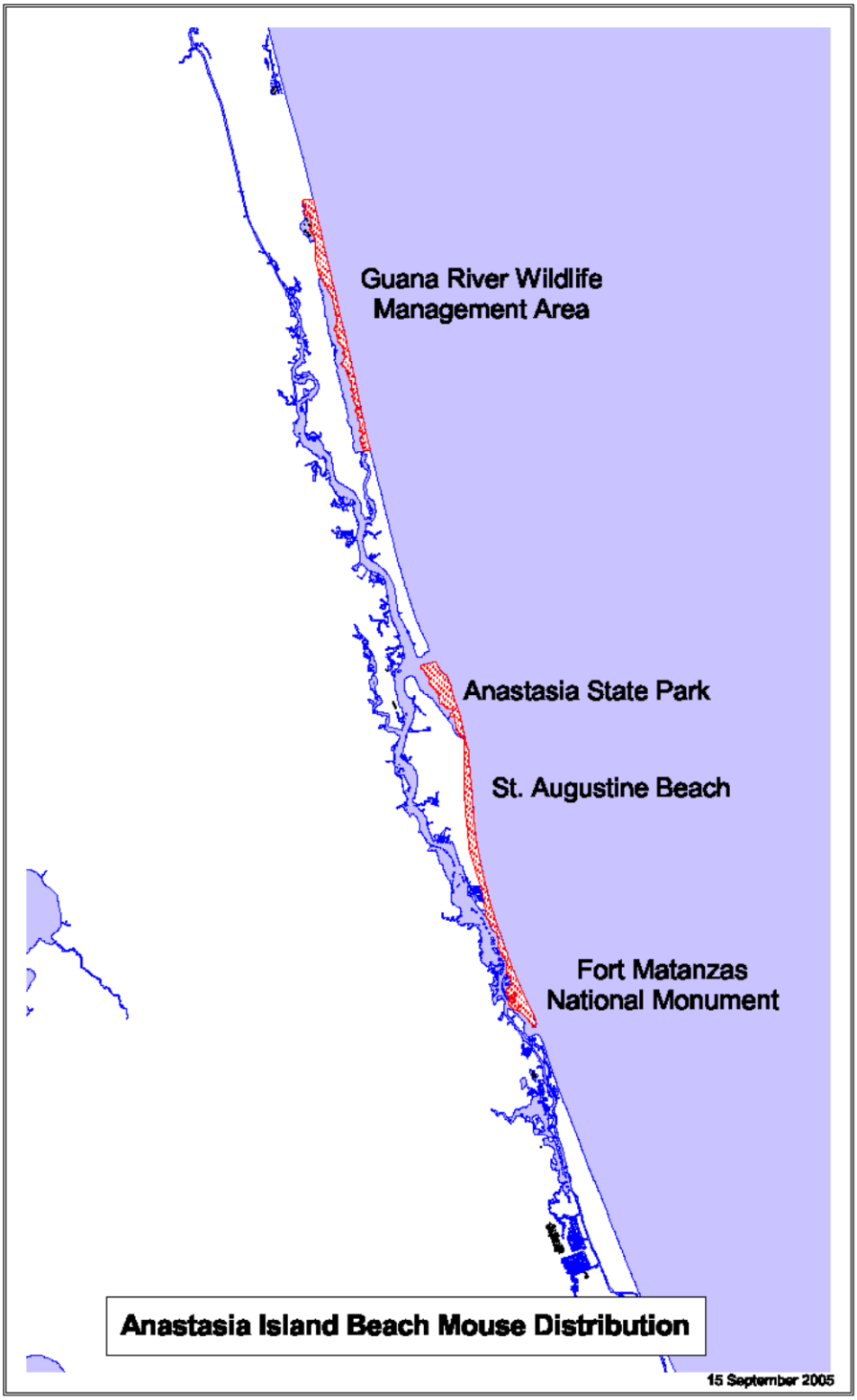

Figure 8. The distribution of the Anastasia Island beach mouse.

Gulf Coast Beach Mice

The CBM and the PKBM were listed with the Alabama beach mouse (ABM) (*Peromyscus polionotus ammobates*), as endangered species under the Act in 1985 (50 *FR* 23872). The SABM was listed under the Act in 1998 (63 *FR* 70053). CBM, SABM, and PKBM are also listed as endangered species by the State of Florida (FWC 2010). Critical habitat was designated for the CBM, and PKBM at the time of listing; however, critical habitat was revised in 2006 (71 *FR* 60238). Critical habitat was also designated for the SABM in 2006 (71 *FR* 60238).

The historical range of the CBM extended 53 miles between Destin Pass, Choctawhatchee Bay in Okaloosa County and East Pass in St. Andrew Bay, Bay County, Florida. PKBM historically ranged along the entire length of Perdido Key for 16.9 miles between Perdido Bay, Alabama (Perdido Pass) and Pensacola Bay, Florida (Bowen 1968). The historical range of the SABM extended 38 miles between Money Bayou in Gulf County, and Crooked Island at the East Pass of St. Andrews Bay, Bay County, Florida including the St. Joseph peninsula and the coastal mainland adjacent to St. Joseph Bay, Florida (**Figure 9**).

Critical habitat

Since the listing of the PKBM and CBM in 1985, research has refined previous knowledge of Gulf Coast beach mouse habitat requirements and factors that influence their use of habitat. Based on the current knowledge of the life history, biology, and ecology of the subspecies and the requirements of the habitat to sustain the essential life history functions of the subspecies, the primary constituent elements (PCE) of critical habitat for Gulf Coast beach mice consist of:

1. A contiguous mosaic of primary, secondary scrub vegetation, and dune structure, with a balanced level of competition and predation and few or no competitive or predaceous nonnative species present, that collectively provide foraging opportunities, cover, and burrow sites;

2. Primary and secondary dunes, generally dominated by sea oats that despite occasional temporary impacts and reconfiguration from tropical storms and hurricanes provide abundant food resources, burrow sites, and protection from predators;

3. Scrub dunes, generally dominated by scrub oaks, that provide food resources and burrow sites, and provide elevated refugia during and after intense flooding due to rainfall and/or hurricane induced storm surge;.

4. Functional, unobstructed habitat connections that facilitate genetic exchange, dispersal, natural exploratory movements, and recolonization of locally extirpated areas; and

5. A natural light regime within the coastal dune ecosystem, compatible with the nocturnal activity of beach mice, necessary for normal behavior, growth and viability of all life stages.

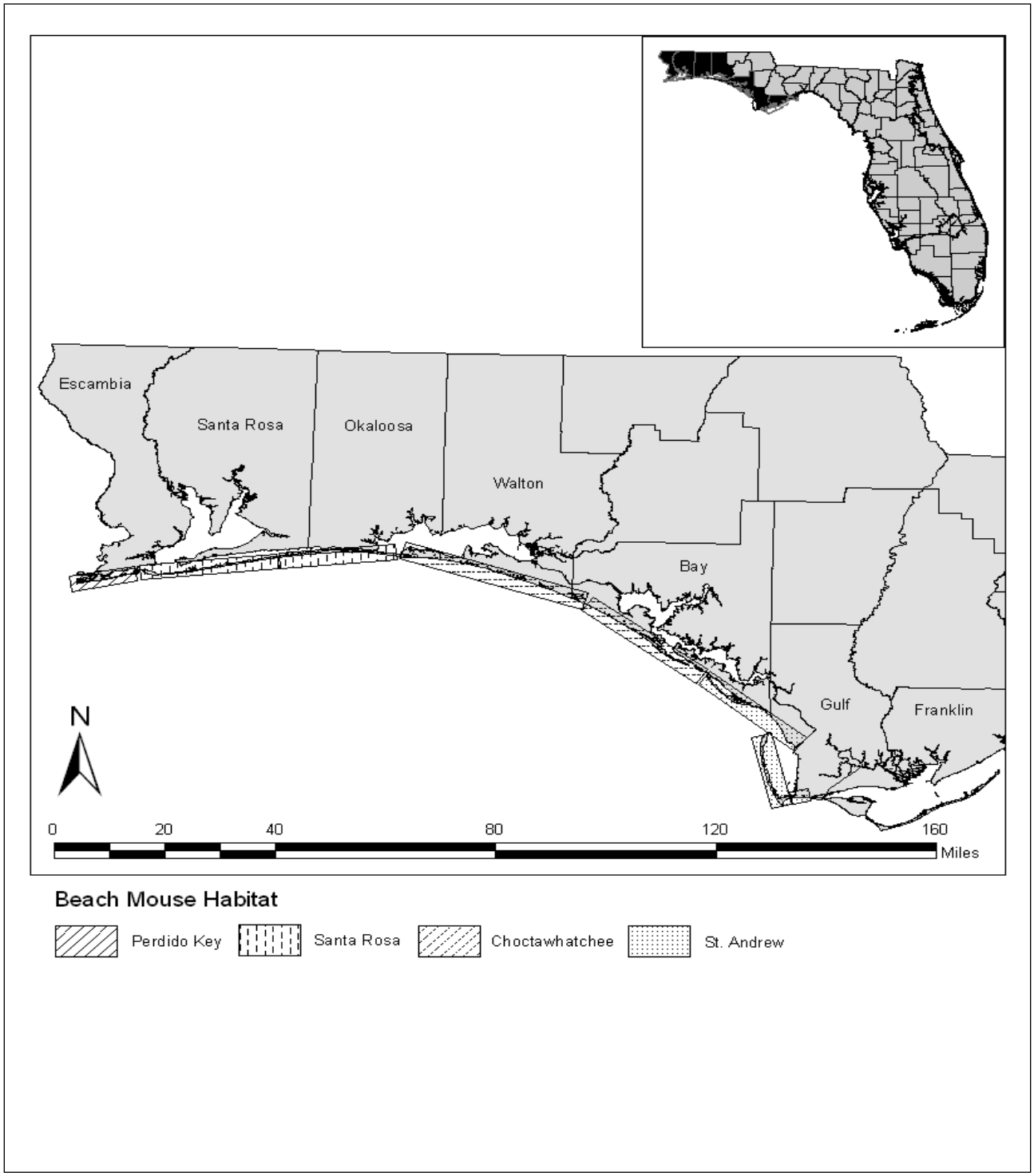

Figure 9. Historical range of Gulf Coast beach mouse subspecies.

Thirteen coastal dune areas (critical habitat units) in southern Alabama and the panhandle of Florida have been determined to be essential to the conservation of PKBM, CBM, and SABM and are designated as critical habitat (**Figures 10 through 12**). These 13 units include five units for PKBM, five units for CBM, and three units for the SABM. These units total 6,194 acres of coastal dunes, and include 1,300 acres for the PKBM in Escambia County, Florida and Baldwin County, Alabama (**Table 10**); 2,404 acres for the CBM, in Okaloosa, Walton, and Bay Counties, Florida (**Table 11**); and 2,490 acres for the SABM in Bay and Gulf Counties, Florida (**Table 12**).

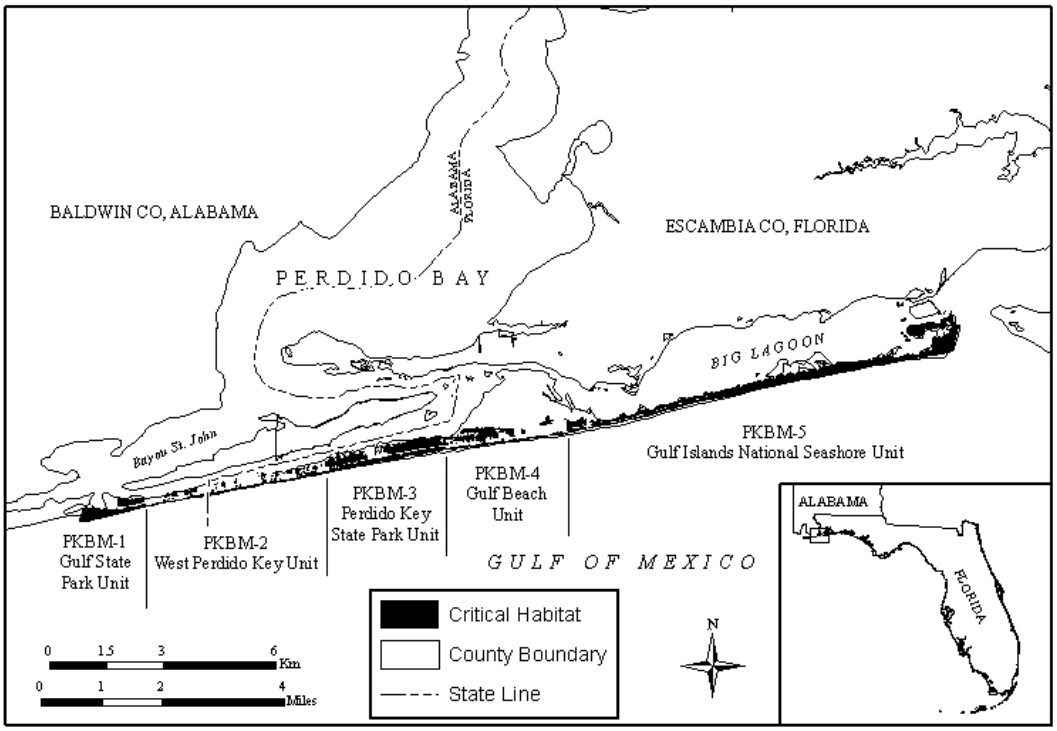

Figure 10. Critical habitat units designated for the Perdido Key beach mouse.

Table 11. Critical habitat units designated for the Perdido Key beach mouse.

Perdido Key Beach Mouse Critical Habitat Units	Federal Acres	State Acres	Local and Private Acres	Total Acres
1. Gulf State Park Unit	0	115	0	115
2. West Perdido Key Unit	0	0	147	147
3. Perdido Key State Park Unit	0	238	0	238
4. Gulf Beach Unit	0	0	162	162
5. Gulf Islands National Seashore Unit	638	0	0	638
Total	638	353	309	1300

Gulf State Park

The Gulf State Park Unit (PKBM-1) consists of 115 acres of PKBM habitat in southern Baldwin County, Alabama, on the westernmost region of Perdido Key. PKBM were known to inhabit this unit during surveys in 1979 and 1982, and by 1986 this was the only known existing population of the subspecies (Humphrey and Barbour 1981; Holler *et al*. 1989). This population of less than 30 individuals was the donor for the reestablishment of PKBM into Gulf Islands National Seashore in 1986. This project ultimately saved Perdido Key beach mice from extinction as the population at Gulf State Park was considered extirpated in 1998 due to tropical storms and predators (Moyers *et al*. 1999). In 2010, captive bred mice are released at Gulf State Park. This reintroduction was deemed a success and the population has continued to increase. The track tube monitoring was established at GSP in 2010, which began with only a 9 percent occurrence rate and the end of the year yielded an 83 percent occurrence rate, 2011 started with an 85 percent occurrence rate and continued to increase slightly until September 2011 which yielded a 73 percent occurrence rate in the tracking tubes (FWC 2012a and FWC 2014b). A 3-day trapping effort the week of May 7, 2012, continued to find PKBM distributed throughout habitat south of Highway 182. Two reproductively-active male PKBM were found north of Highway 182 (J. Gore pers. comm. 2012). The release appears to have been a success and PKBM are occupying all three public lands for the first time since being listed as endangered. Recent track tube data for 2013 shows an average of 93 percent occurrence of PKBM in the tracking tubes at GSP (FWC 2013a and FWC 2013b).

Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat. Because scrub habitat is separated from the frontal dunes by a highway in some areas, the population inhabiting this unit can be especially vulnerable to hurricane impacts, and therefore further linkage to scrub habitat and/or habitat management would improve connectivity. This unit is managed by the Alabama Department of Conservation and Natural Resources and provides primary constituent elements (PCEs) 2, 3, 4, and 5. Threats specific to this unit that may require special management considerations include artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, and/or a decrease in habitat quality. This unit, which contains interior scrub habitat as well as primary and secondary dunes, serves as a re-designation and expansion of the original critical habitat designation (50 *FR* 23872). The original designation did not include scrub habitat which we now know is necessary for the long-term persistence of beach mouse populations.

The West Perdido Key Unit (PKBM-2) consists of 114 acres in southern Escambia County, Florida, and 33 acres in southern Baldwin County, Alabama. This unit encompasses essential features of beach mouse habitat from approximately 1.0 mile west of where the Alabama-Florida State line bisects Perdido Key east to 2.0 miles east of the State line and areas from the MHWL north to the seaward extent of human development or maritime forest. This unit consists of private lands and ultimately includes essential features of beach mouse habitat between Perdido Key State Park (Unit 3) and GSP (Unit 1). Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat and provides PCEs 2, 3, and 4.

Habitat fragmentation and other threats specific to this unit are mainly due to development. Consequently, threats to this unit that may require special management considerations include habitat fragmentation and habitat loss, artificial lighting, presence of feral cats as well as other predators at unnatural levels, excessive foot traffic and soil compaction, and damage to dune vegetation and structure. This area was not known to be occupied at the time of listing. While no trapping has been conducted on these private lands to determine presence, sign of beach mouse presence was confirmed by the Service in 2013 and 2014 through observations of beach mouse burrows and tracks, and this unit is contiguous with two occupied units. Therefore, we have determined this unit to be currently occupied. This unit provides essential connectivity between two core population areas (PKBM-3 and PKBM-1), provides habitat for expansion, natural movements, and re-colonization, and is therefore essential to the conservation of the species. Specifically, this unit may have historically provided for the re-colonization of GSP (PKBM-1) and/or may facilitate similar re-colonization in the future as the habitat recovers from recent hurricane events.

The Perdido Key State Park Unit (PKBM-3) consists of 238 acres in southern Escambia County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of PKSP from approximately 2.0 miles east of the Alabama–Florida State line to 4.0 mile east of the State line and the area from the MHWL north to the seaward extent of the maritime forest. Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat. This unit provides PCEs 2, 3, 4, and 5 and is essential to the conservation of the species. Improving and/or restoring habitat connections would increase habitat quality and provide more functional connectivity for dispersal, exploratory movements, and population expansion. This unit is managed by the Florida Park Service. Threats specific to this unit that may require special management considerations include artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, and/or a decrease in habitat quality. This unit serves as a redesignation and expansion of a zone included in the initial critical habitat designation (50 *FR* 23872); however, the zone did not include scrub habitat, which we now know is necessary for the long-term persistence of beach mouse populations.

Trapping efforts in this area were limited in the past. In 2000, a successful relocation program reestablished mice at PKSP. In 2004 and 2005, hurricane/tropical storm damage to the habitat at PKSP dropped PKBM detection to only 10 percent of the available habitat, indicating low densities (Loggins 2007). In 2005, the FWC started monitoring the presence of PKBM on public lands by tracking tubes. The Service and other land managers have relied on this data as a means of tracking the presence of PKBM in GSP, PKSP, and GINS. Tracking data from June 2006 indicated that about 25 percent of the available habitat was occupied at PKSP (FWC 2007). Trapping at PKSP and GINS in March 2007 was cancelled after one night after the capture of only one mouse (a fatality) and very limited sightings of beach mouse sign (tracks, burrows) (FWC 2007). Trapping conducted in April of 2008 found no mice on PKSP (J. Himes pers. comm. 2008). According to 2009 tracking data, there were no mice occurrences at PKSP until May 2009, then only sporadic occurrences until November 2009 as the occurrence data started to show a slow but steady increase (FWC 2014b). Tracking data from 2010 showed a dramatic increase in PKBM

occurrences within PKSP with 20 percent occurrence at the beginning of the year, and 84 percent occurrence at the end of 2010 (FWC 2010c). Trapping in 2010 on PKSP captured 11 individual beach mice (11 total captures) in February and 36 individuals (106 total captures) in May. At that time, information was insufficient to accurately estimate population size. These captures represent the minimum number of mice in the park for those months. Trapping at GINS and PKSP in spring 2010 generally confirmed the population was increasing with PKBM widely distributed at both public lands.

The number of track tubes visited by mice has increased over the past several years and recent years indicate almost all track tubes contain PKBM tracks. This is likely due to the fact that the storm-impacted coastal habitats have basically recovered and development and predator pressures have decreased. Data from 2011 showed that 96 percent (81 total traps) of track tubes registered beach mouse tracks, indicating that mice were becoming widespread throughout PKSP (J. Gore pers. comm. 2011, FWC 2012a, and FWC 2014b). The 2012 track tube surveys yielded 99 percent of track tubes with beach mouse tracks at PKSP (D. Greene pers. comm. 2012 and FWC 2012a, FWC 2012b, and FWC 2012c). During 2013, the track tube data indicates 97 percent of track tubes contained PKBM tracks (FWC 2013a and FWC 2013b).

There were effects to the Unit resulting from the overwash and inundation by storm surge that occurred several times during the 2004 and 2005 storm seasons. Blow outs occurred on the west and east portions of the PKSP. Two sections of the Hwy 292 were washed out. Park facilities were destroyed. Dune vegetation was significantly impacted, but has been restored passively and actively. Park facilities have been reconstructed in accordance with protected species guidelines.

The Gulf Beach Unit (PKBM-4) consists of 162 acres in southern Escambia County, Florida. This unit includes essential features of beach mouse habitat between GINS and Perdido Key State Park from approximately 4.0 miles east of the Alabama–Florida State line to 6.0 miles east of the State line and areas from the MHWL north to the seaward extent of human development or maritime forest. This unit consists of private lands. Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat. Habitat fragmentation and other threats specific to this unit are mainly due to development. Consequently, threats to this unit that may require special management considerations include habitat fragmentation and habitat loss, artificial lighting, presence of feral cats as well as other predators at unnatural levels, excessive foot traffic and soil compaction, and damage to dune vegetation and structure. While not known to be occupied at the time of listing, a single beach mouse was trapped within the unit as a result of trapping efforts in 2004 (Service 2004). There have been no data collected within this unit to confirm either absence or presence since this single trapping event in 2004. However, Service personnel have observed burrows and tracks indicating PKBM are occupying the area. This unit provides PCEs 2, 3, and 4 and is essential to the conservation of the species. This unit includes high-elevation scrub habitat and serves as a refuge during storm events and as an important repopulation source if storms extirpate or greatly reduce local populations. This unit currently provides essential connectivity between two core populations GINS (PKBM-5) and PKSP (PKBM-3) and provides essential habitat for expansion, natural movements, and recolonization (PCE 4).

The Gulf Islands National Seashore Unit (Unit 5) consists of 638 acres in southern Escambia County, Florida, on the easternmost region of Perdido Key. This unit encompasses essential features of beach mouse habitat within the boundary of Gulf Islands National Seashore–Perdido Key Area (also referred to as Johnson Beach) from approximately 6.0 miles east of the Alabama–Florida State line to the eastern tip of Perdido Key at Pensacola Bay and the area from the MHWL north to the seaward extent of the maritime forest. Beach mouse habitat in this unit consists mainly of primary and secondary dune habitat, but provides the longest contiguous expanse of frontal dune habitat within the historic range of the PKBM. PBKM were known to inhabit this unit in 1979. No beach mice were captured during surveys in 1982 and 1986 (Humphrey and Barbour 1981; Holler *et al*. 1989). However the population was impacted by Hurricane Frederic (1979), and considered unoccupied at the time of listing. However, no beach mice were captured during surveys in 1982 and 1986 (Humphrey and Barbour 1981; Holler *et al*. 1989). In 1986, PKBM were re-established to GINS as part of the State of Florida and Service recovery efforts. In 2000 and 2001, PKBM captured from this site served as donors to re-establish beach mice at PKSP. Due to damage from storm surge during the 2004 and 2005 storm seasons, PKBM are detected on approximately 30 percent of the beach mouse habitat available (Loggins 2007). Tracking data from June 2006 indicated that about 32 percent of the available habitat was occupied at GINS (FWC 2007). Trapping at PKSP and GINS in March 2007 was cancelled after one night after the capture of only one mouse (a fatality) and very limited sightings of beach mouse sign (tracks, burrows) (FWC 2007). Trapping conducted in April of 2008 was more encouraging with the capture of 35 mice at GINS (S. Sneckenberger pers. comm. 2008). Through 2008-2010 the population continues to expand from GINS to PKSP and beyond. This is the first natural recolonization of a park without the need for a translocation. From 2010 to 2013, the track tube occurrences have averaged 84 percent, 94 percent, 95 percent, and 94 percent respectively (FWC 2014b, FWC 2012a, FWC 2012b, FWC 2012c, FWC 2013a, and FWC 2013b).

PKBM-5, in its entirety, possesses all five PCEs and is essential to the conservation of the species. However, most of this unit consists of frontal dunes, making the population inhabiting this unit particularly threatened by storm events. Threats specific to this unit that may require special management considerations include artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, and/or a decrease in habitat quality. This unit is managed by the National Park Service–Gulf Islands National Seashore. This unit was included in the initial critical habitat designation (50 *FR* 23872) as well as the 2006 revision (71 *FR* 60238). The majority of this unit was overwashed and inundated by storm surge several times during the 2004 and 2005 storm seasons. Park facilities were destroyed and most of the Park road was destroyed. Dune vegetation was washed away or covered with sand. Habitat has since recovered and was comprised of natural and human facilitated dune restoration by GINS staff. Park structures were reconstructed landward of their former locations and in accordance with protected species guidelines.

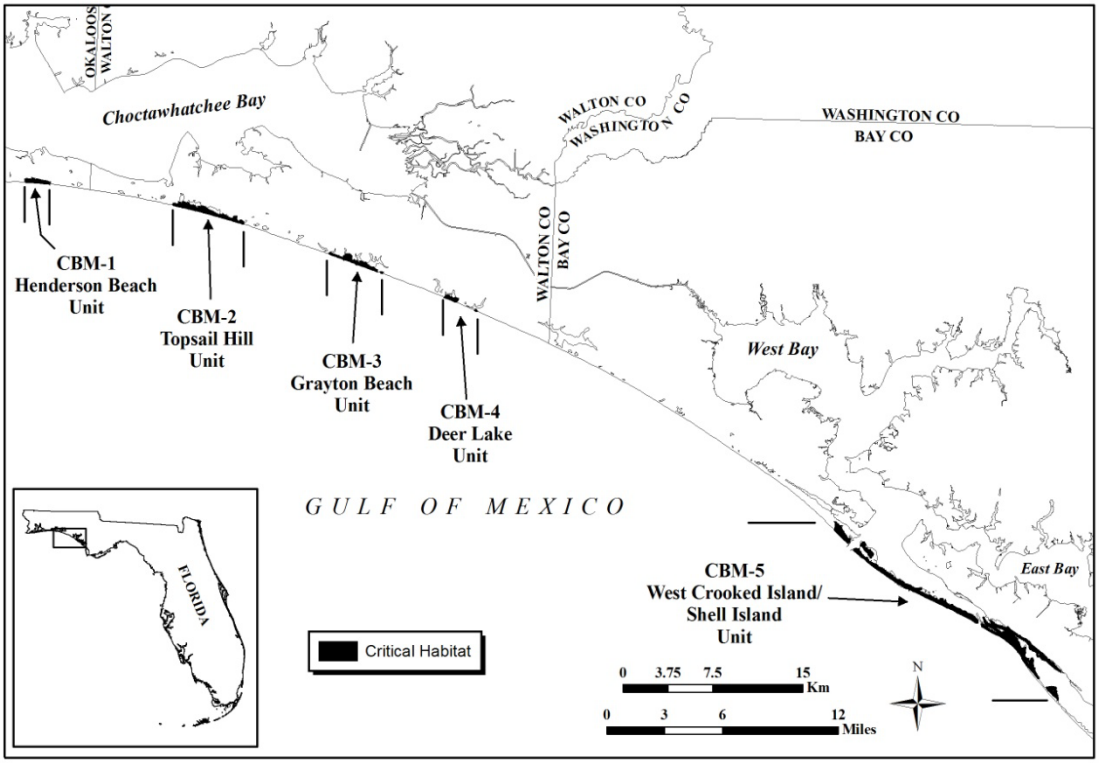

Figure 11. Critical habitat units designated for the Choctawhatchee beach mouse.

Table 12. Critical habitat units designated for the Choctawhatchee beach mouse.

Choctawhatchee Beach Mouse Critical Habitat Units	Federal Acres	State Acres	Local and Private Acres	Total Acres
1. Henderson Beach Unit	0	96	0	96
2. Topsail Hill Unit	0	277	31	308
3. Grayton Beach Unit	0	162	17	179
4. Deer Lake Unit	0	40	9	49
5. W. Crooked Island/Shell Island Unit	1333	408	30	1771
Total	1333	982	87	2404

The Henderson Beach unit (CBM–1) consists of 96 acres in Okaloosa County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of Henderson Beach State Park from 0.5 miles east of the intersection of Highway 98 and Scenic Highway 98 to 0.25 miles west of Matthew Boulevard and the area from the MHWL north to the seaward extent of the

maritime forest. This westernmost unit provides primary, secondary, and scrub dune habitat (PCEs 2 and 3). This unit is within the historical range of the subspecies; however, it was not known to be occupied at the time of listing and current occupancy is unknown because no recent efforts have been made to document beach mouse presence or absence. Because this unit includes protected, high-elevation scrub habitat, it may serve as a refuge during storm events and as an important source population if storms extirpate or greatly reduce local populations or populations to the east.

This unit is managed by the Florida Park Service and is essential to the conservation of the species. Threats specific to this unit that may require special management considerations include habitat fragmentation, Park development, artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

The Topsail Hill Unit (CBM–2) consists of 308 acres in Walton County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of Topsail Hill Preserve State Park, as well as adjacent private lands from 0.1 miles east of the Gulf Pines subdivision to 0.6 miles west of the Oyster Lake outlet and the area from the MHWL north to the seaward extent of human development or maritime forest. This unit provides primary, secondary, and scrub dune habitat and possesses all five PCEs. Its large, contiguous, high-quality habitat allows for natural movements and population expansion. Choctawhatchee beach mice were confirmed present in the unit in 1979 (Humphrey *et al*. 1987), were present at the time of listing, and are still present.

Beach mice have been captured on Stallworth County Park and Stallworth Preserve subdivision, a private development within the unit, and east of the Park (Service 2003a and Yanchis pers comm 2014). The population of Choctawhatchee beach mice inhabiting this unit appears to harbor unique genetic variation and displays a relatively high degree of genetic divergence considering the close proximity of this population to other populations (Wooten and Holler 1999).

This unit has portions with different ownership, purposes, and mandates. Threats specific to this unit that may require special management considerations include Park and residential development, artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

Lands containing the features essential to the conservation of the CBM within the area covered under the Habitat Conservation Plan (HCP) for the Stallworth County Preserve (4 acres) are excluded from critical habitat designation under section 4(b)(2) of the Act.

The Grayton Beach Unit (CBM–3) consists of 179 acres in Walton County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of Grayton Beach State Park, as well as adjacent private lands and inholdings, from 0.3 mi west of the Alligator Lake outlet east to 0.8 miles west of Seagrove Beach and the area from the MHWL north to the seaward

extent of human development or maritime forest. This unit provides primary, secondary, and scrub dune habitat (PCEs 2 and 3), habitat connectivity (PCE 4) and is essential to the conservation of the species. This unit also provides a relatively natural light regime (PCE 5). Beach mice were not detected in the unit in 1979 (Holler 1992a); however, they were found to be present in 1995 after Hurricane Opal (Moyers *et al.* 1999). While it seems likely that beach mice were present at the time of listing (and may have been present, but not detected, in 1979), the Service does not have data to confirm this assumption. Therefore, the Service considered this unit to be unoccupied at the time of listing. A program to strengthen and reestablish the population began in 1989 and yielded a persistent population at Grayton Beach State Park. A recent translocation of 43 CBM from Topsail State Park to Grayton Beach State Park in 2011 has proven successful as the 2013 follow-up trapping data indicated 93 new CBM at Grayton Beach State Park. According to 2013 track tube data, there is a 69 percent occurrence of beach mouse presence (average) at Grayton Beach State Park (FWC 2013a and FWC 2013b). Beach mice are also known to currently occupy the private lands immediately east of the park.

This unit has portions with different ownership, purposes, and mandates. Threats specific to this unit that may require special management considerations include hurricane impacts that may require dune restoration and revegetation, excessive open, unvegetated habitat due to recreational use or storm impacts that may require revegetation, Park development, artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

Lands containing the features essential to the conservation of the Choctawhatchee beach mouse within the area covered under the HCP for the Watercolor development (4 acres) are excluded from critical habitat designation under section 4(b)(2) of the Act.

The Deer Lake Unit (CBM–4) consists of 49 acres in Walton County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of Deer Lake State Park as well as adjacent private lands from approximately one mile east of the Camp Creek Lake inlet west to approximately 0.5 miles west of the inlet of Deer Lake and the area from the MHWL north to the seaward extent of maritime forest or human development. This unit provides primary, secondary, and scrub dune habitat (PCEs 2 and 3), habitat connectivity to adjacent lands (PCE 4), and is essential to the conservation of the species. This unit also provides a relatively natural light regime (PCE 5). Because live-trapping efforts in this area have been limited to incidental trapping, and beach mice were not detected in 1998 (Moyers *et al*. 1999), the Service considered this unit to be unoccupied at the time of listing. CBM were translocated from Topsail Hill Preserve State Park to private lands adjacent to this unit in 2003 and 2005 (Service 2003b, 2005a, 2005b, 2005c, 2005d). Tracking within the adjacent State park lands have indicated expansion of the population into the park. Recent track tube data from 2013 indicates Deer Lake State Park had a 73 percent (average) occurrence rate for monthly CBM presence (FWC 2013a and FWC 2013b).

This unit has portions with different ownership, purposes, and mandates. Threats specific to this unit that may require special management considerations include artificial lighting, presence of

feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

Lands containing the features essential to the conservation of the CBM within the area covered under the HCP/Incidental Take Permit (ITP) for Watersound (71 acres) are excluded from critical habitat designation under section 4(b)(2) of the Act (see Application of Section 4(a)(3) and Exclusions Under Section 4(b)(2) of the Act section below). This excluded area is 0.5 miles west of the Camp Creek Lake inlet to 0.5 miles east of the Camp Creek Lake inlet.

The West Crooked Island/ Shell Island Unit (CBM–5) consists of 1,771 acres in Bay County, Florida. This unit encompasses essential features of beach mouse habitat within the boundaries of St. Andrew State Park mainland from 0.1 miles east of Venture Boulevard east to the entrance channel of St. Andrew Sound, Shell Island east of the entrance of St. Andrew Sound east to East Pass, and West Crooked Island southwest of East Bay and east of the entrance channel of St. Andrew Sound, and areas from the MHWL north to the seaward extent of the maritime forest. Shell Island consists of State lands, Tyndall Air Force Base (AFB) lands, and small private inholdings. Choctawhatchee beach mice were known to inhabit the majority of Shell Island in 1987 (Holler 1992b) and were again confirmed present in 1998 (Moyers *et al*. 1999), 2002, and 2003 (Lynn 2003a). Because beach mice inhabited nearly the entire suitable habitat on the island less than two years prior to listing and were reconfirmed after listing, the Service considered this area to be occupied at the time of listing. The West Crooked Island population is the result of a natural expansion of the Shell Island population after the two islands became connected in 1998 and 1999, a result of Hurricanes Opal and Georges (Service 2003b). Shell Island was connected to the mainland prior to the 1930s when a navigation inlet severed the connection on the western end. Beach mice were documented at St. Andrew State Park mainland as late as the 1960s (Bowen 1968), though no records of survey efforts exist again until Humphrey and Barbour (1981) and Meyers (1983) at which time beach mice were not detected. Therefore, it seems likely that this area was not occupied at the time of listing. Current beach mouse population levels at this site are unknown, and live-trapping to document the absence of mice has not been conducted. Similar to the original designation, this Park was designated as critical habitat because it has features essential to the CBM. It is also within the historical range of the mouse. This unit supports the easternmost population of CBM, with the next known population 22 miles to the west.

This unit provides primary, secondary, and scrub dune habitat and possesses all five PCEs. Portions of this unit are managed by the Florida Park Service, while the remaining areas are federally (Tyndall AFB) and privately owned.

Threats specific to this unit that may require special management considerations include artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high residential or recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

Figure 12. Critical habitat units designated for the St. Andrew beach mouse.

Table 13. Critical habitat units designated for the St. Andrew beach mouse.

St. Andrew Beach Mouse Critical Habitat Units	Federal Acres	State Acres	Local and Private Acres	Total Acres
1. East Crooked Island Unit	649	0	177	826
2. Palm Point Unit	0	0	162	162
3. St. Joseph Peninsula Unit	0	1280	222	1502
Total	649	1280	561	2490

The East Crooked Island Unit (SABM–1) consists of 826 acres in Bay County, Florida. This unit encompasses essential features of beach mouse habitat on East Crooked Island from the entrance of St. Andrew Sound to one mile west of Mexico Beach, and the area from the MHWL to the seaward extent of the maritime forest (not including Raffield Peninsula). Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat and possesses all five PCEs. SABM were known to inhabit the unit in 1986 and 1989 (James 1992), though the population was

presumably extirpated after 1989 due to impacts from hurricanes. The East Crooked Island population was reestablished with donors from St. Joseph State Park in 1997. This unit was occupied at the time of listing. Live-trapping in 2002 confirmed occupation of mice (Moyers and Shea 2002, Lynn 2002a, Slaby 2005). Recent track tube data indicates mice are still present in this unit (FWC 2013a and FWC 2013b). This unit maintains connectivity along the island and this unit is essential to provide a donor population following storm events.

The majority of this unit is federally owned (Tyndall AFB), while the remaining habitat is privately owned. Threats specific to this unit that may require special management considerations include artificial lighting, presence of feral cats as well as other predators at unnatural levels, and high recreational and military use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

The Palm Point Unit (SABM–2) consists of 162 acres of private lands in Gulf County, Florida. This unit encompasses habitat from Palm Point 1.25 miles northwest of the inlet of the Gulf County Canal to the southeastern boundary of St. Joseph Beach and the area from the MHWL to the seaward extent of the maritime forest. SABM were documented in the area by Bowen (1968) and were considered to have been present in this unit at the time of listing. Since SABM beach mouse habitat is limited to only two other areas, protecting this mainland site located within the species' historical range is needed for the subspecies' long-term persistence. As other viable opportunities are limited or nonexistent, this unit is essential to reduce the threats of stochastic events to this subspecies. Furthermore, as this unit is on the mainland, it is somewhat buffered from the effects of storm events. This area provides frontal and scrub dune habitat (PCEs 2 and 3), but may provide limited connectivity between habitats. Threats specific to this unit that may require special management considerations include habitat fragmentation, habitat loss, artificial lighting, presence of free-roaming cats as well as other predators at unnatural levels, and high residential use that may result in soil compaction, damage to dunes, or other decrease in habitat quality.

The St. Joseph Peninsula Unit (SABM–3) consists of 1,502 acres in Gulf County, Florida. This unit encompasses essential features of beach mouse habitat within the boundary of St. Joseph Peninsula State Park (Park) as well as south of the Park to the peninsula's constriction north of Cape San Blas (also known as the "stumphole" region) and area from the MHWL to the seaward extent of the maritime forest. Beach mouse habitat in this unit consists of primary, secondary, and scrub dune habitat, and provides a relatively contiguous expanse of habitat within the historical range of the SABM. This unit possesses all five PCEs and was occupied at the time of listing. SABM were known to inhabit this unit in 1986 and 1987 (James 1987, 1992, 1995, Gore 1994, Moyers *et al.* 1999, Slaby 2005). In addition, recent trapping and tracking efforts suggest that mice continue to occupy private lands south of the Park (K. Yanchis pers comm., FWS 2012). The Park alone does not provide sufficient habitat to allow for population expansion along the peninsula, which may be necessary for a population anchored by the tip of a historically dynamic peninsula. A continuous presence of beach mice along the peninsula is the species' best defense against local and complete extinctions due to storm events. The population of SABM inhabiting

this unit appears to possess unique genetic variation, and displays greater than expected genetic divergence from other populations (Wooten and Holler 1999).

The Florida Park Service manages portions of this unit, while the remaining area is privately owned. Threats specific to this unit that may require special management considerations include artificial lighting, habitat fragmentation and habitat loss, presence of feral cats as well as other predators at unnatural levels, and high recreational use that may result in soil compaction, damage to dunes, or other decrease in habitat quality. The population inhabiting this unit may also be particularly susceptible to hurricanes due to its location within St. Joseph Bay (the peninsula is a thin barrier peninsula with a north–south orientation).

Life history (All subspecies of beach mice)

Beach mice are differentiated from the inland subspecies by the variety of fur (pelage) patterns on the head, shoulders, and rump. The overall dorsal coloration in coastal subspecies is lighter in color and less extensive than on those of the inland subspecies (Sumner 1926, Bowen 1968). Similarly, beach mouse subspecies can be differentiated from each other by pelage pattern and coloration.

The SEBM averages 5.47 inches in total length (average of 10 individuals = 5.07 inches, with a 2.04-inch tail length (Osgood 1909, Stout 1992). Females are slightly larger than males. These beach mice are slightly darker in appearance than some other subspecies of beach mice, but paler than inland populations of *P. polionotus* (Osgood 1909). SEBM have pale, buffy coloration from the back of their head to their tail, and their underparts are white. The white hairs extend up on their flanks, high on their jaw, and within 0.07 to 0.12 inches of their eyes (Stout 1992). There are no white spots above the eyes as with AIBM (Osgood 1909). Their tail is also buffy above and white below. Juvenile SEBM are more grayish in coloration than adults; otherwise they are similar in appearance (Osgood 1909).

The AIBM averages 5.45 inches in total length (average of 10 individuals); with 2.05 inches mean tail length (James 1992). This subspecies has a very pale, buff-colored head and back with extensive white coloration underneath the sides (Howell 1939). Bowen (1968) noted two distinct rump color pigmentations, one tapered and the other a squared pattern, which extended to the thighs.

The SABM has head and body lengths averaging 2.95 inches, and tail mean lengths averaging 2.05 inches (James 1992). This subspecies has a very pale, buff-colored head and back with extensive white coloration underneath and along the sides (Howell 1939). Bowen (1968) noted two distinct rump color pigmentations, one tapered and the other a squared pattern, which extended to the thighs.

The PKBM is slightly smaller than the other Gulf coast beach mouse subspecies (Bowen 1968). Head and body length ranges from 2.7 to 3.3 inches (Holler 1992b). The pigmentation of PKBM

is gray to gray-brown with the underparts white and coloration on the head is less pronounced. The line between pigmented and unpigmented pelage runs dorsally posterior above the eyes and behind the ears. Pigmentation patterns on the rump are either squared or squared superimposed on a tapered pattern (Bowen 1968). There is no tail stripe.

CBM have head and body lengths ranging from 2.7 to 3.5 inches (Holler 1992a). This beach mouse is distinctly more orange-brown to yellow-brown than the other Gulf coast beach mouse subspecies (Bowen 1968). Pigmentation on the head either extends along the dorsal surface of the nose to the tip, or ends posterior to the eyes leaving the cheeks white. A dorsal tail stripe is either present or absent.

Behavior

Peromyscus polionotus is the only member of the genus that digs an extensive burrow. Beach mice are semifossorial, using their complex burrows as a place to rest during the day and between nightly foraging bouts, escape from predators, have and care for young, and hold limited food caches. Burrows of *P. polionotus* generally consist of an entrance tunnel, nest chamber, and escape tunnel. Burrow entrances are usually placed on the sloping side of a dune at the base of a shrub or clump of grass. The nest chamber is formed at the end of the level portion of the entrance tunnel at a depth of 23.6 to 35.4 inches, and the escape tunnel rises from the nest chamber to within 9.8 inches of the surface (Blair 1951). Nests of beach mice are constructed in the nest chamber of their burrows, a spherical cavity about 1.5 to 2.5 inches in diameter. The nest comprises about one-fourth of the size of the cavity and is composed of sea oat roots, stems, leaves and the chaffy parts of the panicles (Ivey 1949). Beach mice have been found to select burrow sites based on a suite of biotic and abiotic features including dune slope, soil compaction, vegetative cover, and height above sea level (Lynn 2000a, Sneckenberger 2001). A shortage of potential burrow sites is considered to be a possible limiting resource.

Reproduction and Demography

Studies on *Peromyscus* species in peninsular Florida suggest that these species may achieve greater densities and undergo more significant population fluctuations than their temperate relatives, partially because of their extended reproductive season (Bigler and Jenkins 1975). Subtropical beach mice can reproduce throughout the year; however, their peak reproductive activity is generally during late summer, fall, and early winter. Extine (1980) reported peak reproductive activity for SEBM on Merritt Island during August and September, based on external characteristics of the adults. This peak in the timing and intensity of reproductive activity was also correlated to the subsequent peak in the proportion of juveniles in the population in early winter (Extine 1980). Peak breeding season for Gulf Coast beach mice is autumn and winter, declining in spring, and falling to low levels in summer (Rave and Holler 1992, Blair 1951). However, pregnant and lactating beach mice have been observed in all seasons (Moyers *et al.* 1999).

Sex ratios in beach mouse populations are generally 1:1 (Extine 1980, Rave and Holler 1992).

Beach mice are believed to be generally monogamous (Smith 1966, Foltz 1981, Lynn 2000a). While a majority of individuals appear to pair for life, paired males may sire extra litters with unpaired females. Beach mice are considered sexually mature at 55 days of age; however some are capable of breeding earlier (Weston 2007). Gestation averages 28 to 30 days (Weston 2007) and the average litter size is four pups (Fleming and Holler 1990). Littering intervals may be as short as 26 days (Bowen 1968).

Apparent survival rate estimates (products of true survival and site fidelity) of beach mice along the Gulf Coasts of Florida and Alabama have demonstrated that their average life span is about nine months (Swilling 2000). Other research indicated that 63 percent of Alabama beach mice lived (or remained in the trapping area) for four months or less, 37 percent lived 5 months or greater and two percent lived 12 to 20 months (Rave and Holler 1992). Less than half (44 percent) of beach mice captured for the first time were recaptured the next season (Holler *et al*. 1997). Greater than 10 percent of mice were recaptured three seasons after first capture; and four to eight percent were recaptured more than one year after initial capture. Beach mice held in captivity have lived three years or more (Blair 1951, Holler 1995).

Habitat and Movement

Beach mice inhabit coastal dune ecosystems on the Atlantic and Gulf Coasts of Florida and the Gulf Coast of Alabama. The dune habitat is generally categorized as: primary dunes (characterized by sea and other grasses), secondary dunes (similar to primary dunes, but also frequently include such plants as woody goldenrod (*Chrysoma pauciflosculosa*), false rosemary (*Conradina canescens*), and interior or scrub dunes (often dominated by scrub oaks and yaupon (*Ilex vomitoria*). Contrary to the early belief that beach mice were restricted to (Howell 1909, 1921, Ivey 1949), or preferred the frontal dunes (Blair 1951, Pournelle and Barrington 1953, Bowen 1968), recent research has shown that scrub habitat serves an invaluable role in the persistence of beach mouse populations (Swilling *et al.* 1998, Sneckenberger 2001). Beach mice occupy scrub dunes on a permanent basis and studies have found no detectable differences between scrub and frontal dunes in beach mouse body mass, home range size, dispersal, reproduction, survival, food quality, and burrow site availability (Swilling *et al.* 1998, Swilling 2000, Sneckenberger 2001). While seasonally abundant, the availability of food resources in the primary and secondary dunes fluctuates (Sneckenberger 2001). In contrast, the scrub habitat provides a more stable level of food resources, which becomes crucial when food is scarce or nonexistent in the primary and secondary dunes. This suggests that access to primary, secondary, and scrub dune habitat is essential to beach mice at the individual level.

The sea oat zone of primary dunes is considered essential habitat of beach mice on the Atlantic Coast (Humphrey and Barbour 1981, Humphrey *et al.* 1987, Stout 1992). The SEBM has also been reported from sandy areas of adjoining coastal strand/scrub vegetation (Extine 1980, Extine and Stout 1987), which refers to a transition zone between the fore dune and the inland plant community (Johnson and Barbour 1990). Beach mouse habitat is heterogeneous, and distributed in patches that occur both parallel and perpendicular to the shoreline (Extine and Stout 1987). Because this habitat occurs in a narrow band along Florida's coast, structure and composition of

the vegetative communities that form the habitat can change dramatically over distances of several feet.

Primary dune vegetation described from SEBM habitat includes sea oats, bitter panicgrass, railroad vine, beach morning-glory, saltmeadow cordgrass (*Spartina patens*), lamb'squarters (*Chenopodium album*), saltgrass (*Distichlis spicata*), and camphorweed (Extine 1980). Coastal strand and inland vegetation is more diverse, and can include pricklypear, saw palmetto, wax myrtle, Florida rosemary (*Ceratiola ericoides*), sea grape, and sand pine (*Pinus clausa*) (Extine and Stout 1987). Extine (1980) observed this subspecies as far as 0.62 miles inland on Merritt Island; he concluded that the dune scrub communities he found them in represent only marginal habitat for the SEBM. SEBM have been documented in coastal scrub more than a mile from the beach habitat at Kennedy Space Center/Merritt Island National Wildlife Refuge (NWR) and Cape Canaveral Air Force Station (CCAFS) (Stout *et al*. 2006). Extine (1980) and Extine and Stout (1987) reported that the SEBM showed a preference for areas with clumps of palmetto, sea grape, and expanses of open sand.

Essential habitat of the AIBM is characterized by patches of bare, loose, sandy soil (Humphrey and Frank 1992a). Although they are mainly found in the sea oat zone of the primary zone, they will occur in sandy areas with broomsedge (*Andropogon* sp.) (Service 1993). Ivy (1949) reported AIBM to occur in woody vegetation as far as 500 feet inland. Pournelle and Barrington (1953) found this subspecies in scrub as far as 1,800 feet from the dunes. Because this habitat occurs in a narrow band along Florida's coast, structure and composition of the vegetative communities that form the habitat can change dramatically over distances of only a few feet. Much of the habitat within the range of the AIBM has been converted to condominiums and housing developments. The majority of the high quality habitat, densely occupied by beach mice, remains along the length of both ASP and FMNM, at either end of Anastasia Island.

Two main types of movement have been identified for small mammals: within home-range activity and long-range dispersal. Such movements are influenced by a suite of factors, such as availability of mates, predation risk, and habitat quality. Movement and home range studies have been conducted for most beach mouse subspecies, but are limited to natural habitat (*i.e*., research has been conducted on public lands within contiguous beach mouse habitat, not within a development or in a fragmented landscape). Novak's (1997) study of the home range of CBM on Shell Island indicated males had a mean home range of 1.0 $\pm$ 4.1 acres and females had a mean home range of 0.81 $\pm$ 2.18 acres. Lynn (2000a) found male and female radio-tagged ABM had a mean home range of 1.68 $\pm$ 0.27 acres and 1.73 $\pm$ 0.40 acres, respectively. Swilling *et al.* (1998) observed one radio-collared ABM to travel over 328 feet during nightly forays after Hurricane Opal to obtain acorns from the scrub dunes. Using radio telemetry, Lynn (2000a) documented an ABM that traveled one mile within a 30-minute period. Moyers and Shea (2002) trapped a male and female CBM that moved about 637 feet and 2,720 feet in one night, respectively. Gore and Schaefer (1993) documented a marked Santa Rosa beach mouse crossing State Road (SR) 399, a two-lane highway. Lynn and Kovatch (2004) through mark and recapture trapping documented PKBM that crossed SR 292, a two-lane highway and right-of-way (100-feet wide).

Sneckenberger (2001) found significant seasonal differences in the movement of ABM, and suggested that this was a result of seasonal fluctuations in food availability, food quality, and nutritional needs. Smith (2003) found that Santa Rosa beach mice demonstrated an increase in movement as habitat isolation increased suggesting that longer travel distances were needed to obtain necessary resources. Smith also found that Santa Rosa beach mice had a preference for vegetation cover and connectivity, which is likely a behavioral response to increased predation risk in open areas. Thus, while beach mice are able and do travel great distances the travel pathways should have vegetated cover and no large gaps or open areas. Previous connectivity research suggests critical thresholds exist for species persistence in fragmented landscapes (With and Crist 1995). As fragmentation increases and connectivity is lost, species' ability to move through and between habitats is reduced in a nonlinear fashion.

Foraging

Beach mice are nocturnal and forage for food throughout the dune system. Beach mice feed primarily upon seeds and fruits, and appear to forage based on availability and have shown no preferences for particular seeds or fruits (Moyers 1996). Beach mice also eat small invertebrates, especially during late spring and early summer when seeds are scarce (Ehrhart 1978, Moyers 1996). Research suggests that the availability of food resources fluctuates seasonally in Gulf Coast coastal dune habitat, specifically that the frontal dunes appear to have more species of high quality foods, but these sources are primarily grasses and annuals that produce large quantities of small seeds in a short period of time. Foods available in the scrub consist of larger seeds and fruits that are produced throughout a greater length of time and linger in the landscape (Sneckenberger 2001). Nutritional analysis of foods available in each habitat revealed that seeds of plant species in both habitats provide a similar range of nutritional quality.

Population dynamics

Population size

Estimating animal abundance or population size is an important and challenging scientific issue in wildlife biology (Otis *et al.* 1978, Pollock *et al.* 1990). A number of different census methods are available to estimate wildlife populations, each with particular benefits and biases. Beach mouse surveys involve live trapping mark-recapture studies, which is a common method with small mammals. A five-night minimum trapping period has been standard practice since 1987 for Gulf Coast beach mice. As the referenced trapping events were not designed similarly or using a standardized sampling techniques, data should not be compared between subspecies or trapping events, nor should densities (mice per 100 trap nights) be inferred beyond the trapping area during that trapping session.

Population densities of beach mice typically reach peak numbers in the late autumn into spring (Rave and Holler 1992, Holler *et al*. 1997). Peak breeding period occurs in autumn and winter, apparently coinciding with the increased availability of seeds and fruits from the previous growing season. Seasonal and annual variation in size of individual populations may be great (Rave and Holler 1992, Holler *et al.* 1997). Food supplementation studies showed that old field mouse

populations increased when foods were abundant; thus, populations of old field mice appear to be food-limited (Smith 1971, Galindo-Leal and Krebs 1998). Similar studies have not been conducted with beach mouse populations.

Gulf Coast Beach Mice

In 1979, Humphrey and Barbour (1981) estimated about 515 CBM existed on Topsail Hill and Shell Island. That estimate was used during the Federal listing of the CBM in 1985. Population estimates on Shell Island from February 1993 to March 1994, ranged from 105 to 338 CBM on a 23-acre study area (Novak 1997). Just prior to Hurricane Opal in 1995, it was estimated that Shell Island supported 800 to 1,200 CBM (Gore 1999). Three years following Hurricane Opal in June 1998, one trapping effort at six different sites on Shell Island resulted in a cumulative population estimate of 195 CBM (164 CBM captured) (Moyers *et al*. 1999). The east portion of the island has been trapped from 2000 to 2003. Population estimates have ranged between 24 and 67 CBM (Lynn 2004b). At Topsail Hill Preserve State Park, trapping conducted in March 2003 and March 2005 yielded a population estimate of 190 to 250 CBM (Service 2003a, Sneckenberger 2005). From late 2006 through 2007 results of tracking tubes surveys at Topsail Hill Preserve State Park suggested that the CBM population was not densely distributed (FWC 2008b). Trapping of four 100-trap transects yielded population estimates of 190, 250, less than 10 (too few to estimate), and 87 in 2003, 2005, 2006, and 2007, respectively (Service 2007a). The track and trapping data together indicate that Topsail Hill Reserve State Park currently does not support a high population of beach mice. In 2003 and again in 2005, a total of 26 mice were translocated from Topsail Hill Preserve State Park to the WaterSound private development adjacent to Deer Lake State Park. Trapping has been sporadic on WaterSound but has yielded population estimates of 5 to 46 individuals in 2003 to 2007 (Moyers 2007). Deer Lake State Park has not been trapped; however, tracks have been observed as recently as 2006 (FWC 2008b). Population estimates from trapping at Grayton Beach State Park (main unit) from 1995 to 2000, ranged from 25 to 116 CBM (Moyers *et al.* 1999, Van Zant 2000). The central unit was trapped for three nights in August 2002; however, no mice were captured (Lynn 2002b). Limited tracking surveys were accomplished in 2003, 2004 and 2005 and beach mouse tracks were observed (Kovatch 2003, Toothacker 2004, FWC 2008b). The western area, although it provides CBM habitat, has not been documented as occupied by CBM (Moyers *et al.* 1999, Van Zant 2000). The population estimates for the WaterColor development for the two years prior to and one year following development ranged from 3 to 7 CBM (St. Joe Company 1999). CBM were last captured in February of 2001 at WaterSound; quarterly trapping has continued on the site through mid-2008 without CBM being captured (St. Joe/Arvida 2003). Auburn University trapped West Crooked Island in October 2000, and the Service trapped the area in 2001 to 2003. The population estimate ranged from a low of 174 to a high of 244 CBM (Lynn 2000b, 2002d, 2002e, 2002f, 2002g, 2003b). The Service estimated the total population of CBM in 2003, to be about 600 to 1,000 beach mice. A recent translocation of 43 CBM from Topsail State Park to Grayton Beach State Park in 2011 has proven successful as the 2013 follow-up trapping data indicated 93 new CBM at Grayton Beach State Park. According to 2013 track tube data, there is a 69 percent occurrence of beach mouse presence (average) at Grayton Beach State Park (FWC 2013a and FWC 2013b). Recent track tube data

from 2013 indicates Deer Lake State Park had a 73 percent (average) occurrence rate for monthly CBM presence (FWC 2013a and FWC 2013b).

Since its listing in 1985, PKBM population estimates never reached more than 400 to 500 individuals until 2003. Before Hurricane Ivan (2004) a population estimate of 500 to 800 was divided between two populations - the Johnson Beach Unit of GINS and PKSP (Service 2004). The status of PKBM at Gulf State Park (GSP) is uncertain, likely extirpated in 1999. In October 2005, following the active hurricane seasons of 2004 and 2005, a trapping effort of less than one-third of the habitat available on public lands yielded captures of less than 30 individuals. Tracking data from June 2006 indicated that about 25 and 32 percent of the available habitat was occupied at PKSP and GINS, respectively (Loggins 2007). Trapping at PKSP and GINS in March 2007, was cancelled after one night after the capture of only one mouse (a fatality) and very limited sightings of beach mouse sign (tracks, burrows) (Loggins 2007). With no tracks observed in the tube surveys the PKBM may now be absent from PKSP (FWC 2008b). According to 2009 tracking data, there were no mice occurrences at PKSP until May 2009, then only sporadic occurrences until November 2009 as the occurrence data started to show a slow but steady increase (FWC 2014b). Tracking data from 2010 showed a dramatic increase in PKBM occurrences within PKSP with 20 percent occurrence at the beginning of the year, and 84 percent occurrence at the end of 2010 (FWC 2010c). Trapping in 2010 on PKSP captured 11 individual beach mice (11 total captures) in February and 36 individuals (106 total captures) in May. At that time, information was insufficient to accurately estimate population size. These captures represent the minimum number of mice in the park for those months. Trapping at GINS and PKSP in spring 2010 generally confirmed the population was increasing with PKBM widely distributed at both public lands. Recent data from 2011 showed that 96 percent (81 total traps) of track tubes registered beach mouse tracks, indicating that mice were becoming widespread throughout PKSP (J. Gore pers. comm. 2011, FWC 2012a, and FWC 2014b). The 2012 track tube surveys yielded 99 percent of track tubes with beach mouse tracks at PKSP (D. Greene pers. comm. 2012 and FWC 2012a, FWC 2012b, and FWC 2012c). During 2013, the track tube data indicates 97 percent of track tubes contained PKBM tracks (FWC 2013a and FWC 2013b). At GINS, the number of PKBM has not increased since the initial high levels in winter of 2005-2006 (FWC 2008b). However, population estimates indicate there may be a few hundred PKBM at GINS (Gore 2008). Trapping conducted in April of 2008 was more encouraging with the capture of 35 mice at GINS (S. Sneckenberger pers. comm. 2008). Through 2008-2010 the population continues to expand from GINS to PKSP and beyond. This is the first natural recolonization of a park without the need for a translocation. From 2010 to 2013, the track tube occurrences at GINS have averaged 84 percent, 94 percent, 95 percent, and 94 percent respectively (FWC 2014b, FWC 2012a, FWC 2012b, FWC 2012c, FWC 2013a, and FWC 2013b).

The SABM even at its lowest population probably numbered several hundred individuals (Gore as cited in 63 *FR* 70055). James (1992) estimated that the East Crooked Island subpopulation to be about 150. However, by 1996, SABM were no longer found on East Crooked Island. Following Hurricane Opal in 1995, Mitchell *et al.* (1997) estimated the St. Joe Peninsula State Park population to be between 300 and 500 mice. In November 1997 and January 1998, 19 pairs of St. Andrew beach mice were relocated from St. Joseph Peninsula State Park to East Crooked Island,

Tyndall Air Force Base (Moyers *et al.* 1999). Trapping surveys conducted on East Crooked Island in 2000 and 2002 through 2007 indicated that beach mice occupied the entire island (Lynn 2002c, FWC 2008b). Population estimates ranged from 71 to 133 mice (Lynn 2002c). The FWC (2008b) estimates 22 miles of habitat as occupied by SABM throughout the mouse's historical range with population estimates of about 3,000 mice at East Crooked Island and about 1,775 mice in the front dunes at St. Joseph State Park. Data from 2008-2012 on East Crooked Island showed a decrease in SABM, with average track tube occurrences of 97 percent, 97 percent, 96 percent, 87 percent, and 83 percent, respectively (FWC 2014b and FWC 2012a). However, recent data from 2013 indicates 95 percent of track tubes contained SABM tracks (FWC 2013a and FWC 2013b). Surveys conducted from 2008-2012 at Rish Park yielded average track tube occurrence that fluctuated between 79 percent, 91 percent, 76 percent, 79 percent, and 83 percent, respectively (FWC 2014b and FWC 2012a). More recent data in 2013 showed an average of 73 percent of track tubes contained SABM tracks (FWC 2013a and FWC 2013b).

Atlantic Coast Beach Mice

Populations of the SEBM have been estimated to be around 5,000 to 6,000 mice. Recent surveys have confirmed that SEBM are found on the beaches of Canaveral National Seashore, Merritt Island NWR, and CCAFS in Brevard County, all on federally protected lands. In April 2002, a population of SEBM was documented at the Smyrna Dunes Park, at the north end of New Smyrna Beach (Sauzo 2004). Prior to 2006, populations of the SEBM were thought extirpated from both sides of the Sebastian Inlet (Bard 2004). However, during surveys in June 2006, a single mouse was located at the very southern end of the Sebastian Inlet State Park. Mice were also found at Jungle Trail on the Pelican Island National Wildlife Refuge, another area where they where thought extirpated. Additional surveys of other areas south of Brevard County have not located any mice and indicate the distribution of this subspecies in the counties south of Brevard, severely fragmented. SEBM are no longer believed to occur at Jupiter Island, Palm Beach, Lake Worth, Hillsboro Inlet or Hollywood Beach (Service 1999).

Although the distribution of the AIBM has declined significantly, particularly in the northern part of its range, the populations at ASP and FMNM have continued to fluctuate seasonally between two and 90 mice per acre. It is thought that populations should be characterized by a range rather than a static value (Frank and Humphrey 1996). Quarterly surveys of these two sites have shown that the populations have remained stable. Due to the limited dune habitat at the ASP, this population has not been able to maintain a stable population and it is unknown how many mice remain.

Population variability

Beach mouse populations fluctuate on a seasonal and annual basis. Attempts to explain population dynamics have revealed an incomplete understanding of the species and its population cycles. It is clear that beach mice, like all rodents, are known for high reproductive rates and experience extreme highs and lows in population numbers. Depressed beach mouse populations may be associated with tropical storms and drought, perhaps resulting from reduced habitat and food

resources. These fluctuations can be a result of reproduction rates, food availability, habitat quality and quantity, catastrophic events, disease, and predation (Blair 1951, Bowen 1968, Smith 1971, Hill 1989, Rave and Holler 1992, Swilling *et al.* 1998, Swilling 2000).

Population stability

Population viability analysis (PVA) is essentially a demographic modeling exercise to predict the likelihood a population will continue to exist over time (Groom and Pascual 1997). The true value in using this analytical approach is not to determine the probability of a species' extinction, but to clarify factors that have the most influence on a species' persistence. From 1996 to 1999, the Service funded Auburn University to develop a PVA for beach mice (Holler *et al*. 1999, Oli *et al.* 2001). Four subpopulations of Gulf Coast beach mice subspecies were modeled. They consisted of two subpopulations of PKBM, one at GINS-Perdido Key Area and one at Florida Point, and two subpopulations of ABM, one at Bon Secour NWR and one at Fort Morgan State Park. They used a stochastic (random) differential equation (Wiener-drift) model, applied to long term demographic data. The model is stochastic because it incorporates the variable effects of the environment upon population change. However, it did not model the effects of hurricanes on the habitat or population of beach mice.

The Oli *et al.* (2001) analyses indicated that all four subpopulations were at risk of extinction, with habitat fragmentation as the most influential factor. The GINS-Perdido Key Area had the highest risk for extinction; the PKBM had a 100 percent chance of reaching one individual (becoming functionally extinct) within 21 (mode) or 45 (median) years. At Florida Point, the PKBM had a low risk of becoming functionally extinct (1.3 percent) within 13 to 20 years. However, following Hurricane Opal in 1995, and subsequent predation pressure, the PKBM population at Florida Point was believed extirpated in 1999. This localized extirpation clearly demonstrates that while PVA's are useful in determining significant factors in species survival, they have limited use in predicting the time to extinction for a given species.

More recently, the Conservation Breeding Specialist Group (Traylor-Holzer 2004, 2005, 2006) was contracted by the Service to conduct a population and habitat viability analysis (PHVA) on ABM using the Vortex population simulation model (Lacy 1993). The goal was to develop an ABM population model and use the model to assess the status of the ABM habitat, and populations and projections for continued existence. The PHVA results projects the ABM to have a 26.8 percent $\pm$ 1.0 percent likelihood of extinction over the next 100 years. Much of this risk is due to hurricane impacts on ABM populations and habitat, which can result in population declines. The model suggests that hurricanes are a driving force for ABM populations, both directly and also indirectly as their impacts interact with other factors, including development of higher elevation (scrub) habitat and predation by cats. Due to the similarities in the subspecies and proximal location, it can be inferred that these factors also have a strong influence on the persistence of PKBM populations. When reviewing PHVA results, it is crucial that the actual values for the risk of extinction are not the focus of the interpretation. The true value of a PHVA is the ability to compare management strategies and development scenarios, run sensitivity analyses, and determine the main influence(s) on population persistence.

Similar to the land use arrangement on Perdido Key, the Fort Morgan peninsula (occupied by ABM) consists of three areas of public lands separated by two areas of private lands, which allow for limited (varied) dispersal between the public lands. The current level of dispersal between public lands through private lands is unknown, but is affected by development and habitat degradation. Without dispersal between public lands through private lands, the PHVA results project the ABM to have a 41.2 percent ± 1.1 percent likelihood of extinction. If all privately-owned habitat between the public lands is lost, the likelihood of extinction increases to 46.8 percent ± 1.1 percent. Again, it can be inferred that a similar increase in risk of extinction would occur with the PKBM if dispersal could not occur through private lands.

Despite the similarities in the subspecies, it is important to note that carrying capacity (K), which was found to be a strong influence on the model, would be different in PKBM. For ABM, K was estimated using maximum ABM density estimates (4.5 to 11.6 ABM per acre) and acres of habitat (2,989 acres). As density estimates for PKBM would likely be lower, and remaining PKBM habitat is less than 1,300 acres, the Vortex model for PKBM would likely project a greater likelihood of extinction.

The Service contracted with the Georgia Cooperative Fish and Wildlife Research Unit to critique the PVAs for the ABM accomplished by Oli *et al.* (2001) and Conservation Breeding Specialist Group (Traylor-Holzer 2006). Conroy and Runge (2006) indicated that neither PVA provided reliable estimates of extinction probability for ABM. They recommended that future PVA work should incorporate sampling, temporal, and possibly spatial variance for input variables and should clearly and explicitly express uncertainty in extinction output. Until this can be done, reliable estimates of extinction probability for the ABM (and other beach mouse subspecies) cannot be estimated.

Species that are protected across their ranges have lower probabilities of extinction (Soulé and Wilcox 1980). Beach mouse populations persist naturally through local extirpations due to storm events or the harsh, stochastic nature of coastal ecosystems. Historically, these areas would be recolonized as population densities increase and dispersal occurred from adjacent populated areas. In addition, from a genetic perspective, beach mice recover well from population size reductions (Wooten 1994), given sufficient habitat is available for population expansion after the bottleneck occurs. As human development has fragmented the coastal dune landscape, beach mice can no longer recolonize along these areas as they did in the past (Holliman 1983). As a continuous presence of beach mice or suitable habitat along the coastline is no longer possible and any hurricane can impact the entire range of each subspecies, the probability of beach mice persisting would be enhanced by the presence of contiguous tracts of suitable habitat occupied by multiple independent populations (Shaffer and Stein 2000). The history of the PKBM alone illustrates the need for multiple populations (a now potentially extirpated population was the source of the two remaining populations of the subspecies) (Holler *et al.* 1989, 71 *FR* 60238). While maintaining multiple populations of beach mouse subspecies provides protection from total loss (extinction), especially when migration and relocations are possible (Oli *et al.* 2001), conservation of each subspecies necessitates protection of genetic variability throughout their ranges (Ehrlich 1988).

Preservation of natural populations is therefore crucial, as the loss of a population of beach mice can result in a permanent loss of alleles (Wooten and Holler 1999). This loss of genetic variability cannot be regained through translocations or other efforts.

Status and Distribution

The distribution of all the beach mouse subspecies is significantly reduced from their historical ranges due to modification and destruction of the coastal dune ecosystem inhabit. Habitat loss and alteration was likely a primary cause of the extinction of one subspecies, the Pallid beach mouse, which was endemic to barrier beach between Matanzas and Ponce de Leon inlets in Volusia and Flagler Counties (Humphrey and Barbour 1981).

Atlantic Coast Beach Mice

The distribution of the SEBM has declined significantly, particularly in the southern part of its range. Historically, it was reported to occur along about 174 miles of Florida's central and southeast Atlantic coast from Ponce (Mosquito) Inlet, Volusia County, to Hollywood Beach, Broward County (Hall 1981). Bangs (1898) reported it as extremely abundant on all the beaches of the east peninsula from Palm Beach at least to Mosquito (Ponce) Inlet. During the 1990s, the SEBM was reported only from Volusia County (Canaveral National Seashore); in Brevard County (Canaveral National Seashore, Kennedy Space Center/Merritt Island NWR, and CCAFS); a few localities in Indian River County (Sebastian Inlet State Park, Treasure Shores Park, and several private properties), and St. Lucie County (Pepper Beach County Park and Fort Pierce Inlet State Park) (Humphrey *et al*. 1987, Robson 1989, Land Planning Group, Inc. 1991, Humphrey and Frank 1992b, Service 1993). The SEBM is geographically isolated from all other subspecies of beach mice.

Populations of the SEBM are still found on the beaches of Canaveral National Seashore, Merritt Island NWR, and CCAFS in Brevard County, all on federally protected lands. In April 2002, a population of SEBM was documented at the Smyrna Dunes Park, at the north end of New Smyrna Beach (Sauzo 2004). Populations from the north side of Sebastian Inlet appear to be extirpated (Bard 2004). SEBM were documented on the south side of Sebastian Inlet in 2006, although none have been found since then.

The status of the species south of Brevard County is currently unknown. The surveys conducted during the mid-1990s indicated the distribution of this subspecies in the counties south of Brevard County was severely limited and fragmented. There are not enough data available to determine population trends for these populations. These surveys revealed that it occurred only in very small numbers where it was found. In Indian River County, the Treasure Shores Park population experienced a significant decline in the 1990s, and it is uncertain whether populations still exist at Turtle Trail or adjacent to the various private properties (Jennings 2004). Trapping efforts documented a decline from an estimated 300 individuals down to numbers in the single digits. In 2006, a population off Jungle Trail at Pelican Island NWR was discovered (Van Zant 2006). No beach mice were found during surveys in St. Lucie County and it is possible that this species is

extirpated there. The SEBM no longer occurs at Jupiter Island, Palm Beach, Lake Worth, Hillsboro Inlet or Hollywood Beach (Service 1999).

The primary reason for the significant reduction in the range of the SEBM is the loss and alteration of coastal dunes. Large-scale commercial and residential development on the coast of Florida has eliminated SEBM habitat in the southern part of its range. This increased urbanization has also increased the recreational use of dunes, and harmed the vegetation essential for dune maintenance. Loss of dune vegetation results in widespread wind and water erosion and reduces the effectiveness of the dune to protect other beach mouse habitat. In addition to this increased urbanization, coastal erosion is responsible for the loss of the dune environment along the Atlantic coast, particularly during tropical storms and hurricanes. The extremely active 2004 hurricane season had a pronounced affect on Florida's Atlantic coast beaches and beach mouse habitat.

The encroachment of residential housing onto the Atlantic coast also increases the likelihood of predation and harassment by free-roaming cats and dogs. A healthy population of SEBM on the north side of Sebastian Inlet State Park in Brevard County was completely extirpated by 1972, presumably by free-roaming cats (Bard 2004). Urbanization of coastal habitat could also lead to potential competition of beach mice with house mice (*Mus musculus*) and introduced rats.

The distribution of the beach mouse is limited due to modification and destruction of its coastal habitats due mostly to developmental pressures. One additional Atlantic coast subspecies, the pallid beach mouse (*P. p. decoloratus*), was formerly reported from two sites in Volusia County, but extensive surveys provide substantial evidence that this subspecies is extinct (Humphrey and Barbour 1981).

The distribution of the AIBM has declined significantly, particularly in the northern part of its range. Historically, it was reported to occur from the vicinity of the Duval-St. Johns County line southward to Matanzas Inlet, St. Johns County, Florida (Humphrey and Frank 1992a). It currently occurs only on Anastasia Island, primarily at the north (ASP) and south (FMNM) ends of the island, although beach mice still occur at low densities in remnant dunes along the entire length of the island (Service 1993). The original distribution consisted of about 50 miles of beach; current populations occupy about 14 miles of beach with possibly only 3 miles supporting viable populations (Service 1993).

In 1992 to 1993, 55 mice (27 females and 28 males) were reintroduced to GMTNERR-Guana River portion of the Reserve (4.0 miles of undeveloped beach) in St. Johns County. In 1993, the population was estimated at 220 mice. Quarterly trapping has been conducted since the reintroduction and mice have not been captured since September 2006. This may be a result of habitat loss or alteration from storms and or habitat conditions.

The primary reason for the significant reduction in the range of the AIBM is the loss and alteration of coastal dunes. Large-scale commercial and residential development on the coast of Florida has eliminated AIBM habitat in the northern two-thirds of its range. This increased urbanization has also increased the recreational use of dunes, and harmed the vegetation essential for dune

maintenance. Loss of dune vegetation results in widespread wind and water erosion and reduces the effectiveness of the dune to protect other beach mouse habitat. In addition to this increased urbanization, coastal erosion is responsible for the loss of the dune environment along the Atlantic coast, particularly during tropical storms and hurricanes. The extremely active 2004 hurricane season had a severe effect on Florida's Atlantic coast beaches and beach mouse habitat.

The encroachment of residential housing onto the Atlantic coast also increases the likelihood of predation by free-roaming cats and dogs. ASP has successfully reduced feral cat populations at the recreation area and has seen a benefit to the beach mice. Urbanization of coastal habitat could also lead to potential competition of beach mice with house mice and introduced rats.

Gulf Coast Beach Mice

PKBM populations have existed since the late 1970s as isolated populations along its historical range (16.9 miles). The effects of Hurricane Frederic (1979) coupled with increased habitat fragmentation due to human development led to the extirpation of all but one population of PKBM. The less than 30 individuals at Gulf State Park (at the westernmost end of Perdido Key) were once the only known existing population of PKBM (Holler *et al*. 1989). Beach mice from this site were used to reestablish PKBM at Gulf Islands National Seashore (GINS) between 1986 and 1988 (Holler *et al.* 1989). Then in 1999 the population at Gulf State Park was considered extirpated (Moyers *et al.* 1999). In 2000, 10 PKBM (five pairs) was relocated from GINS to PKSP. In February of 2001, this relocation was supplemented with an additional 32 PKBM (16 pairs). The PKBM were released on both north and south sides of SR 292 in suitable habitat. Two years of quarterly survey trapping indicated that the relocations of PKBM to PKSP were successful and this was considered an established population (Lynn and Kovatch 2004). PKBM were also trapped on private land between GINS and PKSP in 2004, increasing documentation of current occurrences of the mouse (Lynn 2004a). Based on the similarity of habitat between these areas and the rest of Perdido Key, as well as the continuity of the habitat, the mouse is believed to inhabit other private properties where suitable habitat exists north and south of SR 292. The PKBM is considered to occur on 42 percent of Perdido Key (1,227 acres of 2,949 acres) (**Table 14**).

Table 14. Perdido Key beach mouse habitat on Perdido Key in Florida and Alabama.

Area	Total in AL & FL		Total in Florida		Total in Alabama	
	Acres	**Percent**	**Acres**	**Percent**	**Acres**	**Percent**
Perdido Key	2,949	100	2,615	89	334	11
PKBM habitat	**1,292**	100	**1,146**	**88**	148	12
Private lands	1,440	49	1,278	43	162	5
PKBM habitat	**302**	**23**	**270**	**24**	33	3
Public lands	1,509	51	1,337 GINS 1,052 PKSP 285	45	172 GSP 172	6
PKBM habitat	990	76	876 GINS 638 PKSP 238	67	114 GSP 114	9

[1]Data calculated by Service's Panama City, Florida using 2004 Digital Orthophoto Quarter-Quadrangle (DOQQ) aerial photography, 2005 parcel data from Baldwin County, Florida and 2005 parcel data from Escambia County, Florida and revised June 2006.

The listing of PKBM was based on data collected in 1983-84, and at that time the mouse was recovering from the effects of Hurricane Frederick in 1979. Following Hurricane Frederic estimated population numbers based on trapping were 13 PKBM found at one location (Gulf State Park). Just prior to listing, only one PKBM was captured in trapping surveys, this again being at Gulf State Park. Since that time, numbers have fluctuated dramatically based on hurricanes and/or translocation efforts, but were at their highest estimate ever documented just prior to Hurricane Ivan in 2004 at between 500-800 individuals. This was a result of significant partnership efforts and included translocation and habitat restoration on public lands. Even with the destructive hurricanes in 2004 and 2005, current numbers of PKBM, while low (no population estimates are available), are greater than one mouse and mice have been confirmed from two areas (PKSP and GINS). Survey efforts (tracking and trapping) have also been sporadic and inconsistent; therefore, it is difficult to establish long term trend information at this time.

CBM subpopulations currently persist along approximately 15 miles of Gulf of Mexico shoreline consisting of four isolated areas along 11 miles of beachfront within its former range. Another 5 miles outside of the CBM's known historical range has been recently colonized (Lynn, 2000a, 2003a). In the 1950s, the CBM was widespread and abundant at that time according to Bowen (1968). By 1979, Humphrey and Barbour (1981) reported only 40 percent of the original habitat remained undeveloped in noncontiguous areas. They also documented that the CBM had been extirpated from seven of its nine historical localities being restricted to the Topsail Hill area in

Walton County and Shell Island in Bay County. In 1985 when the CBM became federally protected, CBM were still only known from the Topsail Hill area and Shell Island, an area consisting of about 10 miles of coastline (50 *FR* 23872). In 1989, a cooperative interagency effort reintroduced CBM onto the central and west units of Grayton Beach State Park increasing the occupied coastline by another mile (Holler *et al*. 1989). In 1999, with the closing of East Pass and Shell Island connecting to West Crooked Island, CBM increased their range by approximately four miles (Lynn 2000b). CBM are now known to occupy approximately 15 miles of Gulf of Mexico beachfront; 12 of the 15 miles are publicly owned lands.

There are four subpopulations of CBM that exist: 1) Topsail Hill Preserve State Park (and adjacent eastern and western private lands), 2) Shell Island (includes St. Andrew State Park mainland and Shell Island with private inholdings and Tyndall AFB), 3) Grayton Beach (and adjacent eastern private lands), and 4) West Crooked Island. Approximately 96 percent of the lands known to be occupied by CBM are public lands. Translocations to establish a fifth subpopulation of CBM occurred in March of 2003 and 2005. CBM from Topsail Hill Preserve State Park were moved to private lands at Camp Creek/Water Sound in Walton County, Florida (Lynn 2003a, Service 2005a, 2005b, 2005c, 2005d).

Topsail Hill Preserve State Park consists of 1,637 acres of which 262 acres provide CBM habitat; the majority being occupied by CBM. The Florida Park Service prepared a Unit Management Plan for the Preserve that explicitly plans for conservation and protection of CBM habitats (FDEP 2007). Private lands on the east side consist of approximately 9.63 acres. Of that, 7 acres consist of the development known as the Stallworth Preserve. The Service issued an ITP for CBM associated with the Stallworth Preserve HCP in 1995; an amendment to the permit was issued in 1999. The remaining 2.63 acres has been purchased by Walton County with a grant from the Service. Private lands on the west side of the Preserve consist of 24 acres and include Four-Mile Village, a low density single family development, and the Coffeen Nature Preserve managed by the Sierra Club.

Shell Island consists of lands within the St. Andrew State Park, Tyndall AFB, and private lands. The Unit Management Plan for the State Park was completed in 1999. The plan identifies the need for protection and management of the CBM. Tyndall AFB manages their portion of Shell Island under the installation's Integrated Natural Resources Management Plan. The Service has joined with the State Park and Tyndall AFB since 1995 by providing funding to protect and restore CBM habitats on Shell Island.

The St. Andrew State Park mainland consists of 1,260 acres of which 123 acres are beach mouse habitat. Several tracking efforts looking for signs of CBM on the mainland were made between 1995 and 1998; no evidence was found that indicated the presence of the beach mouse (Moyers 1996, Moyers *et al.* 1999). However, live-trapping to document the absence of the mouse has not been conducted. Reintroduction of this area is considered an action to support recovery of CBM.

The Grayton Beach subpopulation consists of two units in Grayton Beach State Park. The Park is divided into a central and western unit and is currently connected by a narrow band of primary

dunes. Total acreage of the Park is 2,236 acres with 153 acres providing suitable CBM habitat. The Unit Management Plan for the Park identified the protection of the CBM as an important component. The Park has requested and received funds from the Service to implement CBM habitat restoration and protection. Portions of private lands (WaterColor and Seaside developments) on the east side of the central unit are occupied by CBM or provide suitable habitat.

West Crooked Island consists of 1,558 acres of which 730 acres provide CBM habitat and remains occupied by CBM (Lynn 2004b). The West Crooked Island subpopulation resulted from its connection to Shell Island in 1998-1999. The construction of the St. Andrew Pass navigation inlet in the early 1930s severed Shell Island from the mainland on its western end. Since then, the original pass, East Pass (or Old Pass) began to close. After passage of Hurricane Opal in 1995, East Pass temporarily closed and reopened; however, after passage of hurricanes Earl and Georges in 1998, the pass closed (Coastal Tech 1999, Middlemas 1999). CBM dispersed onto West Crooked Island from Shell Island colonizing most of the island within two years (Lynn 2004b). East Pass was reopened as a joint venture between Tyndall AFB and Bay County in December of 2001 but has since closed again.

SABM is now known to consist of two subpopulations, East Crooked Island and St. Joseph Peninsula State Park. The majority of the East Crooked Island subpopulation is located on Tyndall AFB and the other on the St. Joseph Peninsula State Park. Other important public lands for the conservation of the mouse would include Eglin Air Force Base lands at Cape San Blas and Billy Joe Rish Park. Private lands adjacent to Tyndall AFB and the State Park are either known to be occupied by SABM or contain habitat. Trapping by St Joe/Arvida on about 111 acres of SABM habitat at East Crooked Island was conducted in 2000, 2001, and 2003. The trapping confirmed existence of SABM on the property (Moyers and Shea 2002). However, trapping their property in St. Joseph Beach did not result in capture of any beach mice (Moyers and Shea 2002). Although SABM is thought to continue to occupy habitat south of St. Joseph Peninsula State Park, only tracking has been conducted to confirm its presence on private lands since the late 1990s. Private lands adjacent to public lands are available for population dispersal and food source during periods of high population and after severe weather events. However, subpopulations on large tracts of private land within the historical range of the subspecies are needed for conservation of the SABM.

Land development has been primarily responsible for the permanent loss of SABM habitat along its approximately 40-mile long historical range. In addition, construction of U.S. highway 98 accelerated the habitat loss from associated development. By the mid 1990's about 12 linear miles were known to be occupied (Gore 1994, 1995), indicating a 68 percent reduction in it historical distribution (63 *FR* 70053). An effort to re-establish the SABM back into its historical range was initiated around the time of listing (Moyers *et al.* 1999); however, the range reduction described above did not take this into account since the success of the reintroduction was not known at the time (63 *FR* 70053). Similar analyses have not been conducted since.

Our best documentation of the species' decline can be seen from trapping or tracking surveys conducted at various times throughout its range. By the mid to late 1980's concerns were raised

when trapping efforts failed to result in captures at West Crooked Island (Gore 1987). By 1990 the SABM appeared to only inhabit a small portion (approximately 11 linear miles) of its original range: west end of East Crooked Island and within St. Joseph Peninsula State Park (Gore 1990). SABM's apparent decline continued into the mid-1990's when in 1994, the population on East Crooked Island was "presumed to be extinct" (Wooten and Holler 1999), leaving only one known population on St. Joseph Peninsula (Moyers *et al.* 1999). Subsequent reintroduction efforts in 1997-1998 appeared to have re-established the population on East Crooked Island (Moyers *et al.* 1999).

Recovery Criteria

The Recovery Plan for the SEBM identifies the primary recovery objectives for the subspecies (Service 1993). The SEBM can be considered for delisting if 10 viable, self-sustaining populations can be established throughout a significant portion of its historical range. More specifically, delisting can be considered if the following conditions are met:

1. Viable populations are maintained on the five public land areas where the subspecies currently occurs. Each population should not fluctuate below an effective breeding size of 500 individuals;

2. Five additional viable populations are established throughout the historical range of the subspecies; and

3. These populations should be monitored for at least five years.

The Recovery Plan for the AIBM identifies the primary recovery objectives for the subspecies (Service 1993). The AIBM can be considered for reclassification from endangered to threatened status if five viable, self-sustaining populations can be established. Because the majority of this subspecies' historical range has been permanently destroyed, it is not likely that it can be fully recovered or delisted. For the AIBM to be considered for downlisting to threatened, it is required that those populations at the northern and southern end of Anastasia Island continue to be viable. Each population should support a breeding population of 500 individuals. Two additional viable populations shall be established within the mainland portion of the historical range. All of these populations should be monitored for five years.

The Recovery Plan for the PKBM, CBM, and ABM identifies the primary recovery objectives to be the stabilization of present populations by preventing further habitat deterioration, and the reestablishment of populations in areas where they were extirpated (Service 1987). For each of the subspecies to be considered for downlisting to threatened, it is required that there be a minimum of at least three distinct self-sustaining populations in designated critical habitat with at least 50 percent of the critical habitat being protected and occupied by beach mice (Service 1987).

While this is the currently approved Recovery Plan for the three beach mouse subspecies, studies and research since the Recovery Plan publication provided additional information concerning

recovery needs for the subspecies. Protection and enhancement of existing populations and their habitat, plus reestablishment of populations in suitable areas within their historical ranges, are necessary for the subspecies survival and recovery. Core beach mouse populations remain isolated and are vulnerable to natural and anthropogenic factors that may further reduce or degrade habitat and/or directly reduce beach mouse population sizes. Maximizing the number of independent populations is critical to species survival. Protection of a single, isolated, minimally viable population risks the extirpation or extinction of a species as a result of harsh environmental conditions, catastrophic events, or genetic deterioration over several generations (Kautz and Cox 2001). To reduce the risk of extinction through these processes, it is important to establish multiple protected populations across the landscape (Soulé and Simberloff 1986, Wiens 1996). Through the critical habitat designation process we are addressing this by designating five independent units for the subspecies spaced throughout its historical range, depending on the relative fragmentation, size, and health of habitat, as well as availability of areas with beach mouse PCEs.

The Service completed a five-year status review of the CBM and PKBM in August 2007 (Service 2007a, 2007b). For both subspecies the following was recommended: designate a beach mouse recovery coordinator; revise the recovery plan; accomplish viable populations, monitor habitat improvement, corridor persistence and hurricane response; conduct genetic studies and translocations as necessary; participate in education and outreach and complete an emergency response plan.

A Recovery Plan for the SABM was finalized in 2010 and the recovery objectives are to reestablish additional populations, threat minimization or removal, habitat protection and/or restoration, and outreach/education to the public. This recovery plan is up to date and includes current threats to SABM.

In accordance with the Act, Federal agencies (including the Service) consult with the Service for actions that may adversely affect beach mice and their designated habitat. In Florida, consultations have included military missions and operations, beach nourishment and other shoreline protection, and actions related to protection of coastal development (**Table 14**).

Table 15. Previous biological opinions within Florida that have been issued for projects that had adverse impact to the nesting beach mice.

PROJECT	YEAR	IMPACT (Habitat/critical habitat/individuals)
GINS Dune Protection (PKBM)	2000	0.01 acre (CH)
Translocation to PKSP (PKBM)	2000	≤ 3 beach mice (source mice from CH; relocation to CH and non-CH in PKSP)
Supplemental translocation to PKSP (PKBM)	2003	≤ 3 beach mice (source mice from CH; relocation to CH and non-CH in PKSP)

PROJECT	YEAR	IMPACT (Habitat/critical habitat/individuals)
FEMA Berm Orange Beach, AL (PKBM)	2003	0.14 acre non-CH
Service scientific collecting permit program (PKBM)	2004-2005	1 beach mouse per 400 trap-nights per area (partial CH)
Florencia Development (within Action Area) (PKBM)	2005	3.5 acres (non-CH)
PKSP Re-build (PKBM)	2005	1.99 acres (CH)
FEMA Berm Emergency consultation (within Action Area) (PKBM)	2005	Consultation not complete (non-CH)
GINS road rebuild (PKBM)	2005	1.7 acres (CH)
Magnolia West Development (within Action Area) (PKBM)	2006	5.2 acres (not CH at time of construction, presently CH)
Palazzo Development (PKBM)	2006	0.58 acre (not CH at time of construction, presently CH)
Searinity Development (PKBM)	2006	0.32 acre (not CH at time of construction, presently CH)
Retreat Development (PKBM)	2006	0.21 acre (not CH at time of construction, presently CH)
Bond Residence (PKBM)	2006	0.17 acre (CH)
Three-batch condo (Island Club, Marquesas, Lorelei) (PKBM)	2007	0.95 acres (CH)
Naval Air Station Pensacola Pensacola Pass navigation channel dredging (PKBM)	2007	6.3 miles (CH)
Paradise Island development (PKBM)	2007	0.91 acres (CH)
Calabria condo development (PKBM)	2008	0.33 acres (non-CH)
Escambia County beach nourishment (PKBM)	2008	0.16 acres (partial CH)
Seabreeze Condominiums (PKBM)	2009	0.39 acres
Spanish Key Parking Lot (PKBM)	2009	0.28 acres

PROJECT	YEAR	IMPACT (Habitat/critical habitat/individuals)
Perdido Key Fire Station (PKBM)	2010	0.43 acres (CH)
Evans Residence	2012	0.21 acre
Stern Residence	2012	0.07 acre
Whalen Residence	2012	0.18 acre
Carbone Residence	2012	0.74 acre
Lost Key	2012	26.1 acre
Stallworth Preserve Development (CBM)	1995	7 acres (CH)
Navy Panama City Beach site 4 construction (CBM)	2000	0.01 acre (CH)
East Pass Re-opening (CBM)	2001	Temporary, indirect take (CH)
WaterColor and WaterSound Developments (CBM)	2000	7.6 acres (non-CH)
Service scientific collecting permit (CBM)	2004-2005	1 beach mouse per 400 trap-nights per area (partial CH)
FEMA beach berms post hurricane Ivan emergency consultation (CBM)	2005	Consultation not complete (partial CH)
Western Lake Reopening consultation (CBM)	2006	2.7 acres annually for 5 years (CH)
FEMA Statewide post-disaster berm programmatic BO (PKBM, CBM, SABM, AIBM, and SEBM)	2007	75 miles for eroded shoreline(partial CH)
Angelos Development (CBM)	2009	0.42 acres
Bonfire Beach (SABM)	2008	38 acres
Ovation (SABM)	2010	5.41 acres (CH)
Sea Colony Development (AIBM)	1998	0.7 acres (non-CH)
Anastasia State Park beach nourishment (AIBM)	2005	50 linear feet (non-CH)

PROJECT	YEAR	IMPACT (Habitat/critical habitat/individuals)
Service scientific collecting permit program (AIBM)	2004-2005	1 beach mouse per 400 trap-nights per area (non-CH)
Rodent Control Program on CCAFS (SEBM)	2002	50 beach mice
Cape Canaveral Air Force borrow source (SEBM)	2007	300 linear feet (non-CH)
Service scientific collecting permit program (SEBM)	2004-2005	1 beach mouse per 400 trap-nights per area (non-CH)
CCAFS Routine Maintenance Programmatic (SEBM)	2008	Temporary loss of habitat during trenching/digging for pipeline installation and repair, roadside mowing, soil remediation, pole placement, wells, soil boring, lines of sight, scrub restoration

Common Threats to Beach Mice in Florida

Habitat Loss or Degradation

Coastal dune ecosystems are continually responding to inlets, tides, waves, erosion and deposition, longshore sediment transport and depletion, and fluctuations in sea level. The location and shape of barrier island beaches perpetually adjusts to these physical forces. Winds move sediment across the dry beach forming dunes and the island interior landscape. The natural communities contain plants and animals that are subject to shoreline erosion and deposition, salt spray, wind, drought conditions, and sandy soils. Vegetative communities include foredunes, primary and secondary dunes, interdunal swales, sand pine scrub, and maritime forests. During storm events, overwash is common and may breach the island at dune gaps or other weak spots, depositing sediments on the interior and backsides of islands, increasing island elevation and accreting the sound shoreline. Breaches may result in new inlets through the island.

The quality of the dune habitat (primary, secondary, and scrub) is an important factor in maintaining and facilitating beach mouse recovery. Habitat manipulation is an old and widely used tool in wildlife management. It is especially useful in improving habitat suitability to increase local populations of a species. For beach mice, improving habitat can enhance the abundance and diversity of food resources, increase the chances of meeting a mate, and reduce competition for food and burrow sites.

Long term trapping data has shown that beach mouse densities are cyclic and fluctuate by order of magnitude on a seasonal and annual basis. These fluctuations can be a result of reproduction rates, food availability, habitat quality and quantity, catastrophic events, disease, and predation (Blair 1951, Bowen 1968, Smith 1971, Hill 1989, Rave and Holler 1992, Swilling *et al.* 1998, Swilling

2000, Sneckenberger 2001). Without suitable habitat sufficient in size to support the natural cyclic nature of beach mouse populations, subspecies are at risk from local extirpation and extinction, and may not attain the densities necessary to persist through storm events and seasonal fluctuations of resources.

Habitat loss and fragmentation associated with residential and commercial real estate development is the primary threat contributing to the endangered status of beach mice (Holler 1992a, 1992b, Humphrey and Frank 1992a). Coastal commercial and residential development has fragmented all the subspecies into disjunct populations. Isolation of habitats by imposing barriers to species movement is an effect of fragmentation that equates to reduction in total habitat (Noss and Csuti 1997). Furthermore, isolation of small populations of beach mice reduces or precludes gene flow between populations and can result in the loss of genetic diversity. Demographic factors such as predation (especially by cats), diseases, and competition with house mice, are intensified in small, isolated populations, which may be rapidly extirpated by these pressures. Especially when coupled with events such as storms, reduced food availability, and/or reduced reproductive success, isolated populations may experience severe declines or extirpation (Caughley and Gunn 1996). The influence these factors have on populations or individuals is largely dependent on the degree of isolation.

The conservation of multiple large, contiguous tracts of habitat is essential to the persistence of beach mice. At present, large parcels of land exist mainly on public lands. Protection, management, and recovery of beach mice on public areas have been complicated by increased recreational use as public lands are rapidly becoming the only natural areas left on the coast. Public lands and their staff are now under pressure to manage for both the recovery of endangered species and recreational use. Where protection of large contiguous tracts of beach mouse habitat along the coast is not possible, establishing multiple independent populations is the best defense against local and complete extinctions due to storms and other stochastic events (Danielson 2005). Protecting multiple populations increases the chance that at least one population within the range of a subspecies will survive episodic storm events and persist while vegetation and dune structure recover.

Habitat connectivity also becomes essential where mice occupy fragmented areas lacking one or more habitat types. If scrub habitat is lacking from a particular tract, adjacent or connected tracts with scrub habitat are necessary for food and burrow sites when resources are scarce in the frontal dunes, and are essential to beach mouse populations during and immediately after hurricanes. Trapping data suggests that beach mice occupying the scrub following hurricanes recolonize the foredune once vegetation and some dune structure have recovered (Swilling *et al*. 1998, Sneckenberger 2001). Similarly, when frontal dune habitat is lacking from a tract and a functional pathway to frontal dune habitat does not exist, beach mice may not be able to attain the resources necessary to expand the population and reach the densities necessary to persist through the harsh summer season or the next storm. Functional pathways may allow for natural behavior such as dispersal and exploratory movements, as well as gene flow to maintain genetic variability of the population within fragmented or isolated areas. To that end, contiguous tracts or functionally connected patches of suitable habitat are essential to the long-term conservation of beach mice.

A lack of suitable burrow sites may be a consequence of habitat degradation. Beach mice use burrows to avoid predators, protect young, store food, and serve as refugia between foraging bouts and during periods of rest. Beach mice have been shown to select burrow sites based on a suite of abiotic and biotic factors. A limitation in one or more factors may result in a shortage of suitable sites and the availability of potential burrow sites in each habitat may vary seasonally. Beach mice tend to construct burrows in areas with greater plant cover, less soil compaction, steep slopes, and higher elevations above sea level (Lynn 2000a, Sneckenberger 2001). These factors are likely important in minimizing energy costs of burrow construction and maintenance while maximizing the benefits of burrow use by making a safe and physiologically efficient refuge. Similar to food resources, this fluctuation in availability of burrow sites suggests that a combination of primary, secondary, and scrub dune habitat is essential to beach mice at the individual level.

Predation

Beach mice have a number of natural predators including coachwhip (*Masticophis flagellum*) corn snakes (*Elaphe guttata guttata*), pygmy rattlesnake (*Sistrurus miliarius*), eastern diamondback rattlesnake (*Crotalus adamanteus*), short-eared owl (*Asio flammeus*), great-horned owl (*Bubo virginianus*), great blue heron (*Ardea herodias*), northern harrier (*Circus cyaneus*), red fox, gray fox, skunk (*Mephitis mephitis*), weasel (*Shallela frenata*), and raccoon (Blair 1951, Bowen 1968, Holler 1992a, Novak 1997, Moyers *et al.* 1999, Van Zant and Wooten 2003). Predation of beach mouse populations that have sufficient recruitment and habitat availability is natural and not a concern. However, predation pressure from natural and non-native predators may result in the extirpation of small, local populations of beach mice.

Free-roaming cats are believed to have a devastating effect on beach mouse persistence (Bowen 1968, Linzey 1978) and are considered to be the main cause of the loss of at least one population of beach mice (Holliman 1983). Cat tracks have been observed in areas of low trapping success for beach mice (Moyers *et al.* 1999). The PHVA for the ABM indicated that if each population had as few as one cat, which ate one mouse a day, rapid extinction would occur in over 99 percent of all iterations (Traylor-Holzer 2005).

In response to increasing depredation of sea turtle nests by coyote, fox, hogs, and raccoon, multi-agency cooperative effort have been initiated and are ongoing throughout Florida, in particular on public lands. These programs also benefit beach mice.

Hurricanes

Hurricanes can severely affect beach mice and their habitat, as tidal surge and wave action overwash habitat, leaving a flat sand surface denuded of vegetation; sand is deposited inland, completely or partially covering vegetation; blowouts between the ocean and bays and lagoons leave patchy landscapes of bare sand; primary dunes are sheared or eroded; and habitat is completely breached, creating channels from the ocean to bays and lagoons. Other effects include direct mortality of individuals, relocation/dispersal, and subsequent effects of habitat alterations

(that impact such factors as forage abundance/production and substrate elevation). Habitat impacts can be widespread, encompassing the range of the subspecies.

Until frontal dune topography and vegetation redevelop, scrub habitat maintains beach mice populations and provides the majority of food resources and potential burrow sites (Lynn 2000a, Sneckenberger 2001). While storms temporarily reduce population densities (often severely), this disturbance regime maintains open habitat and retards plant succession, yielding a habitat more suitable for beach mice than one lacking disturbance. The low-nutrient soil of the coastal dune ecosystem often receives a pulse of nutrients from the deposition of vegetative debris along the coastline (Lomascolo and Aide 2001). Therefore, as the primary and secondary dunes recover, beach mice recolonize this habitat readily as food plants develop to take advantage of the newly available nutrients. Recovery times vary depending upon factors such as hurricane characteristics (*i.e.*, severity, amount of associated rain, directional movement of the storm eye, storm speed), successional stage of habitat prior to hurricane, elevation, and restorative actions post hurricane. Depending on these factors, recovery of habitat may take from one to over 40 years.

The impact of hurricanes on plant communities temporarily affects food availability, and hence can limit population densities in impacted habitats soon after storms. Observations indicate that Hurricane Opal (a Category 3 storm in November 1995) caused a decrease in one population of ABM by 30 percent (Swilling *et al.* 1998). However, population densities in scrub habitat typically increased following hurricanes (Swilling *et al.* 1998). Sneckenberger (2001) also found atypical numbers of ABM in scrub following a hurricane. Five months post-storm, "densities (individuals/km) were up to 7.5 times greater in scrub areas than in frontal dune grids." Impacts of the storm may have been apparent as long as 17 months after the storm when scrub densities remained triple those of frontal dunes (Sneckenberger 2001). Moyers *et al.* (1999) found similar results for CBM at Grayton Beach State Park. When frontal and primary dunes sustained extensive damage during Hurricane Opal in 1995, beach mice were captured behind what remained of primary dune habitat. By 1998, however, primary dunes and the immediate habitat inland appeared to support higher numbers of beach mice.

In addition to the overall change in post Hurricane Opal distribution of ABM, Swilling *et al*. (1998) found the mean percent of newly marked individuals increased from 14 percent for the three trapping periods before the storm to an average of 26.7 percent for the same interval post hurricane. The average for the three trapping periods immediately following was even higher, at 42.7 percent of the individuals captured. Swilling *et al.* (1998) concluded that this increased presence of new individuals reflected increased reproduction. A statistical analysis of the data indicated that the number of females exhibiting signs of reproduction was significantly higher than normal (18.9 percent higher). Moyers *et al.* (1999) also found similar results at Topsail Hill Preserve State Park. Four to five months following Hurricane Opal, all female CBM captured were pregnant or lactating. Trapping six months after the hurricane, Moyers *et al.* (1999) noted that 51.5 percent of captured CBM were new unmarked beach mice.

Although hurricanes can significantly alter beach mouse habitat and population densities in certain habitats, some physical effects may benefit the subspecies. Hurricanes are probably responsible

for maintaining coastal dune habitat upon which beach mice depend through repeated cycles of destruction, alteration, and recovery of dune habitat. Holler *et al.* (1999) suggested that hurricanes could function to break up population subgroups and force population mixing. The resultant breeding between members of formerly isolated subgroups increases genetic heterogeneity and could decrease the probability of genetic drift and bottlenecks.

Beachfront Lighting

Artificial lighting increases the risk of predation and influences beach mouse foraging patterns and natural movements as it increases their perceived risk of predation. Foraging activities and other natural behaviors are influenced by many factors. Artificial lighting alters behavior patterns causing beach mice to avoid otherwise suitable habitat and decreases the amount of time they are active (Bird *et al.* 2004).

The presence of vegetative cover reduces predation risk and perceived predation risk of foraging beach mice, and allows for normal movements, activity, and foraging patterns. Foraging in sites with vegetative cover is greater and more efficient than in sites without cover (Bird 2002). Beach mice have also been found to select habitat for increased percent cover of vegetation, and decreased distance between vegetated patches (Smith 2003).

Genetic variability

Selander *et al.* (1971) conducted an electrophoretic study on 30 populations of *P. polionotus*, including populations of beach mouse subspecies. Based on 30 allozyme loci, they estimated that the level of allozyme variation found in beach mouse populations was at least 40 percent lower than the level of variation in nearby inland populations. This work indicates that beach mouse populations already have lower genetic variability before inbreeding, bottleneck events, or founder effects that may occur in a reintroduced population. Lower levels of heterozygosity has been linked to less efficient feeding, fewer demonstrations of social dominance and exploratory behavior, and smaller body size (Smith *et al.* 1975, Garten 1976, Teska *et al.* 1990). Research focused on inbreeding depression in old-field mice (including one beach mouse subspecies), determined that the effects of inbreeding negatively influenced factors such as litter size, number of litters, and juvenile survivorship (Lacy *et al.* 1995).

In 1995, the Service contracted with Auburn to conduct genetic analysis of: 1) post-reestablishment gene structure in PKBM and CBM; 2) microgeographic patterning and its relevance to alternate management approaches for ABM on the Bon Secour NWR; and 3) if feasible, the historical relationship of SABM from Crooked Island relative to CBM from Shell Island and SABM from St. Joseph Peninsula.

Results of the work for CBM found: 1) founder effects were observed in the Grayton Beach State Park population (fixation of alleles common to the donor population and allele frequency shifts); 2) incongruity in number and size of several alleles was observed between Grayton Beach State Park and Shell Island; 3) overall genetic divergence between the donor and reestablished

population was moderate; 4) genetic differences between Topsail Hill Preserve State Park and other CBM sites were higher than expected given the spatial proximity; 5) Topsail Hill Preserve State Park appears to be a reservoir for unique variation within the remaining populations of CBM; and 6) the overall relatedness estimated for Grayton Beach State Park suggested that any mating would involve close relatives (Wooten and Holler 1999).

Wooten and Holler (1999) recommended strategies for management of CBM based on genetics. Management of the Grayton Beach State Park population for genetic characteristics appears to be needed; however, additional genetic analyses will be needed. Relocation of CBM to Grayton Beach State Park from Shell Island should be continued.

Results of the work for PKBM found that: 1) founder effect (from Florida Point to GINS) did impact the GINS-Perdido Key Area subpopulation. Loss of rare alleles and allele frequency shifts were noted; 2) a low to moderate level of overall genetic divergence was observed; 3) data suggests that some effects of genetic drift were mediated by continued transfer of individuals; 4) levels of heterozygosity were unexpected given recent history; 5) average levels of relatedness among individuals is high which may portend future inbreeding related problems (however, no evidence of existing inbreeding was observed in the data); and 6) the overall level of microsatellite variation retained in the GINS-Perdido Key Area subpopulation was higher than anticipated. Wooten and Holler (1999) recommended management of PKBM based on genetics by: 1) preserving the natural population to the maximum extent possible since the loss of the Florida Point subpopulation resulted in the permanent loss of alleles; 2) using the GINS-Perdido Key Area subpopulation as a donor for reestablishment of other populations because of the retention of a substantial amount of genetic variation; and 3) reestablishment plans should include transfers between donor and reestablished subpopulations. In addition, translocations should be accomplished in pairs.

Analysis of genetic work focused on SABM indicated that there are two possible genetic histories for Crooked Island beach mice: 1) the last known beach mice from Crooked Island were derived from CBM or 2) the last known beach mouse from Crooked Island were unique from both CBM found on Shell Island or SABM found on St. Joseph peninsula (Van Zant 2003).

Climate Change (refer to page 49)

Analysis of the Species/Critical Habitat Likely to be Affected

Beach mice are currently federally protected because of their low numbers caused by habitat loss with continuing threats to their habitat (including critical habitat for CBM, PKBM, and SABM) and resulting affects from storm and post-storm events. The primary reason for the significant reduction in their range is the loss and alteration of coastal dunes. Large-scale commercial and residential development on the coast of Florida has eliminated beach mouse habitat. Coastal urbanization has also increased the recreational use of beachfront areas. Dune habitat maintenance is an important component of beach mouse conservation. Providing a healthy and continuous dune system assures mouse population stability. Integral to this is keeping visitors to the beach off the

dunes and replanting as necessary when impacts occur or are observed. The extremely active 2004 and 2005 hurricane seasons also had a severe effect on Florida's beaches and beach mouse habitat.

Critical habitat for three (PKBM, CBM, and SABM) of the five subspecies of beach mice has been designated and will be discussed. No critical habitat has been designated for the other two subspecies (SEBM and AIBM). Therefore, the proposed action would have no effect on designated critical habitat for these two subspecies because none is designated.

Generally, sand placement activities or dredged navigation channel material is not placed on existing beach mouse habitat consisting of vegetated dunes. Typical effects from these activities to beach mice and their habitats consist of the staging and storage of equipment, work vehicles, or materials and beach access for sand placement activities or dredged material placement. These effects may result in the permanent and temporary loss, degradation, or fragmentation of beach mouse habitat and changes in essential life history behaviors (dispersal and movement, foraging, seeking mates, breeding, and care of young). Beach mice spend their entire lives within the dune ecosystem and are nocturnal. Sand placement projects may occur at anytime of the year depending on their location and are usually conducted on a 24/7 schedule. The quality of the placed sand could affect the suitability of the beach and dunes to support beach mouse burrow construction and food sources. The effect of the activities covered under the consultation with incorporation of the proposed conservation measures on beach mice overall survival and recovery are considered in this SPBO.

ENVIRONMENTAL BASELINE

Status of the species/Critical Habitat within the Action Area (all subspecies of beach mice)

The action area encompasses the entire range of five subspecies of beach mice, and designated critical habitats of three beach mouse subspecies. Therefore, the previous discussion in "Status of the Species" applies here. The known distribution of the five subspecies of beach mice is a result of cursory surveys and intermittent trapping involving different projects. There has not been a systematic trapping study done in order to determine the status of each subspecies throughout their ranges.

Factors affecting the species environment within the action area

Coastal development

Beach mice were listed as endangered and threatened species primarily because of the fragmentation, adverse alteration, and loss of habitat due to coastal development. The threat of development-related habitat loss continues to increase. Other contributing factors include low population numbers, habitat loss from a variety of reasons (including hurricanes), predation or competition by animals related to human development (cats and house mice), and the existing strength or lack of regulations regarding coastal development.

Hurricanes

Hurricanes were probably responsible for maintaining coastal beach habitat upon which beach mice depend through repeated cycles of destruction, alteration, and recovery of 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 can impact beach mice either directly (e.g., drowning) or indirectly (e.g., loss of habitat). Depending on their frequency, storms can affect beach mice on either a short-term basis (e.g., temporary loss of habitat) or long term (e.g., loss of food, which in turn may lead to increased juvenile mortality, resulting in a depressed breeding season). How hurricanes affect beach mice also depends on the 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 habitat, frequent or successive severe weather events could compromise the ability of certain populations of beach mice to survive and recover. Beach mice evolved under natural coastal environmental events such as hurricanes. The extensive amount of predevelopment coastal beach and dune habitat allowed beach mice 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 beach mice 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 prestorm locations can result in a major loss of habitat for beach mice.

The 2004 hurricane season was the most active storm season in Florida since weather records began in 1851. Hurricanes Charley, Frances, Ivan, and Jeanne, along with Tropical Storm Bonnie, damaged the beach and dune system, upland structures and properties, and infrastructure in the majority of Florida's coastal counties. The cumulative impact of these storms exacerbated erosion conditions throughout the state.

The 2005 hurricane season was a record-breaking season with 27 named storms. Hurricanes Dennis, Katrina, Ophelia, Rita, and Wilma, and Tropical Storms Arlene and Tammy impacted Florida. The cumulative impact of these storms exacerbated erosion conditions in south and northwest Florida.

Beachfront Lighting

Artificial lighting along developed areas of both coastlines continues to cause increase susceptibility to predators, altered foraging and breeding habits which impact beach mouse recovery. While a majority of coastal local governments and counties have adopted beachfront lighting ordinances compliance and enforcement is lacking in some areas. Further, the lighting in areas outside the beachfront ordinance coverage areas continues to be unregulated resulting in

urban glow. Even the darker areas of conservation managed lands are subject to surrounding sky glow.

Predation

A major continuing threat to beach mice is predation by free-roaming cats and other nonnative species. The domestic cat is not native to North America and is considered a separate species from its wild ancestral species, *Felis silvestris*. Cats are hunters, retaining this behavior from their ancestors. However, wildlife in the western Hemisphere did not evolve in the presence of a small, abundant predator like the domestic cat, and thus did not develop defenses against them. Cats were introduced to North America a few hundred years ago.

Free-roaming pets prey on small mammals, birds, and other native wildlife. In the U.S., on a nationwide basis, cats kill over a billion small mammals and hundreds of millions of birds each year. Worldwide, cats are second only to habitat destruction in contributing to the extinction of birds. Cats have been documented to take beach mice, sea turtle hatchlings, shorebirds, and migratory birds. A significant issue in the recovery of beach mice is predation by free-ranging pet and feral cats. Beach mice have a number of natural predators including snakes, owls, herons, and raccoons. Predation is part of the natural world. However, predation pressure from both natural and nonnative predators may result in the extirpation of small, local populations of beach mice in a very short time (Bowen 1968, Linzey 1978).

Climate Change

Based on the present level of available information concerning the effects of global climate change on the status of beach mice and its designated critical habitat, 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 beach mice 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

Factors to be considered

Aspects of the sand placement and dredged material placement activities will occur within habitat that is used by beach mice year round. The activities include the storage of equipment, work vehicles, or materials and creation, expansion, or use of beach access points for sand placement activities or dredged material placement. The work, depending on the location, may be conducted any time of the year. Most effects would be expected to be temporary. These short-term and temporary impacts could include loss of foraging habitat, altered beach mouse movement and dispersal activities. Long-term and permanent impacts from the sand placement activities such as excavation of dune habitat and degradation could impact beach mice by fragmentation of their habitat including critical habitat for the PKBM, CBM, and SABM.

There are typically different "levels" of access sites needed for a project. The primary access is a "lay-down" yard, where pipe is delivered and stored, and storage trailers, and other equipment and materials are stored. These are typically big paved parking lots, so that the Corps's trucks can access the area to drop off and pick up equipment. There's typically a beach access at that point to get the pipe and equipment onto the beach and that access is usually at least 50-ft wide (pipe sections are typically 40 to 50 feet long). In NW Florida and Alabama, these yards have been approximately eight miles apart.

“Intermediate areas" are used at about the quarter points of the project length. These are used for the fuel tank, welding equipment, and other items or systems that get used a couple of times a day. These locations can vary from two to three miles apart. In addition, there are access points to allow project vehicles and trucks on and off the beach. Based on previous projects it would be expected to have single-vehicle entry points at one-half to one-mile intervals.

Protective, avoidance, and minimization measures have been incorporated into the project plan to avoid or minimize the potential impacts from the sand placement and dredged material placement activities. However, even with these measures, impacts to beach mice are expected to occur from some aspects of the project activities. The activities are expected to directly or indirectly adversely affect beach mice and/or their habitat including designated critical habitat for the PKBM, CBM, and SABM. The work may occur on public and/or private lands.

Proximity of Action: Some aspects of the sand placement and dredged material placement activities would occur directly in beach mouse habitat. The storage or staging of pipe and other equipment, and vehicles, use or creation of beach access points, and placement of pipe, nourishment or dredged material could occur in habitat occupied or used by SEBM, AIBM, PKBM, CBM, and SABM. Beach mice spend their entire life cycle within the coastal dune system.

Distribution: The storage or staging of pipe and other equipment and vehicles and use of beach access points that could occur in habitat occupied or used by SEBM, AIBM, PKBM, CBM, and SABM may vary depending on the individual project length and existing beach accesses and non-beach mouse habitat that can be used for storage and staging.

Timing: The timing of the activities would directly and indirectly impact beach mice and their habitat depending on the season. Beach mice reproduce year-round with more mice being produced in the late winter and early spring. Impacts could include but would not be limited to disrupting mice seeking mates, constructing nest burrows, foraging for food, caring for their young, and young mice leaving the nest burrow dispersing into new habitat.

Nature of the Effect: The effects of the activities may include the temporary loss of habitat including the loss of a few beach mice from excavation of habitat for beach access and reduction of beach mouse activity including feeding, reproduction, and movement from loss or alteration of habitat. Activities that decrease the amount or quality of dune habitat or movement could affect beach mice by reducing the amount of available habitat and fragmenting the habitat.

Duration: Time to complete the project construction may vary depending on the project length, weather, and other factors (equipment mobilization and break downs, availability of fuel, lawsuits, etc.). Project work could take as little as a month and as long as a one or two years. Beach mouse habitats would remain disturbed until the project is completed and the habitats are restored. Dune restoration could be complete from 6 to 12 months after the project has been completed. The short generation time of beach mice combined with the time frames provided in this document (projects from 1 month to 2 years, dune restoration 6 to 12 months following project completion) will impact multiple generations of beach mice. The time to complete a project and restore the habitat can be a complete loss of habitat availability and use for multiple generations of beach mice.

Disturbance frequency: Depending on the sand placement activity and dredging project frequency, this could result in impacts to beach mice and their habitats at any time during the year on a minimum cycle of every 2 years. Following initial sand placement, activities could occur every year depending on the project location and erosion events. The actual number of times the sand placement would occur is unknown. Following initial sand placement or dredge material placement, maintenance activities could occur every two to 10 years depending on the project location and situation (erosion, long shore sand transportation, upstream activities, and weather events). Thus, impacts related to the subject activities would be expected to occur no more often than every two to three years. However, while not anticipated, work could occur annually in response to emergency events. The actual number of times the nourishment and dredging material disposal activities is unknown but can be based on previous work.

Disturbance intensity and severity: Depending on the frequency needed to conduct the nourishment and dredged material work and the existence of staging areas and beach access points, effects to the recovery of beach mouse may vary. However, the action area encompasses entire range of each subspecies and the overall intensity of the disturbance is expected to be minimal. The severity is also likely to be slight as few if any mice would be lost and dune habitats can be restored quickly if protected from other impacts (pedestrians and vehicles).

The staging and storage of equipment and materials and beach access points could occur within habitat occupied or used by SEBM, AIBM, PKBM, CBM, and SABM and could be adjacent to designated critical habitat for the PKBM, CBM, and SABM. Beach mice are permanent inhabitants of the coastal ecosystem conducting all their life cycles in this environment. While the current status of individual beach mouse subspecies is unknown, their general distribution is known.

Analysis for effects of the action

The action area consists of the Atlantic or Gulf beachfront including the wet and dry unvegetated beach, developing foredunes and interdunal swales, and areas that were formerly primary or secondary dunes. Sand placement or dredged material placement work would not occur on existing vegetated primary or secondary dunes. However, construction of or expansion of an existing beach access could be located through scrub, secondary, or primary dunes. Beach mice

would generally be found inhabiting stable primary, secondary, and scrub dunes on a permanent basis with other habitats being used periodically on a daily or seasonal basis for feeding and movement. Some of these areas also include critical habitat.

Direct and Indirect Impacts

Direct impacts are effects of the action on the species occurring during project implementation and construction (sand placement or dredged material placement). Direct loss of individual beach mice may occur during the creation or expansion of beach access points when heavy equipment clears the habitat and packs the sand. In general the length of time between project maintenance work is expected to be sufficient for beach mouse habitat to be restored. Thus, it is not anticipated that the nourishment and dredged material placement activities would result in permanent beach mouse habitat destruction (including critical habitat). However, habitat for all the beach mouse subspecies and critical habitat for the PKBM, CBM, and SABM that provides food or cover may be temporarily destroyed or altered from the activities.

Indirect effects are a result of a proposed action that occur later in time and are reasonably certain to occur. The indirect effect of the sand placement and dredged material placement activities would be newly created or expanded existing beach access points that act as barriers to beach mouse movement for foraging, or population expansion or dispersal. Maintaining the connectivity among habitats is vital to persistence of beach mice recovery. Recovery actions needed to assure the connectivity include restoration and maintenance of the dune system following project completion.

For the Service to determine if the project impacts on designated critical habitat would be an adverse modification, the Service shall determine if the impact on the habitat appreciably diminishes the capability of the critical habitat to satisfy essential requirements of beach mice. The long-term maintenance of the beach mouse populations in the project areas could be compromised if the sand placement and dredged material placement activities occur too frequently resulting in a long-term barrier to mice movement. However, our evaluation indicates the impacts to critical habitat should be temporary in nature based on past history of nourishment projects. In addition, the area to be directly affected within the individual subspecies would be a small percentage of the overall critical habitat and would not be expected to reduce the carrying capacity of the recovery unit or appreciably diminish the ability of the PCE's to provide for the essential functions of the critical habitat units.

Species' response to a proposed action

This SPBO is based on effects that are anticipated to beach mice (all life stages) as a result of the temporary physical disturbance of beach mice habitat from beach nourishment or dredged material placement and associated activities. Some individual beach mice (all life stages) may be lost during the initial construction or expansion of beach accesses where heavy equipment destroys dune habitat and compacts the sand within the access corridor. Any mice that survive the initial construction may move outside of the disturbed area and construct burrows elsewhere in the vicinity. This will result in increased exposure to predation due to the removal of their burrows.

Following access construction, a bare gap of sand could form a barrier to limit beach mouse movement within the area altering regular movement patterns. The bare areas could not be used for foraging, breeding or sheltering. These impacts are expected to be limited to the construction phase of the project (one month to two years). As the life span of a beach mouse is estimated to be approximately nine months, the loss of individual mice or the temporary loss of habitat could affect several generations of beach mice, but because beach mice can reproduce rapidly with adequate resources, colonization or recolonization of the restored habitat would be expected.

Beach mice have evolved to adapt to catastrophic weather events. Additional factors such as surrounding development pressure and nonnative predators may affect the species' ability to recover from the loss of individuals. However, the temporary loss of the habitat itself is not expected to permanently impact the populations as all beach mouse habitat within the project areas not permanently destroyed would be restored or maintained as part of the conservation measures committed to by the Corps or the Applicant. The temporary nature of the impacts to dune habitats is not expected to alter the function and conservation role of the remaining beach mouse habitat including designated critical habitat.

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 SPBO. Future Federal actions that are unrelated to the proposed project are not considered in this opinion and require separate consultation pursuant to section 7 of the Act.

It is reasonably certain to expect that coastal development, human occupancy and recreational use along the Atlantic and Gulf coasts of Florida will increase in the future. Redevelopment along with new developments following the hurricane seasons of 2004 and 2005 are occurring as allowed by local zoning standards. It is unknown how much influence a nourished beach would contribute to the development and recreational use of the shoreline. Any projects that are within endangered or threatened species habitat will require section 7 consultation or section 10(a) (1)(B) permitting from the Service.

In recognizing the importance of coastal barrier islands along the Atlantic and Gulf coasts, Congress passed the Coastal Barrier Resources Act (CBRA) of 1982 and Coastal Barrier Improvement Act in 1991. The purpose of CBRA is "…to minimize the loss of human life, wasteful expenditure of Federal revenues, and the damage to fish, wildlife, and other natural resources associated with the coastal barriers along the Atlantic and Gulf coasts by restricting future Federal expenditures and financial assistance which have the effect of encouraging development of coastal barriers." Congress established the Coastal Barrier Resources System units that apply to the CBRA.

Escambia County is currently in the final permitting stages of a beach nourishment project for Perdido Key. The project would cover approximately 4 miles of beachfront along county and private lands, not including state and Federal lands. The Service completed an endangered species

consultation for the project in 2008. The project construction is expected to begin in late 2009-2010. The beach nourishment project is likely to enhance beach mouse habitat by providing an additional buffer to the dune habitats from storm events.

The Pensacola Naval Air Station has proposed to dredge their navigation channel resulting in the need to place eight million cubic yards of dredged material that is beach compatible. Because of cost, Perdido Key is the closest area to receive the material. Receiving areas include the Perdido Key Gulf beachfront (in lieu of the County implementing their project described above), PKSP, and GINS, Escambia County. The project could result in the placement of dredged material on 16 miles of beachfront including private, county, state, and Federal lands. The Navy has received their permits to complete the project. The Service completed an endangered species consultation for the project in 2007. The full project is on hold due to funding. However, the Federal navigation channel in the lower portion of the project area is expected to be maintenance dredged in 2009-2010.

Gulf County is currently completing a beach restoration project on St. Joseph peninsula and St. Joseph Peninsula State Park. The project will cover approximately 7.5 miles of Gulf of Mexico beachfront. The Service completed an endangered species consultation for the project. The project was completed in 2008.

CONCLUSION

Sea Turtles

After reviewing the current status of the loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles, the environmental baseline for the action area, the effects of the proposed activities, the "Conservation Measures," and the cumulative effects, it is the Service's biological opinion that work conducted under the Statewide Programmatic action, as proposed, is not likely to jeopardize the continued existence of the loggerhead, green, leatherback, hawksbill or Kemp's ridley sea turtles. Critical habitat has been designated for the NWAO DPS of the loggerhead sea turtle. **Table 4** has the list of the critical habitat units within the project area.

The conservation of the five loggerhead recovery units in the Northwest Atlantic is essential to the recovery of the loggerhead sea turtle. Each individual recovery unit is necessary to conserve genetic and demographic robustness, or other features necessary for long-term sustainability of the entire population. Thus, maintenance of viable nesting in each recovery unit contributes to the overall population. Three of the five loggerhead recovery units in the Northwest Atlantic occur within the action area, the PFRU, the DTRU, and the NGMRU. Sand placement is not expected to occur within the DTRU. The NGMRU averages about 1,000 nests per year. Northwest Florida accounts for 92 percent of this recovery unit in nest numbers (920 nests) and consists of approximately 234 miles of nesting shoreline. Of the available nesting habitat within the NGMRU, with most sand placement projects have a project life of five to seven years and channel maintenance activities occurring every two to three years, on average, sand placement impacts will

occur on 8.8 miles of sea turtle nesting shoreline per year. This is based on the average linear feet of beach on which sand placement occurred during nonemergency years from 2001 to 2008.

The PFRU averages 64,513 nests per year. The entire recovery unit occurs within Florida and consists of approximately 595 miles of sandy shoreline (http://www.dep.state.fl.us/beaches/publications/pdf/fl_beach.pdf). Of the available nesting habitat within the PFRU, sand placement activities will occur on 18.9 miles of nesting shoreline per year during nonemergency years. This is based on the average linear feet of beach on which sand placement occurred during non-emergency years from 2001 to 2008.

Generally, green, leatherback, hawksbill, and Kemp's ridley nesting overlaps with or occurs within the beaches where loggerhead sea turtles nest on both the Atlantic and Gulf of Mexico beaches. Thus, for green, leatherback, hawksbill, and Kemp's ridley sea turtles, sand placement activities will affect an average of 27.7 miles of shoreline per year. This is based on the average linear feet of beach on which sand placement occurred during nonemergency years from 2001 to 2008.

For all species of sea turtles, post-hurricane sand placement activities occurred on approximately 205 miles of shoreline for the 2004-2005 period following the emergency events (declared disasters and Congressional Orders). These activities are within the approximately 1,400 miles of available sea turtle nesting habitat in the southeastern U.S.

Research has shown that the principal effect of sand placement on sea turtle reproduction is a reduction in nesting success, and this reduction is most often limited to the first year following project construction. Research has also shown that the impacts of a nourishment project on sea turtle nesting habitat are typically short-term because a nourished beach will be reworked by natural processes in subsequent years, and beach compaction and the frequency of escarpment formation will decline. Although a variety of factors, including some that cannot be controlled, can influence how a nourishment project will perform from an engineering perspective, measures can be implemented to minimize impacts to sea turtles.

Beach Mice

The PKBM, CBM, and SABM occur on both public and private lands throughout their historical ranges. Both the SEBM and the AIBM are located completely on county, state, or federally protected lands, except for a small area in St. Johns County in which the AIBM are found on private lands along the Florida coast.

After reviewing the current status of the species of the SEBM, AIBM, PKBM, CBM, and SABM, the environmental baseline for the action area, the effects of beach nourishment and dredged material placement and associated activities, the "Conservation Measures," and the cumulative effects, it is the Service's biological opinion that the Statewide Programmatic action for these projects, as proposed, is not likely to jeopardize the continued existence of any of the above subspecies of beach mice and is not likely to destroy or adversely modify designated critical habitat for the PKBM, CBM, or SABM.

As discussed in the Effects of the Action section of this SPBO, we would not expect the carrying capacity of beach mouse habitat within the action area to be reduced. Beach mouse habitat will continue to provide for the biological needs of the subspecies as demonstrated below:

1. No permanent loss of beach mouse habitat will occur within the action area from the project construction or maintenance;

2. Temporary impacts to beach mouse habitat will be restored within the action area after project completion; and

3. A full complement of beach mouse habitat will remain within the action area after project completion.

Temporary impacts are expected to be limited to the construction/maintenance phase of the project and habitat restoration period following the project, which could be completed between one month and two years.

While a few beach mice may be lost, beach mice recover well from population size reductions (Wooten 1994) given sufficient habitat is available for population expansion after the bottleneck occurs. Therefore, we do not consider the potential loss of individuals to be significant.

Also, 50 feet of beach mouse critical habitat for each subspecies (PKBM, CBM, and SABM) could be temporarily affected each time a project is completed as a result of the sand placement activities. We would not anticipate that the loss of the critical habitat would alter or affect the remaining critical habitat in the action area for each subspecies (PKBM, CBM, and SABM) to the extent that it would appreciably diminish the habitat's capability to provide the intended conservation role for the subspecies in the wild.

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 shall 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 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 shall 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 ANTICIPATED TAKE

Sea Turtles

The Service anticipates that no more than 27.7 miles of highly eroded shoreline along the Florida coastline (no more than 8.8 miles within the NGMRU and no more than 18.9 miles within the PFRU) would receive sand placement per year during nonemergency calendar years with a maximum of 102 miles of shoreline (38 miles within the NGMRU and 64 miles of shoreline within the PFRU) receiving sand during or following an emergency event (declared disaster or Congressional Order) as a result of the Statewide Programmatic action. This represents two percent of the entire shoreline per year during a nonemergency year and seven percent of the entire shoreline during an emergency year. Over the last 10 years, one Congressional Order occurred due to emergency events in the 2004-2005 period. The increased sand placement on 102 miles of shoreline is expected to occur once in a 10-year period due to emergency events. Incidental take of sea turtles will be difficult to detect for the following reasons:

1. Turtles nest primarily at night and all nests are not located 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 prevent an unknown number of females from accessing a suitable nesting site.

However, the level of take of these species due to disturbance and sand placement on suitable turtle nesting beach habitat can be anticipated because (1) turtles will continue to nest within the project site during and following sand placement; (2) sand placement activities will likely occur during a portion of the nesting season; (3) sand placement activities will modify the incubation substrate, beach slope, and sand compaction; and (4) artificial lighting will deter or misdirect nesting females and hatchlings during and following sand placement.

Take is expected to be in the form 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 project areas; (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 projects; (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 sand placement areas or on adjacent beaches during sand placement or construction activities; (5) misdirection of nesting and hatchling turtles on beaches adjacent to the sand placement or construction area as a result of project lighting including the ambient lighting from dredges; (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.

According to Schroeder (1994), there is an average survey error of seven percent; therefore, there is the possibility that some nests within the Action Area may be misidentified as false crawls and missed. However, due to implementation of the sea turtle protection measures, we anticipate that the take will not exceed seven percent of the nesting average in the action area. This number is not the level of take anticipated because the exact number cannot be predicted nor can the level of incidental take be monitored.

Beach Mouse

The Service has reviewed the biological information and other information relevant to this action. Based on this review, incidental take is anticipated from the sand placement activities may occur any time of the year within a ten-year period. The Service anticipates incidental take of beach mice would be difficult to detect for the following reasons: (1) an unknown number of beach mice may be injured, crushed or buried during beach access construction work and remain entombed in the sand; (2) beach mice are nocturnal, are small, and finding a dead or injured body is unlikely because of predation, and (3) changes in beach mouse essential life behaviors may not be detectable in standardized monitoring surveys.

For projects that occur within beach mouse habitat it is anticipated that no more than 50 linear feet of beach mouse habitat could be affected per sand placement activity for beach access within a subspecies range statewide as a result of the sand placement activities.

The incidental take is expected to be in the form of: (1) harm or harassment to all beach mice occupying the created or expanded beach access points; (2) harassment of beach mice from disturbance of foraging opportunities within the access areas during the construction period; (3) harassment of beach mice from temporary loss of foraging and burrow habitat; and (4) harassment of beach mice from temporary restriction of movement across access areas.

EFFECT OF THE TAKE

Sea Turtles

In the SPBO, the Service determined that the level of anticipated take is not likely to result in jeopardy to the loggerhead, green, leatherback, hawksbill or Kemp's ridley sea turtles. Loggerhead critical habitat has been designated in the project area. Based on the Corps incorporation of the conservation measures into the project, the Service concurs that the project may affect but is not likely to adversely affect nor adversely modify NWAO loggerhead critical habitat in the terrestrial environment. The Corps will consult with the NMFS on any impacts to critical habitat in the marine environment.

Incidental take of loggerhead nesting and hatchling sea turtles and sea turtle nests is anticipated to occur during project construction and during the life of the project. Take will occur on nesting habitat consisting of the length of the beach where the material will be placed or where jetty or groin maintenance is located but is not expected to exceed 8.8 miles of shoreline per year within the northwest portion of Florida for the NGMRU and 18.9 miles of shoreline per year within the PFRU during a nonemergency year. Take will occur on nesting habitat consisting of the length of the beach where the material will be placed or where groin maintenance is located but is not expected to exceed 102 miles of shoreline (38 miles of shoreline per year within the northwest portion of Florida for the NGMRU and 64 miles of shoreline per year within the PFRU) during an emergency (declared disasters or Congressional Orders) year. The increased sand placement of 102 miles of shoreline is expected to occur once in a 10-year period due to emergency events.

Incidental take of green, leatherback, hawksbill and Kemp's ridley nesting and hatchling sea turtles and sea turtle nests is anticipated to occur during project construction and during the life of the project or while placed sand remains on the beach. Take will occur on nesting habitat consisting of the length of the beach where the material will be placed or where jetty or groin maintenance is located but is not expected to exceed 27.7 miles (8.8 miles within the northwest portion of Florida and 18.9 miles within the northeast, south and west portion of Florida) of shoreline per year during a nonemergency year. Take will occur on nesting habitat consisting of the length of the beach where the material will be placed or where jetty or groin maintenance is located but is not expected to exceed 102 miles of shoreline (38 miles of shoreline per year within the northwest portion of

Florida for the NGMRU and 64 miles of shoreline per year within the PFRU) during an emergency (declared disasters or Congressional Orders) year.

Beach Mouse

In the SPBO, the Service determined that this level of anticipated take is not likely to result in jeopardy to AIBM, SEBM, PKBM, CBM, and SABM or in adverse modification or destruction of designated critical habitat for the PKBM, CBM, or SABM. Critical habitat for the SEBM and AIBM has not been designated; therefore, the project will not result in destruction or adverse modification of critical habitat for these subspecies.

Incidental take of SEBM, AIBM, PKBM, CBM, and SABM is anticipated to occur at beach access locations for the sand placement activities. Take will occur during project construction where beach access points are expanded or created and where equipment is staged or stored within beach mouse habitat along approximately 50 feet of vegetated dunes for beach access.

REASONABLE AND PRUDENT MEASURES

The Service has determined that the following reasonable and prudent measures are necessary and appropriate to minimize take of the loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles; SEBM, AIBM, CBM, PKBM, and SABM in the action area for the following activities:

A. Sand placement from beach nourishment, sand bypass, and sand back pass activities;

B. Sand placement from navigation channel maintenance; and

C. Groin and jetty repair or replacement.

If the Corps is unable to comply with the Reasonable and Prudent Measures and Terms and Conditions, the Corps as the construction agent or regulatory authority may:

1. Inform the Service why the term and condition is not reasonable and prudent for the specific project or activity and request exception under the SPBO or
2. Initiate consultation with the Service for the specific project or activity. The Service may respond by either of the following:
    a. Allowing an exception to the terms and conditions under the SPBO or
    b. Recommending or accepting initiation of consultation (if initiated by the Corps) for the specific project or activity.

Post construction requirements are listed in Reasonable and Prudent measures, A11, A12, A13, and A14. These post construction requirements may besubject to congressional authorization and the allocation of funds. Florida State statutes apply. If the Corps or Applicant cannot fulfill these Reasonable and Prudent Measures, the Corps must reinitiate consultation.

REASONABLE AND PRUDENT MEASURES for:

A. Projects that include sand placement from beach nourishment, sand bypass, and sand back pass activities primarily for shore protection (these projects are usually larger scaled) shall include the following measures:

A1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice shall be implemented in the Corps federally authorized project or regulated activity.

A2. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence and beach mouse burrow construction shall be used for sand placement.

A3. Sand placement shall not occur during the period of peak sea turtle egg laying and egg hatching, to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation. In Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward counties, sand placement shall not occur from May 1 through October 31. In St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County, and Manasota Key in Sarasota and Charlotte counties, sand placement shall not occur from June 1 through September 30. This time frame does not include Venice Beach and which has low density nesting. In Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte (except Manasota Key), Sarasota (except Manasota Key), Manatee, Hillsborough, Pinellas, Franklin (except St. George Island), Gulf (except St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas), Bay, Walton, Okaloosa, Santa Rosa, and Escambia counties, Florida, sand placement may occur during the sea turtle nesting season.

A4. All derelict material or other debris shall be removed from the beach prior to any sand placement.

A5. The beach profile template for the sand placement project shall be designed to mimic, the native beach berm elevation and beach slopes landward and seaward of the equilibrated berm crest.

A6. If a dune system is already part of the project design, the placement and design of the dune shall emulate the natural dune system to the maximum extent possible, including the dune configuration and shape.

A7. Predator-proof trash receptacles shall be installed and maintained at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice.

A8. A meeting between representatives of the Applicant's or Corps, Service, FWC, the permitted sea turtle surveyor, and other species surveyors, as appropriate, shall be held prior to the commencement of work on this project.

A9. If the beach nourishment project will be conducted during the sea turtle nesting season, surveys for nesting sea turtles must be conducted by the FWC-authorized Marine Turtle Permit Holder. Surveys for early and late nesting sea turtles shall be conducted where appropriate.

A10. If nests are constructed in the area of proposed sand placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation.

A11. A post construction survey(s) of all artificial lighting visible from the project beach shall be completed by the Applicant or Corps.

A12. The Applicant or Corps shall ensure that daily nesting surveys are conducted by the FWC Marine Turtle Permit Holder for two nesting seasons following construction if the new sand still remains on the beach.

A13. Sand compaction shall be monitored and tilling shall be conducted if needed to reduce the likelihood of impacting sea turtle nesting and hatching activities.

A14. Escarpment formation shall be monitored and leveling shall be conducted if needed to reduce the likelihood of impacting nesting and hatchling sea turtles.

A15. Construction equipment and materials including pipes shall be stored off the beach in a manner that will minimize impacts to nesting and hatchling sea turtles and beach mice.

A16. Lighting associated with the project construction including on the dredge shall be minimized to reduce the possibility of disrupting and disorienting nesting and hatchling sea turtles and nocturnal activities of beach mice.

A17. During the sea turtle nesting season, the Corps shall not extend the beach fill more than 500 feet (or other agreed upon length if a FWC permit holder is present) between dusk and the time of completion the following day's nesting survey to reduce the impact to emerging sea turtles and burial of new nests.

A18. All vegetation planting shall be designed and conducted to minimize impacts to sea turtles and beach mice.

A19. Beach mouse habitat shall be avoided to the maximum extent possible when selecting sites for access corridors, storage and staging of equipment.

A20. Equipment and construction materials shall not be stored near the seaward dune toe in areas of occupied beach mouse habitat. This area is highly utilized by beach mice.

A21. Existing vegetated habitat at beach access points and travel corridors shall be protected to the maximum extent possible to ensure vehicles and equipment transport stay within the access corridor.

A22. Expanded or newly created beach access points shall be restored following construction.

A23. A report describing the actions taken shall be submitted to the Service following completion of the proposed work.

A24. 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

All conservation measures described in the Corps' Programmatic Biological Assessment are hereby incorporated by reference as Terms and Conditions within this document pursuant to 50 CFR §402.14(I) with the addition of the following Terms and Conditions. In order to be exempt from the prohibitions of section 9 of the Act, the Corps shall comply with the following Terms and Conditions, which implement the Reasonable and Prudent Measures, described above and outline reporting/monitoring requirements.

These Terms and Conditions are nondiscretionary.

Post construction requirements are listed in Terms and Conditions A11, A12, A13, and A14. These post construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Applicant cannot fulfill these Terms and Conditions, the Corps must reinitiate consultation.

TERMS AND CONDITIONS for:

A. Projects that include sand placement from beach nourishment, sand bypass, and sand back pass activities primarily for shore protection shall include the following conditions:

All beaches

A1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice listed on pages 9 and 10 of the SPBO shall be implemented in the Corps federally authorized project or regulated activity.

A2. Beach-compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. The fill material must be similar in both coloration and grain size distribution to that native beach. 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. Fill material shall comply with FDEP requirements pursuant to the Florida Administrative Code (FAC) subsection 62B-41.005(15). If a variance is requested from FDEP, the Service must be contacted to discuss whether the project falls outside of the SPBO. A Quality Control Plan shall be implemented pursuant to FAC Rule 62B-41.008(1)(k)4.b.

A3. Sand placement shall not occur during the period of peak sea turtle egg laying and egg hatching to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation.

a. Sand placement projects in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward counties shall be started after October 31 and be completed before May 1. During the May 1 through October 31 period, no construction equipment or pipes may be placed and/or stored on the beach.

b. Sand placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties may occur during the sea turtle nesting season except on publicly owned conservation lands such as state parks and areas where such work is prohibited by the managing agency or under applicable local land use codes (see exceptions in A3.c below).

c. For higher density nesting beaches in Gulf and Franklin counties sand placement shall not occur during the main part of the nesting season (June 1 through September 30). On Manasota Key located in Sarasota and Charlotte counties (excluding Venice Beach), sand placement shall not occur during the main part of the nesting season (May 1 through October 31). These beaches include St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, and St. George Island in Franklin County.

The Service shall be contacted for coordination, on a project-by-project basis, if sand placement is needed on publicly owned conservation lands and in these higher density nesting beaches in Gulf and Franklin Counties and on Manasota Key in Sarasota and Charlotte counties during the above exclusionary period. The Service will determine whether work (1) may proceed in accordance with the Terms and Conditions; (2) may proceed in accordance with the Terms and Conditions and other requirements as developed by the Service; or (3) would require an individual emergency consultation.

Land managers on publicly owned conservation lands must be involved in the project coordination.

A4. All derelict concrete, metal, and coastal armoring geotextile material and other debris shall be removed from the beach to the maximum extent possible prior to any sand placement in accordance with the dates in A3. If debris removal activities take place during shorebird breeding or peak sea turtle nesting season (**Tables 17 and 18**), the work shall be conducted during daylight hours only and shall not commence until completion of daily seabird, shorebird or marine turtle surveys each day.

A5. The beach profile template for the sand placement project shall be designed to mimic, the native beach berm elevation and beach slopes landward and seaward of the equilibrated berm crest. Prior to drafting the plans and specifications for a beach nourishment project, the Corps must meet with the Service, FWC, and FDEP to discuss the beach profile surveys, dune formation (specifically on high density green turtle nesting beaches), and the sea turtle monitoring reports from previous placement events. The meeting will be used to discuss modifications to the beach profile based on the post-construction monitoring data.

Beach profile may vary depending on location, shoreline dynamics, nature of the fill material, and other factors. If a native beach berm elevation is not possible, due to the beach width, impacts to nearshore hardbottom, or other considerations, as discussed during the meeting, the alternative template shall include features to minimize impacts to sea turtle nesting success and the potential for ponding and escarpment formation for that beach. For all high density green turtle nesting beaches (http://ocean.floridamarine.org/SeaTurtleNesting/), the formation of a dune, either through direct creation or natural accretion, will be included in the project design. Dunes and other construction features must be within the scope of the Congressionally-authorized project, if it is a civil works project, and constructible without impacting other resources. If a recommended dune is not possible, the Corps will contact the Service to see if consultation needs to be reinitiated or discuss features incorporated with the profile that will enhance the existing dune. Dune features included in the profile design (or project) shall have a slope of 1.5:1 followed by a gradual slope of 4:1 for approximately 20 feet seaward on a high erosion beach (**Figure 13)** or a 4:1 slope (**Figure 14**) on a low erosion beach. The Corps must explore options to include a dune system in the project design for existing authorized projects and new non-Federal projects. If another slope is proposed for use, the Corps shall consult the Service. The seaward toe of the dune should be at least 20 feet from the waterline.

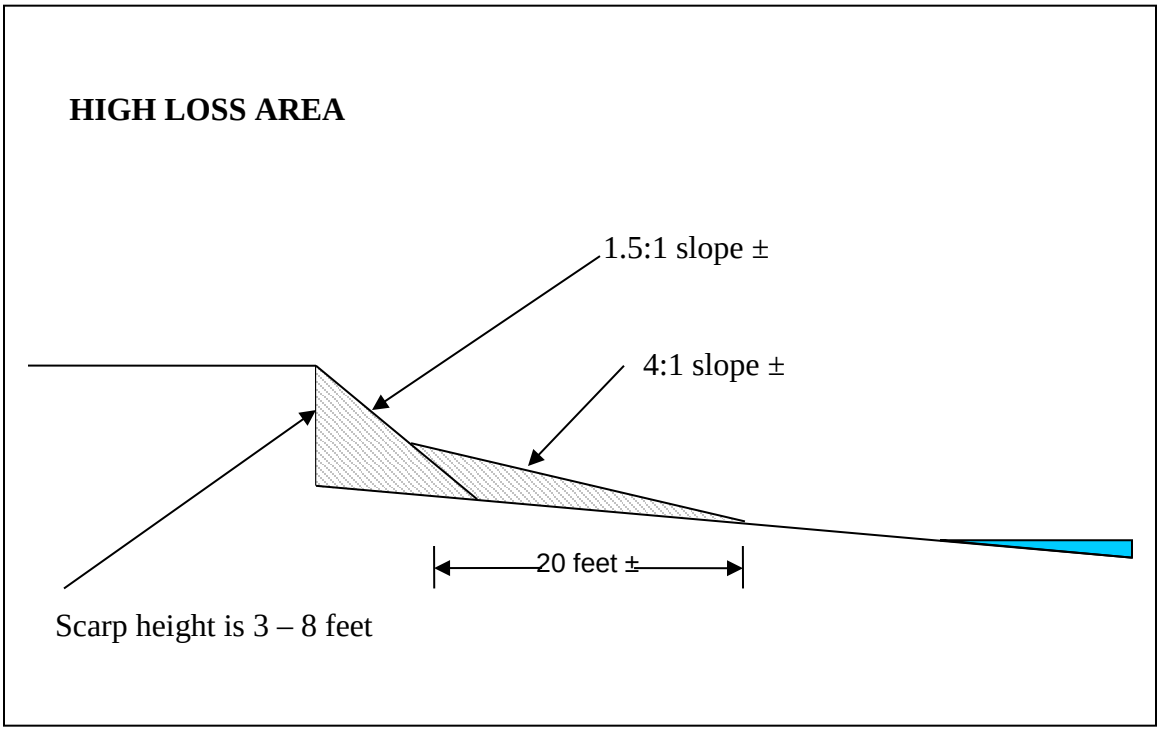

Figure 13. Recommended slope on a high erosion beach for sand placement projects that include the creation of a dune.

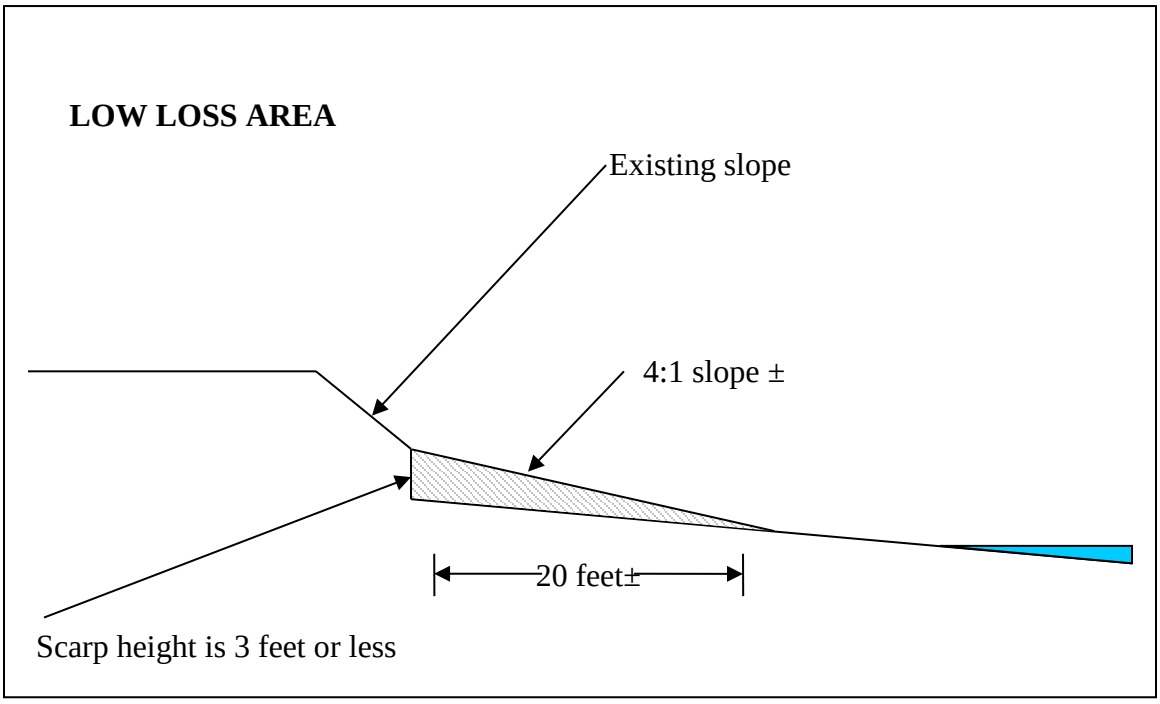

Figure 14. Recommended slope on a low erosion beach for sand placement projects that include the creation of a dune.

A6. Predator-proof trash receptacles shall be installed and maintained during construction at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice (**Appendix F**). The Corps shall provide predator-proof trash receptacles for the construction workers. The Corps shall brief workers on the importance of not littering and keeping the project area trash and debris free.

A7. A meeting between representatives of the Corps (including the Corps project manager and/or the managing contractor), the Service, the FWC, the FWC Marine Turtle Permit Holder, 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, and will include the following

a. Staging locations, storing equipment including fuel stations
b. Coordination with the Marine Turtle Permit Holder on nesting surveys and any nighttime work
c. Pipeline placement (between 5 to 10 feet from dune)
d. Minimizing driving
e. Egg relocation- permit holder and location (must be approved by FWC)
f. Free-roaming cat observation (for projects in or near beach mouse habitat)
g. Follow up lighting surveys - dates and inspector
h. Follow up coordination during construction and post construction
i. Coordination on construction lighting including dredge lighting and travel within and adjacent to the work area
j. Direction of the project including progression of sand placement along the beach
k. Late season nests present in project area (if any)
l. Plans for compaction monitoring or tilling
m. Plans for escarpment surveys

At the preconstruction meeting, the Corps shall also provide the Service with specific anticipated shoreline lengths and anticipated duration using the form on the following web link: http://www.fws.gov/northflorida/SeaTurtles/Docs/Corp%20of%20Engineers%20Sea%20Turtle%20Permit%20Information.pdf. Only the following information should be filled out: Corps Permit Number, FWS Log Number, Project Location, Construction Activity, Duration of Protect, and Actual Take (linear feet of beach). This form shall be emailed to the Service at seaturtle@fws.gov. This form is in addition to the annual report listed below.

Sea Turtle Protection

A8. Daily early morning surveys for sea turtle nests shall be required and continue throughout the season as outlined in **Tables 16 and 17 (Nesting Season Monitoring)** if construction

occurs during the nesting and hatching season. Any known nests recorded just prior to the beginning of Nesting Season Monitoring must be relocated if it will be impacted by the construction activity or marked and avoided if feasible.

Table 16. Beach Sand Placement and Sea Turtle Nest Monitoring/Relocation Windows, Brevard through Broward Counties, Coast of Florida.

Region	Nest Laying Season	Hatching Season Ends (Last day requiring prior monitoring/relocation)	Beach Placement Window	Early Season Relocation*	Late Season Relocation**	Nesting Season Monitoring (monitoring throughout season)
Brevard, Indian River, St. Lucie, and Broward Counties	25 Feb - 11 Nov	15 Jan	1 Nov - 30 Apr	1 Mar - 30 Apr In Brevard, Indian River, St. Lucie, & Broward counties nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded	65 days prior to Jan 15 (11 Nov) (or 65 days prior to start of construction **)	1 Mar - 11 Nov ***
Martin and Palm Beach Counties	12 Feb – 17 Nov	21 Jan	1 Nov - 30 Apr	1 Mar - 30 Apr In Martin and Palm Beach Counties, nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded	65 days prior to 21 Jan (17 Nov) (or 65 days prior to start of construction**)	1 Mar - 17 Nov***

** Relocation can only begin after FWC authorizes nest relocation in accordance with Florida Statute 379.2431 (1).

*** (For late season monitoring: 7 days without a nest, can stop monitoring once electronic mail concurrence is received from FWS or FWC).

Table 17. Beach Sand Placement and Sea Turtle Nest Monitoring/Relocation Windows, Outside of Brevard through Broward Counties, Coast of Florida.

Region	Nest Laying Season	Hatching Season Ends (Last day requiring prior monitoring/ relocation)	Beach Placement Window	Nesting Season Monitoring and Relocation (monitoring throughout season)
Nassau, Duval, Flagler, St. Johns, and Volusia Counties	2 Apr. – 24 Oct	28 Dec	All Year	15 Apr – 24 Oct ***
Miami-Dade County	11 Feb – 25 Sep	29 Nov	All Year	1 Mar – 25 Sep***
Gulf County (St. Joseph Peninsula State Park, St. Joseph peninsula, Cape San Blas) & Franklin County (St. George Isl)	1 May - 4 Sep	13 Nov	1 Oct - 31 May	1 May – 4 Sep***
All other beaches in Gulf and Franklin Counties, and Escambia, Santa Rosa, Okaloosa, Walton, and Bay Counties	2 May – 16 Sep	24 Nov	All Year	1 May - 16 Sep***
Sarasota and Charlotte Counties (Manasota Key)	24 Apr – 7 Sep	11 Nov	1 Nov - 30 Apr (except Venice beach)	15 Apr – 7 Sep***
All other beaches in Sarasota and Charlotte Counties	24 Apr – 12 Sep	16 Nov	All Year	15 Apr – 12 Sep***
Pinellas, Hillsborough, Manatee, Lee, Collier, and Monroe Counties	20 Apr – 19 Sep	23 Nov	All Year	15 Apr – 19 Sep***

*** (For late season monitoring: 7 days without a nest, can stop monitoring once electronic mail concurrence is received from FWS or FWC).

A9. If nests are constructed in the area of anticipated sand placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation as outlined in a through f. If nests are laid on the dune outside of the immediate sand placement area, the Corps must contact the Service to discuss whether relocation or mark and avoidance is required. Any known nests recorded just prior to the beginning of Nesting Season Monitoring must be relocated if it will be impacted by the construction activity or marked and avoided if feasible.

a. For sand placement projects in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties that occur during the earlier part of the nesting season (see Table 14) through April 30, daily early morning surveys shall begin March 1 and continue through the end of the beach placement window, with egg relocation continuing only until completion of fill placement. Eggs shall be relocated per the following requirements (i through iii below). For sand placement projects that occur during the period from November 1 through the end of hatching season (see Table 16), daily early morning sea turtle nesting surveys shall be conducted 65 days prior to project initiation and continue through November 11, and eggs shall be relocated per the requirements listed in (a)i through (a)iii. The Corps must contact the Service if there are any nests still incubating after November 30.

i. 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 FAC 68E-1. Please contact FWC's Imperiled Species Management Section in Tequesta at mtp@myfwc.com for information on the permit holder in the project area. Relocation cannot begin until the Corps has a copy of the FWC permit authorizing relocation for construction purposes at that particular sand placement project. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (this is for all time zones).

ii. 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, predation, or be subject to artificial lighting. Nest relocations in association with construction activities shall cease when construction activities no longer threaten nests.

iii. 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 situ unless other factors threaten the success of the nest. The turtle permit holder shall install an on-beach marker at the nest site and 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 that 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.

Daytime surveys shall be conducted for leatherback sea turtle nests beginning March 1. Nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded within the project area through April 30 or until completion of the project (whichever is earliest). Nightly nesting surveys shall be conducted from 9 p.m. until 6 a.m. The project area shall be surveyed at 1-hour intervals (since leatherbacks require at least 1.5 hours to complete nesting, this will ensure all nesting leatherbacks are encountered) and eggs shall be relocated per the requirements listed in (a)i through (a)iii.

b. For sand placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties that occur during the period of sea turtle nest laying (**see Table 17**), daily early morning (before 9 a.m.) surveys and egg relocation shall be conducted. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Franklin, Gulf, Sarasota, and Charlotte Counties in A10.d. below).

c. For Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties, nesting surveys shall be initiated 70 days prior to sand placement activities (incubation periods are longer in these counties) or by nesting season monitoring (see Table 17) whichever is later. Nesting surveys shall continue through the end of nesting season monitoring (see Table 17) with relocation only through the end of fill placement. Hatching and emerging success monitoring will involve checking nests beyond the completion date of the daily early morning nesting surveys. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Franklin and Gulf Counties in A10.d. below).

d. For St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County, and Manasota Key in Sarasota and Charlotte Counties, sand placement activities shall occur only during the Beach Placement Window indicated in Table 17 (except on Venice Beach), outside the period of peak sea turtle egg laying and egg hatching for this area. If nests are laid

in the early part of the nesting season monitoring during the beach placement window in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii.

e. For Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, Collier, and Monroe Counties, nesting surveys shall be initiated 65 days prior to nourishment or dredged channel material placement activities or by the beginning of the nesting season monitoring indicated in Table 17 whichever is later. Nesting surveys shall continue through the end of nesting season monitoring (see Table 17), with egg relocation continuing only through the end of fill placement. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Sarasota and Charlotte Counties in A10.d. above).

f. For Miami-Dade County, nesting surveys shall be initiated 65 days prior to nourishment or dredged channel material placement activities or by the beginning of the nesting season monitoring indicated in Table 17, whichever is later. Nesting surveys shall continue through the end of the nesting season monitoring and egg relocation shall continue through the end of sand placement. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii

g. For Volusia, Flagler, St. Johns, Duval, and Nassau Counties, nesting surveys shall be initiated 65 days prior to sand placement activities or by the beginning of the nesting season monitoring indicated in Table 17, whichever is later. Nesting surveys shall continue through the end of nesting season monitoring indicated in Table 17 and egg relocation shall continue through the end of sand placement. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii.

A10. Two surveys shall be conducted of all lighting visible from the beach placement area by the Applicant or Corps, using standard techniques for such a survey (**Appendix C**), in the year following construction. The first survey shall be conducted between May 1 and May 15 and a fill out FWS Sea Turtle Lighting Survey Form (**Appendix D**) and send electronically to seaturtle@fws.gov. The second survey shall be conducted between July 15 and August 1. A summary report of the surveys, including any actions taken, shall be submitted to the Service by December 31 of the year in which surveys are conducted. After the annual report is completed, a meeting shall be set up with the Applicant, county or municipality, FWC, Corps, and the Service to discuss the survey report, as well as any documented sea turtle disorientations in or adjacent to the project area. If the project is completed during the nesting season and prior to May 1, the Corps may conduct the lighting surveys during the year of construction.

A11. Daily nesting surveys shall be conducted for two nesting seasons following construction in accordance with **Table 18** and reported in accordance with **Table 20** by the Corps or the Applicant if placed material still remains on the beach. Post construction year-one surveys shall record the number of nests, nesting success, reproductive success, disorientations, and lost nests due to erosion and/or inundation. Post construction year-two surveys shall only need to record nest numbers, nesting success, and disorientations (**Table 20**). This information will be used to periodically assess the cumulative effects of these projects on sea turtle nesting and hatchling production and monitor suitability of post construction beaches for nesting.

Table 18. Post-Construction Sea Turtle Monitoring.

Region	Nest Laying Season	Years 1 and 2 Post-Construction Monitoring
Brevard, Indian River, St. Lucie, and Broward Counties Martin and Palm Beach Counties	25 Feb – 11 Nov 12 Feb – 17 Nov	Daily surveys: 1 Mar - 31 Oct (for late season: 15 days without a nests, can stop monitoring-email FWS and FWC to stop
Nassau, Duval, and St. Johns, Counties	2 Apr. – 24 Oct.	Daily surveys: 1 May – 30 Sep
Flagler and Volusia Counties	2 Apr. – 24 Oct.	Daily surveys: 15 Apr- 15 Oct
Miami-Dade County	11 Feb – 25 Sep	Daily surveys: 1 Apr – 30 Sep
Gulf County (St. Joseph Peninsula State Park, St. Joseph peninsula, Cape San Blas) and Franklin County (St. George Island) All other beaches in Gulf and Franklin Counties, and Escambia, Santa Rosa, Okaloosa, Walton, and Bay Counties	1 May – 4 Sep 2 May – 16 Sep	Daily surveys: 1 May – 31 Aug
Sarasota and Charlotte Counties (Manasota Key) All other beaches in Sarasota and Charlotte Counties Pinellas, Hillsborough, Manatee, Lee, Collier, and Monroe Counties	24 Apr – 7 Sep 24 Apr – 12 Sep 20 Apr – 19 Sep	Daily surveys: 15 Apr –15 Sep

A12. Sand compaction shall be monitored in the area of sand placement immediately after completion of the project and prior to the dates in **Table 19** for 3 subsequent years.

Table 19. Dates for Compaction Monitoring and Escarpment Surveys by County.

County where project occurs	Date
Brevard, Indian River, St. Lucie, Martin, Palm Beach, Broward, Miami-Dade, and Monroe	Work must be completed by Mar 1
Miami-Dade, Monroe	Work must be completed by April 1
Escambia, Santa Rosa, Okaloosa, Walton, Bay, Gulf, Franklin, Volusia, Flagler, St. Johns, Duval, Nassau, Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, Collier	Work must be completed by Apr 15

If tilling is needed, the area shall be tilled to a depth of 36 inches. Each pass of the tilling equipment shall be overlapped to allow more thorough and even tilling. All tilling activity shall be completed at least once prior to the nesting season. An electronic copy of the results of the compaction monitoring shall be submitted electronically to seaturtle@fws.gov prior to any tilling actions being taken or if a request not to till is made based on compaction results. 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.

(NOTE: If tilling occurs during shorebird nesting season (February 15-August 31), shorebirds surveys prior to tilling are required per the Migratory Bird Treaty Act. See Appendix E for shorebird conditions recommended by FWC.

a. Compaction sampling stations shall be located at 500-foot intervals along the sand placement template. 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).

b. At each station, the cone penetrometer shall be pushed to a depth of 6, 12, and 18 inches three times (three replicates at each depth). 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 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 six averaged compaction values.

c. 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 appropriate date listed in **Table 19**.

d. 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.

e. 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.

A13. Visual weekly surveys for escarpments along the project area shall be made immediately after completion of the sand placement and within 30 days prior to the start dates for Nesting Season Monitoring in **Table 19** for 3 subsequent years if sand in the project area still remains on the dry beach.

Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet shall be leveled and the beach profile shall be reconfigured to minimize scarp formation by the dates listed in **Table 19**. Any escarpment removal shall be reported by location in the annual report. If the project is completed during the early part of the sea turtle nesting and hatching season (March 1 through April 30), escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. If during weekly escarpment surveys, it is found that subsequent reformation of escarpments interferes with sea turtle nesting or that they exceed 18 inches in height for a distance of 100 feet during the nesting and hatching season, the Service shall be contacted immediately to determine the appropriate action to be taken. If it is determined by the Service or FWC that that escarpment leveling is required during the nesting or hatching season the Service, in coordination with the FWC, will provide a brief written authorization within 5 days 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 sent electronically to seaturtle@fws.gov. A summary is required even when no action has been taken (**Table 3**).

A14. Staging areas for construction equipment shall be located off the beach during early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see table 14) and peak nesting season (May 1 through October 31) for the remaining counties. 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 placed on the beach shall be located as far landward as

possible without compromising the integrity of the dune system. Pipes placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune if the width of the beach allows. Temporary storage of pipes shall be off the beach to the maximum extent possible. If the pipes are stored 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. If the pipes placed parallel to the dune cannot be placed between 5 to 10 feet away from the toe of the dune during nesting and hatching season, the Corps must reinitiate consultation with the Service as this represents adverse effects not addressed in this SPBO. If it will be necessary to extend construction pipes past a known shorebird nesting site or over-wintering area for piping plovers, then whenever possible those pipes shall be placed landward of the site before birds are active in that area. No pipe or sand shall be placed seaward of a shorebird nesting site during the shorebird nesting season.

A15. Direct lighting of the beach and nearshore waters shall be limited to the immediate construction area during early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see Table 14) and peak nesting season (May 1 through October 31) for the remaining counties, and shall comply with safety requirements. A light management plan for the dredge and the work site shall be submitted for approval by the Service and FWC prior to the pre-construction meeting. In accordance with this plan, lighting on all 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, Corps 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 on dredge and land-based lights and be large enough to block light from all lamps from being transmitted outside the construction area or to the adjacent sea turtle nesting beach in line-of-sight of the dredge (**Figure 15**).

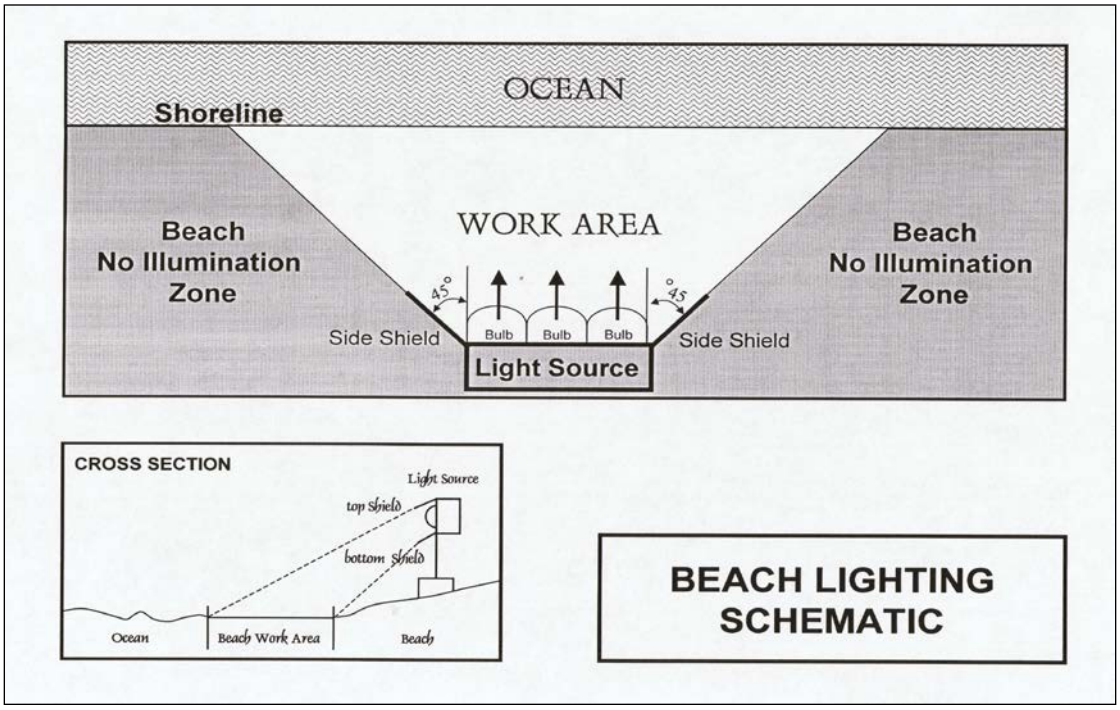

Figure 15. Beach lighting schematic.

A16. During the early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see Table 14) and peak nesting season (May 1 through October 31) for the remaining counties, the Corps shall not extend the beach fill more than 500 feet (or other agreed upon length) along the shoreline between dusk and dawn of 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 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 Corps will be allowed to proceed with the placement of fill during daylight hours until dusk at which time the 500-foot length (or other agreed upon length) limitation shall apply. If any nesting turtles are sighted on the beach within the immediate construction area, activities shall cease immediately until the turtle has returned to the water and the sea turtle permit holder responsible for nest monitoring has relocated the nest.

Dune Planting

A17. All vegetation planting shall be designed and conducted to minimize impacts to sea turtles and beach mice. Dune vegetation planting may occur during the sea turtle nesting season under the following conditions.

a. Daily early morning sea turtle nesting surveys (before 9 a.m.) shall be conducted during the Nest Laying period for all counties in Florida where sea turtle nesting occurs (see Tables 16 and 17). Nesting surveys shall only be conducted by personnel with prior experience and training in nesting surveys. Surveyors shall have a valid FWC permit. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (all times). No dune planting activity shall occur until after the daily turtle survey and nest conservation and protection efforts have been completed. Hatching and emerging success monitoring will involve checking nests beyond the completion date of the daily early morning nesting surveys;

b. Any nests deposited in the dune planting area not requiring relocation for conservation purposes shall be left in place. The turtle permit holder shall install an on-beach marker at the nest site and 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. A series of stakes and highly visible survey ribbon or string shall be installed to establish a 3-foot radius around the nest. No planting or other activity shall occur within this area nor will any activities be allowed that 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 planting activity;

c. If a nest is disturbed or uncovered during planting activity, the Corps, or the Applicant shall cease all work and immediately contact the project turtle permit holder. If a nest(s) cannot be safely avoided during planting, all activity within 10 feet of a nest shall be delayed until hatching and emerging success monitoring of the nest is completed;

d. All dune planting activities shall be conducted by hand and only during daylight hours;

e. All dune vegetation shall consist of coastal dune species native to the local area; (*i.e.*, native to coastal dunes in the respective county and grown from plant stock from that region of Florida). Vegetation shall be planted with an appropriate amount of fertilizer and antidesiccant material for the plant size;

f. No use of heavy equipment shall occur on the dunes or seaward for planting purposes. A lightweight (all-terrain type) vehicle, with tire pressures of 10 psi or less may be used for this purpose; and

g. Irrigation equipment, if needed, shall be authorized under a FDEP permit.

<u>Beach Mouse Protection</u>

A18. Beach mouse habitat shall be avoided when selecting sites for equipment, pipes, vehicle storage and staging to the maximum extent possible. Suitable beach mouse habitat

constitutes the primary dunes (characterized by sea oats and other grasses), secondary dunes (similar to primary dunes, but also frequently includes such plants as woody goldenrod, false rosemary), and interior or scrub dunes.

A19. Equipment placement or storage shall be excluded in the area between 5 to 10 feet seaward of the existing dune toe or 10 percent of the beach width (for projects occurring on narrow eroded beach segments) seaward of the dune toe in areas of occupied beach mouse habitat (**Figure 16**). The toe of the dune is where the slope breaks at the seaward foot of the dune. If the pipes placed parallel to the dune cannot be placed between 5 to 10 feet away from the toe of the dune as required during sea turtle nesting and hatching season, the Corps must reinitiate consultation with the Service as this represents adverse effects not addressed in this SPBO.

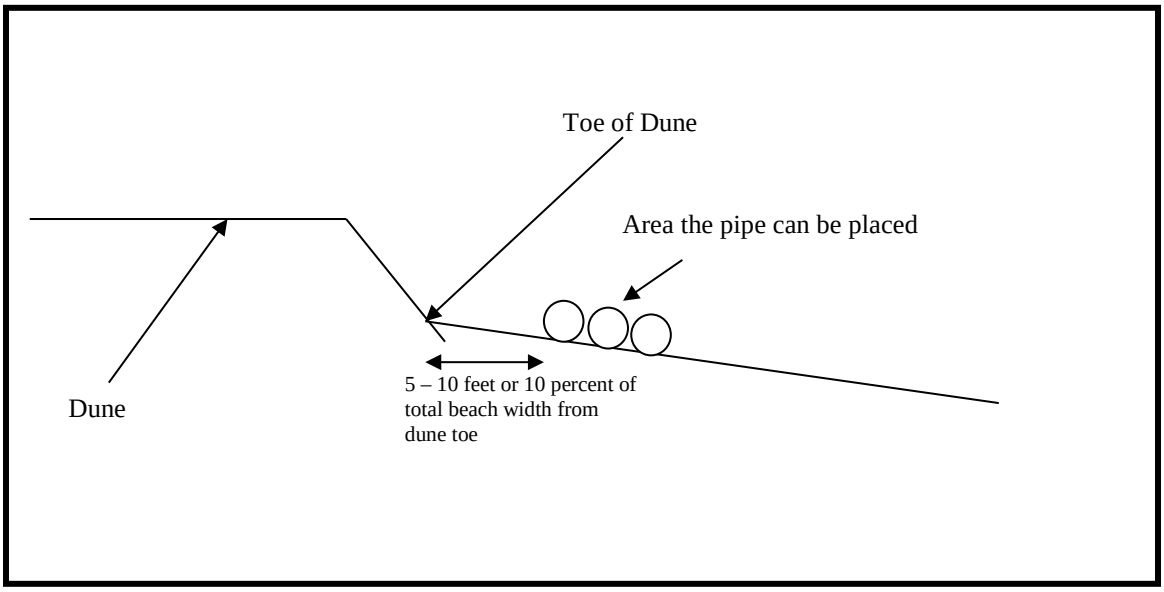

Figure 16. Equipment placement for projects occurring in beach mouse occupied habitat.

A20. Existing beach access points shall be used for vehicle and equipment beach access to the maximum extent possible. These access points shall be delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The access corridors shall be fully restored to the preconstruction conditions following project completion. Parking areas for construction crews shall be located as close as possible to the work sites, but outside of vegetated dune areas to minimize impacts to existing habitat and transporting workers along the beachfront.

A21. The location of new or expanded existing beach access corridors for vehicles and equipment within beach mouse habitat consisting of vegetated dunes shall be spaced no closer than every four miles. The distribution of access areas will result in the least

number of access areas within beach mouse habitat as possible and delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The access corridors shall be (1) no more than 25 feet wide for vehicles and (2) no more than 50 feet wide for equipment. Expanded or new beach access points that impact vegetated dunes shall be restored within 3 months following project completion. Habitat restoration shall consist of restoring the dune to preconstruction conditions with planting of at least three species of appropriate native dune vegetation (*i.e.*, native to coastal dunes in the respective county and grown from plant stock from that region of Florida). Seedlings shall be at least one inch square with a 2.5-inch pot. Planting shall be on 18-inch centers throughout the created dune; however, 24-inch centers may be acceptable depending on the area to be planted. Vegetation shall be planted with an appropriate amount of fertilizer and antidesiccant material, as appropriate, for the plant size. No sand stabilizer material (coconut matting or other material) shall be used in the dune restoration. The plants may be watered without installing an irrigation system. In order for the restoration to be considered successful, 80 percent of the total planted vegetation shall be documented to survive six months following planting of vegetation. If the habitat restoration is unsuccessful, the area shall be replanted following coordination with the Service.

Reporting

A22. A report with the following shall be submitted to the Service electronically (seaturtle@fws.gov) by December 31 after completion of construction.

i. A summary of the information listed in Table 20 for construction

ii. A summary of the information listed in Table 21 for post-construction

Table 20. Information to include in the report following the project completion.

All projects	**Project location (include Florida DEP R-monuments and latitude and longitude coordinates)**
	Project description (include linear feet of beach, actual fill template, access points, and borrow areas)
	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 sites where nests were relocated
Beach mice	**Acreage of new or widened access areas affected in beach mouse habitat**
	Vegetation completed for new or widened access areas
	Success rate of vegetation of restoration

Table 21. Sea turtle monitoring following sand placement activity.

Date	Duration	Variable	Criterion
Nesting Success	Year of in season construction, two years post construction if placed sand remains on beach and variable does not meet criterion based on previous year	Number of nests and non-nesting events	40 percent or greater
Hatching success	Year of in season construction and one year post construction if placed sand remains on beach and variable does not meet success criterion based on previous year	Number of hatchlings by species to hatch from egg	60 percent or greater (a statistically valid number of loggerhead and green nests, and all leatherback nests)
Emergence Success	Year of in season construction and one year post construction if placed sand remains on beach and variable does not meet success criterion based on previous year	Number of hatchlings by species to emerge from nest onto beach	80 percent or greater (a statistically valid number of loggerhead and green nests, and all leatherback nests)
Disorientations	Year of in season construction and two years post construction if placed sand remains on the beach	Number of nests and individuals that misorient or disorient	http://myfwc.com/media/418153/Seaturtle_Guidelines_A_LDIR_Directions.pdf
Lighting Surveys	Two surveys the year following construction, one survey between May 1 and May 15 and second survey between July 15 and August 1	Number, location and photographs of lights visible from nourished berm, corrective actions and notifications made	Lighting survey and meeting resulting with plan for reduction in lights visible from nourished berm within one to two month period
Compaction	Three seasons following construction. Not required if the beach is tilled prior to nesting season each year placed sand remains on beach	Shear resistance	Less than 500 psi
Escarpment Surveys	Weekly during nesting season for three years each year placed sand remains on the beach	Number of scarps 18 inches or greater extending for more than 100 feet that persist for more than 2 weeks	Successful remediation of all persistent scarps as needed

If nesting and reproductive (hatching and emergence) success is less than the criteria in the table above, the Corps and the Service must discuss during the annual meeting to review additional conditions prior to the next sand placement on this beach.

A23. In the event a sea turtle nest is excavated during construction activities, the project turtle permit holder 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, Applicant shall be responsible for notifying FWC Wildlife Alert at 1-888-404-FWCC (3922) and the appropriate Service Field Office immediately (**Table 3**).

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.

REASONABLE AND PRUDENT MEASURES for:

B. Projects that are navigation maintenance dredging with beach placement, swash zone placement, and submerged littoral zone placement (not including near shore placement for shore protection) shall include the following measures:

Historically, these sand placement events as a result of a navigation maintenance dredging project with no local sponsor are smaller scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time.

Post construction requirements are listed in Reasonable and Prudent Measures B10 and B11. These post construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Applicant cannot fulfill these Reasonable and Prudent Measures, the Corps must reinitiate consultation.

B1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice shall be implemented in the Corps federally authorized project or regulated activity.

B2. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence and beach mouse burrow construction shall be used for sand placement.

B3. For dredged material placement on the beach, sand placement shall not occur during the period of peak sea turtle egg laying and egg hatching to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation. In Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties, dredged material placement shall not occur from May 1 through October 31. In St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County dredged material placement shall not occur from June 1 through September 30. On Manasota Key in Sarasota and Charlotte Counties, dredged material placement shall

not occur from May 1 through October 31 (except Venice Beach). In Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte (except Manasota Key), Sarasota (except Manasota Key), Manatee, Hillsborough, Pinellas, Franklin (except St. George Island), Gulf (except St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape Sand Blas), Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties, sand placement may occur during the sea turtle nesting season (**Table 16 and Table 17**).

B4. For dredged material placement in the swash zone or submerged littoral zone during the nesting season, sand placement will be conducted at or below MLLW line.

B5. All derelict concrete, metal, and coastal armoring geotextile material and other debris shall be removed from the beach prior to any dredged material placement to the maximum extent possible.

B6. The Corps shall continue to work with FDEP, FWC, and the Service to create a sea turtle friendly beach profile for placement of material during construction.

B7. Predator-proof trash receptacles shall be installed and maintained at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice (**Appendix F**).

B8. A meeting between representatives of the Corps, Service, FWC, the permitted sea turtle surveyor, and other species surveyors, as appropriate, shall be held prior to the commencement of work on this project.

B9. If the beach nourishment project will be conducted during the sea turtle nesting season, surveys for nesting sea turtles must be conducted. Surveys for early and late nesting sea turtles shall be conducted where appropriate. If nests are constructed in the proposed area of sand placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation.

B10. Sand compaction shall be monitored and tilling shall be conducted if needed to reduce the likelihood of impacting sea turtle nesting and hatching activities. Not required for dredged material placement in the swash and littoral zone.

B11. Escarpment formation shall be monitored and leveling shall be conducted if needed to reduce the likelihood of impacting nesting and hatchling sea turtles. Not required for dredged material placement in the swash and littoral zone.

B12. Construction equipment and materials shall be stored in a manner that will minimize impacts to nesting and hatchling sea turtles and beach mice.

B13. Lighting associated with the project construction shall be minimized to reduce the possibility of disrupting and disorienting nesting and hatchling sea turtles and nocturnal activities of beach mice.

B14. During the sea turtle nesting season, the Corps shall not extend the beach fill more than 500 feet (or other agreed upon length if a FWC sea turtle permit holder is present) between dusk and the time of completion of the following day's nesting survey to reduce the impact to emerging sea turtles and burial of new nests.

B15. Beach mouse habitat shall be avoided when selecting sites for storage and staging of equipment to the maximum extent possible.

B16. Equipment and construction materials shall not be stored near the seaward dune toe in areas of occupied beach mouse habitat. This area is highly utilized by beach mice.

B17. Existing vegetated habitat at beach access points and along shoreline travel corridors shall be protected to the maximum extent possible to ensure vehicles and equipment transport stay within the access and travel corridors.

B18. Expanded or newly created beach access points shall be restored.

B19. A report describing the actions taken shall be submitted to the Service work for each year when the activity has occurred.

B20. 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 for:

B. Projects that are navigation maintenance dredging with beach placement, swash zone placement, and submerged littoral zone placement of Corps civil works project shall include the following measures:

Historically, these sand placement events as a result of a navigation maintenance dredging project with no local sponsor are smaller scaled, conducted at closer time intervals, and the sand often does not remain on the beach for an extended period of time.

Post construction requirements are listed in Terms and Conditions B10 and B11. These post construction requirements may be subject to congressional authorization and the allocation of funds. If the Corps or Applicant cannot fulfill these Terms and Conditions, the Corps must reinitiate consultation.

All beaches

B1. Conservation Measures included in the Corps' PBA that address protection of nesting sea turtles and beach mice listed on pages 9 and 10 of the SPBO shall be implemented in the Corps federally authorized project or regulated activity.

B2. Beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. The fill material must be similar in both coloration and grain size distribution to that native beach. 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. Fill material shall comply with FDEP requirements pursuant to the Florida Administrative Code (FAC) subsection 62B-41.005(15). A Quality Control Plan shall be implemented pursuant to FAC Rule 62B-41.008(1)(k)4.b.

B3. Dredged material placement shall not occur during the period of peak sea turtle egg laying and egg hatching to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation.

a. Dredged material placement in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties shall occur only during the beach placement window indicated in Table 16. construction equipment or pipes may be placed and/or stored on the beach only during the beach placement window indicated in Table 16.

b. Dredged material placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties may occur during the sea turtle nesting season except on publicly owned conservation lands such as state parks and areas where such work is prohibited by the managing agency or under applicable local land use codes (see exceptions in B3.c. below).

c. For higher density nesting beaches in Gulf and Franklin counties dredged material placement shall not occur during the main part of the nesting season June 1 through September 31. On Manasota Key in Sarasota and Charlotte Counties, dredged material placement shall not occur during the main part of the nesting season (May 1 through October 31). This timeframe does not include Venice Beach due to the low density nesting. These beaches include St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County, and Manasota Key in Sarasota and Charlotte Counties. See Table 17 for the Beach Placement Windows.

d. For dredged material placement in the swash zone (at or below the MHWL) or submerged littoral zone during the sea turtle nesting season (**Tables 16and 17**), the Corps shall contact the Service for coordination.

The Service shall be contacted for coordination, on a project-by-project basis, if sand placement is needed on publicly owned conservation lands and in these higher density nesting beaches in Gulf and Franklin Counties and on Manasota Key in Sarasota and Charlotte Counties during the above exclusionary period. The Service will determine whether work (1) may proceed in accordance with the Terms and Conditions; (2) proceed in accordance with the Terms and Conditions and other requirements as developed by the Service; or (3) would require that an individual emergency consultation be conducted.

B4. For dredged material placement in the swash zone or submerged littoral zone during the nesting and hatching season, sand placement will be conducted at or below the MLLW line. The swash zone is that region between the upper limit of wave run-up (approximately one-foot above MHW) and the lower limit of wave run-out (approximately one-foot below MLW). Material will not be placed so that it is exposed above the water during low tide during the nesting and hatching season. The Corps must consult with NMFS on impacts to hatchlings that emerge from those nests adjacent to the inwater construction area. The Service will discuss with the Corps and NMFS additional measures that could include caging nests close to the emergence date.

B5. All derelict concrete, metal, and coastal armoring geotextile material and other debris shall be removed from the beach prior to any dredged material placement to the maximum extent possible. If debris removal activities take place during the peak sea turtle nesting season (**Tables 16 and 17**), the work shall be conducted during daylight hours only and shall not commence until completion of the sea turtle nesting survey each day.

B6. The Corps shall continue to work with FDEP, FWC and the Service in conducting the second phase of testing on the sea turtle friendly profile during project construction. This includes exploring options to include a dune system in the project design for existing authorized projects and new non-federal projects and how the existing sand placement template may be modified.

B7. Predator-proof trash receptacles shall be installed and maintained during construction at all beach access points used for the project construction to minimize the potential for attracting predators of sea turtles and beach mice (**Appendix F**). The Corps shall provide predator-proof trash receptacles for the construction workers. All workers shall be briefed on the importance of not littering and keeping the project area trash and debris free.

B8. A meeting between representatives of the Corps, 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, free-roaming cat observation, and reporting within the work area, as well as follow up meetings during construction (**Table 3**).

Sea Turtle Protection

B9. Daily early morning surveys for sea turtle nests shall be required as outlined in a through f. If nests are constructed in the area of sand proposed placement, the eggs shall be relocated to minimize sea turtle nest burial, crushing of eggs, or nest excavation (**Tables 614 and 17**).

a. For sand placement projects in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties that occur during earlier part of the nest laying season through April 30, daily early morning surveys shall be conducted for sea turtle nests shall begin with the start of the nesting season monitoring (see Table 16) and continue through the end of the beach placement window, with egg relocation continuing only until completion of fill placement. Eggs shall be relocated per the following requirements. For sand placement projects that occur during the period from November 1 through the end of hatching season (see Table 16), daily early morning sea turtle nesting surveys shall be conducted 65 days prior to project initiation and continue through the end of the nest laying season indicated in Table 16, and eggs shall be relocated per the requirements listed in (a)i through (a)iii.

i. 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 FAC 68E-1. Please contact FWC's Imperiled Species Management Section in Tequesta at (561) 575-5407 for information on the permit holder in the project area. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (this is for all time zones).

ii. 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.

iii. Nests deposited within areas where construction activities have ceased or will not occur for 65 days or nests laid in the nourished area prior to tilling shall be marked and left in situ unless other factors threaten the success of the nest. The turtle permit holder shall install an on-beach marker at the nest site and 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 that 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.

During the period from March 1 through April 30, daytime surveys shall be conducted for leatherback sea turtle nests beginning March 1. Nighttime surveys for leatherback sea turtles shall begin when the first leatherback crawl is recorded within the project or adjacent beach area through April 30 or until completion of the project (whichever is earliest). Nightly nesting surveys shall be conducted from 9 p.m. until 6 a.m. The project area shall be surveyed at 1-hour intervals (since leatherbacks require at least 1.5 hours to complete nesting, this will ensure all nesting leatherbacks are encountered) and eggs shall be relocated per the requirements listed in (a)i through (a)iii.

b. For sand placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties that occur during the nest laying period (**Table 17**), daily early morning (before 9 a.m.) surveys shall be conducted. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Franklin, Gulf, Sarasota, and Charlotte Counties in B9.d. below).

c. For Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties, nesting surveys shall be initiated 70 days prior to sand placement activities (incubation periods are longer in these counties) or at the beginning of nesting season monitoring (see Table 17) whichever is later. Nesting surveys shall continue through the end of the nest laying season (see Table 17). Hatching and emerging success monitoring will involve checking nests beyond the completion date of the daily early morning nesting surveys. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Franklin and Gulf Counties in B9.d. below).

d. For St. Joseph Peninsula State Park, St. Joseph peninsula, and Cape San Blas in Gulf County, St. George Island in Franklin County sand placement activities shall occur only during the Beach Placement Window indicated in Table 17. For Manasota Key in Sarasota and Charlotte Counties (except Venice Beach), sand placement activities shall during the Beach Placement Window indicted in Table 15, the period of peak sea turtle egg laying and egg hatching for this area. If nests laid in the early part of the nest laying season during the beach placement window in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii below.

e. For Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, Collier, and Monroe Counties, nesting surveys shall be initiated 65 days prior to nourishment or dredged channel material placement activities or by April 15, whichever is later. Nesting surveys shall continue through September 15. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii (see nest relocation exceptions for Sarasota and Charlotte Counties in B9.d. above).

f. For Miami-Dade County, nesting surveys shall be initiated 65 days prior to dredged material placement activities or by the beginning of the nesting season monitoring indicated in Table 17, whichever is later. Nesting surveys shall continue through the end of the nest laying season or the end of sand placement whichever comes first. If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii.

g. For Volusia, Flagler, St. Johns, Duval, and Nassau Counties, nesting surveys shall be initiated 65 days prior to dredged material placement activities or by the beginning of nest laying season (**Table 17**) whichever is later. Nesting surveys shall continue through the nesting season monitoring period (**Table 15).** If nests are laid in areas where they may be affected by construction activities, eggs shall be relocated per the requirements listed in (a)i through (a)iii.

B10. Sand compaction shall be monitored in the area of dredged material placement immediately after completion of the project and prior to the dates in **Table 19** for 3 subsequent years. Not required for dredged material placement in the swash and littoral zone.

If tilling is needed, the area shall be tilled to a depth of 36 inches. Each pass of the tilling equipment shall be overlapped to allow more thorough and even tilling. All tilling activity shall be completed at least once prior to the nesting season. An electronic copy of the results of the compaction monitoring shall be submitted seaturtle@fws.gov prior to any tilling actions being taken. 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.(NOTE: If tilling occurs during shorebird nesting season (February 15-August 31), shorebirds surveys prior to tilling are required per the Migratory Bird Treaty Act (http://myfwc.com/docs/Conservation/FBCI_BNB_SeaTurtleMonitors.pdf)

a. Compaction sampling stations shall be located at 500-foot intervals along the sand placement template. 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).

b. 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 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 six averaged compaction values.

c. 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 appropriate date listed in **Table 19**.

d. 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.

e. 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.

B11. Visual weekly surveys for escarpments along the project area shall be made immediately after completion of the dredged material placement and within 30 days prior to the start dates for Nesting Season Monitoring in **Table 19** for 3 subsequent years if sand in the project area still remains on the dry beach. Not required for dredged material placement in the swash and littoral zone.

Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet shall be leveled and the beach profile shall be reconfigured to minimize scarp formation by the dates listed above. Any escarpment removal shall be

reported by location. If the project is completed during the early part of the sea turtle nesting and hatching season (March 1 through April 30), 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 by the Service, in coordination with the FWC, that escarpment leveling is required during the nesting or hatching season, the Service will provide a brief written authorization within 30 days 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 electronic to seaturtle@fws.gov.

B12. If available, staging areas for construction equipment shall be located off the beach during early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see Table 16) and peak nesting season (May 1 through October 31) for the remaining counties. 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 placed on the beach shall be located as far landward as possible without compromising the integrity of the dune system. Pipes placed parallel to the dune shall be 5 to 10 feet away from the toe of the dune if the width of the beach allows. Temporary storage of pipes shall be off the beach to the maximum extent possible. If the pipes are stored 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. If the pipes that are placed parallel to the dune cannot be placed between 5 to 10 feet away from the toe of the dune during nesting and hatching season, the Corps must reinitiate consultation with the Service as this represents take that was not considered in the SPBO. If it will be necessary to extend construction pipes past a known shorebird nesting site or over-wintering area for piping plovers, then whenever possible those pipes shall be placed landward of the site before birds are active in that area. No pipe or sand shall be placed seaward of a shorebird nesting site during the shorebird nesting season.

B13. Direct lighting of the beach and nearshore waters shall be limited to the immediate construction area during early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see Table 14) and peak nesting season (May 1 through October 31) for the remaining counties, and shall comply with safety requirements. Lighting on all 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, Corps 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 and to the adjacent sea turtle nesting beach in line-of-sight of the dredge (**Figure 15**).

B14. During the period during early (before April 30) and late (after November 1) nesting season for Brevard through Broward counties (see Table 16) and peak nesting season (May 1 through October 31) for the remaining counties, the Corps shall not extend the beach fill more than 500 feet (or other agreed upon length if FWC sea turtle permit holder is present) along the shoreline between dusk and dawn of 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 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 Corps will be allowed to proceed with the placement of fill during daylight hours until dusk at which time the 500-foot length (or other agreed upon length) limitation shall apply. If any nesting turtles are sighted on the beach within the immediate construction area, activities shall cease immediately until the turtle has returned to the water and the sea turtle permit holder responsible for nest monitoring has relocated the nest.

Beach Mouse Protection

B15. Beach mouse habitat shall be avoided when selecting sites for equipment, pipes, vehicle storage and staging, and beach travel corridors to the maximum extent possible. Suitable beach mouse habitat constitutes the primary dunes (characterized by sea oats and other grasses), secondary dunes (similar to primary dunes, but also frequently includes such plants as woody goldenrod, false rosemary), and interior or scrub dunes.

B16. Equipment placement or storage shall be excluded in the area between 5 to 10 feet seaward of the existing dune toe or 10 percent of the beach width (for projects occurring on narrow eroded beach segments) seaward of the dune toe in areas of occupied beach mouse habitat (**Figure 16**). The toe of the dune is where the slope breaks at the seaward foot of the dune.

B17. Existing beach access points shall be used for vehicle and equipment beach access to the maximum extent possible. These access points shall be delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The topography at the access points shall be fully restored to preconstruction conditions following project completion. Parking areas for construction crews shall be located as close as possible to the work sites, but outside of vegetated dune areas to minimize impacts to existing habitat and transporting workers along the beachfront.

B18. The location of new or expanded existing beach access corridors for vehicles and equipment within beach mouse habitat consisting of vegetated dunes shall be no closer

than every four miles. The distribution of access areas will result in the least number of access areas within beach mouse habitat as possible and delineated by post and rope or other suitable material to ensure vehicles and equipment transport stay within the access corridor. The access corridors shall be (1) no more than 25 feet wide for vehicles and (2) no more than 50 feet wide for equipment. Expanded or new beach access points that impact vegetated dunes shall be restored within 3 months following project completion. Habitat restoration shall consist of restoring the dune to preconstruction conditions with planting of at least three species of appropriate native dune vegetation (*i.e.*, native to coastal dunes in the respective county and grown from plant stock from that region of Florida). Seedlings shall be at least 1 inch square with a 2.5-inch pot. Planting shall be on 18-inch centers throughout the created dune; however, 24-inch centers may be acceptable depending on the area to be planted. Vegetation shall be planted with an appropriate amount of fertilizer and antidesiccant material, as appropriate, for the plant size. No sand stabilizer material (coconut matting or other material) shall be used in the dune restoration. The plants may be watered without installing an irrigation system. In order for the restoration to be considered successful, 80 percent of the total planted vegetation shall be documented to survive six months following planting of vegetation. If the habitat restoration is unsuccessful, the area shall be replanted following coordination with the Service.

Reporting

B19. An excel sheet with the information listed in **Table 20** shall be submitted to the Service electronically seaturtle@fws.gov by December 31 of the year following construction. A report with the information from Terms and Conditions B10 and B11 shall be submitted to the Service by December 31 of the year for 3 years following construction.

B20. In the event a sea turtle nest is excavated during construction activities, the project turtle permit holder 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, Applicant shall be responsible for notifying FWC Wildlife Alert at 1-888-404-FWCC (3922) and the appropriate Service Field Office immediately (**Table 3**).

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.

REASONABLE AND PRUDENT MEASURES for:

C. Projects that include groin or jetty repair or replacement within the existing footprint shall include the following measures:

In Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties:

C1. Groin or jetty repair or replacement projects shall not occur during the period of peak sea turtle egg laying and egg hatching (May 1 through October 31), to reduce the possibility of sea turtle nest burial, crushing of eggs, or nest excavation.

C2. Maintenance of groin or jetty projects conducted during the early (February 1 through April 30) and late sea turtle nesting season (November 1 through November 30) shall adhere to the following conditions:

a. Install a barrier around the perimeter of the groin or jetty repair or replacement work area sufficient to prevent adult and hatchling sea turtles from accessing the project site.

b. For projects conducted during the early and late sea turtle nesting season, construction equipment and materials shall be stored in a manner that will minimize impacts to sea turtles to the maximum extent possible.

c. For projects conducted during the early and late sea turtle nesting season, no work may occur at night.

In Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties:

C3. For maintenance of groin or jetty projects, conducted during the sea turtle nesting season.

a. Daily surveys shall be conducted by sea turtle permit holders. Nests laid adjacent to the work area shall be marked by flag and rope for avoidance.

b. A barrier shall be installed around the perimeter of the groin or jetty maintenance work area sufficient to prevent adult and hatchling sea turtles from accessing the project site.

c. Construction equipment and materials shall be stored in a manner that will minimize impacts to sea turtles and beach mice to the maximum extent possible.

d. No work shall occur at night.

In All Counties:

C4. If any safety lighting associated with the project is required, the Corps must coordinate with the Service. All safety lighting must be minimized to reduce the possibility of disrupting and disorienting nesting or hatchling sea turtles and nocturnal activities of beach mice. All lights shall be downward directed, full cut-off and fully shielded, and shall utilize long wavelength (greater than 590 nm) light sources.

C5. If entrapment of sea turtle hatchlings occurs in the groin or jetty system, the Corps shall meet with the Service to discuss a possible solution prior to the next nesting season.

C6. 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.

TERMS AND CONDITIONS for:

C. Projects that include groin or jetty repair or replacement within the existing footprint shall include the following conditions:

In Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties:

C1. Groin or jetty repair or replacement projects shall be started after October 31 and be completed before May 1.

C2. For groin or jetty repair or replacement projects conducted during the early (before April 30) and/or late (after November 1) sea turtle nesting season (see Table 16):

a. A barrier (e.g., hay bales, silt screens) sufficient to prevent adult and hatchling sea turtles from accessing the project site shall be installed in a 100-foot buffer around the perimeter of the project site. The barrier shall be placed parallel to shore, at mean high water (MHW), as close to the groin or jetty as feasible, particularly during the period from sunset to sunrise. The Corps must contact the Service if there are any existing nests within the 100-foot buffer area.

b. On-beach access to the construction site shall be restricted to the wet sand below MHW to the maximum extent possible. Travel corridors on the beach to the MHWL shall be delineated. If the project is conducted during the early (before April 30) and/or late (after November 1) sea turtle nesting season (see Table 16), daily morning surveys shall be conducted within the travel corridor. If nests are laid within the travel corridor, the travel corridor must be re-routed to avoid the nest. If re-routing is not possible, these nests shall be relocated per the requirements listed in A9 (a)i through (a)iii.

c. Staging areas for construction equipment shall be located off the beach to the maximum extent possible.

d. No construction shall be conducted at night.

e. Daily early morning surveys for sea turtle nests shall be required as outlined in e(i) and e (ii). All nests laid in the vicinity of the project area shall be marked for avoidance per the requirements specified below:

i. Nesting surveys and nest marking will only be conducted by persons with prior experience and training in these activities and who are authorized to conduct such activities through a valid permit issued by FWC, pursuant to FAC 68E-1. Please contact FWC's Imperiled Species Management Section in Tequesta at mtp@myfwc.com for information on the permit holder in the project area. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (this is for all time zones). The Corps shall not initiate work until daily notice has been received from the sea turtle permit holder that the morning survey has been completed. Surveys shall be performed in such a manner so as to ensure that construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures.

ii. Nests deposited within the project area and access areas shall be left in place and marked for avoidance unless other factors threaten the success of the nest (nest laid below debris line marking the typical high tide, erosion). The turtle permit holder shall install an on-beach marker at the nest site and 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. The actual location of the clutch will be determined and nests will be marked. A series of stakes and highly visible survey ribbon or string shall be installed to establish a 10-foot radius around the nest. No activity shall occur within this area nor will any activity occur that could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and that the nest has not been disturbed by the project activity. Nest relocation is only allowed if nests laid within the travel corridor (beach access to MHWL) cannot be rerouted to avoid the nest.

In Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, and Escambia Counties:

C3. For groin or jetty repair or replacement projects conducted during the sea turtle nesting season (see Table 17):

a. Daily early morning surveys shall be conducted within the travel corridor.

b. A barrier (e.g., hay bales, silt screens) sufficient to prevent adult and hatchling sea turtles from accessing the project site shall be installed in a 100-foot buffer around the perimeter of the project site. The barrier shall be placed parallel to shore, at MHW, as close to the groin or jetty as feasible during the period from sunset to sunrise.

c. On-beach access to the construction site shall be restricted to the wet sand below MHW to the maximum extent possible. Travel corridors on the beach to the MHWL will be delineated. Nests laid within the travel corridor that would impede traffic will be relocated per the requirements listed in A9(a)i through (a)iii.. Nests laid in adjacent areas will be marked and avoided per the requirements listed in C(2)(e) i through iii. Staging areas for construction equipment shall be located off the beach to the maximum extent possible.

d. No nighttime construction may occur during the nesting season.

e. Material stockpiled on the beach shall only occur within the 200-foot barrier (100-foot area on either side). Construction activities shall not occur in any location prior to completion of the necessary sea turtle protection measures outlined below. If any nesting turtles are sighted on the beach, construction activities shall cease immediately until the turtle has returned to the water and the sea turtle permit holder responsible for nest monitoring has marked the nest. All activities shall avoid the marked nest areas.

C4. All nests laid adjacent to the project area shall be marked for avoidance per the following requirements:

a. Nesting surveys and nest marking will only be conducted by persons with prior experience and training in these activities and who are authorized to conduct such activities through a valid permit issued by FWC, pursuant to FAC 68E-1. Please contact FWC's Imperiled Species Management Section in Tequesta at mtp@myfwc.com for information on the permit holder in the project area. Nesting surveys shall be conducted daily between sunrise and 9 a.m. (this is for all time zones). The Corps shall not initiate work until daily notice has been received from the sea turtle permit holder that the morning survey has been completed. Surveys shall be performed in such a manner so as to ensure that construction activity does not occur in any location prior to completion of the necessary sea turtle protection measures.

i. Nests deposited within the project area and access areas shall be left in place and marked for avoidance unless other factors threaten the success of the nest (nest laid below debris line marking the typical high tide, erosion). The turtle permit holder shall install an on-beach marker at the nest site and 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. The actual location of the clutch will be determined and nests will be marked. A series of stakes and highly visible survey ribbon or string shall be installed to establish a 10-foot radius around the nest. No activity shall occur within this area nor will any activity occur that could result in impacts to the nest. Nest sites shall be inspected daily to assure nest markers remain in place and that the nest has not been disturbed by the project activity. Nest relocation is only allowed if nests laid within the travel corridor (beach access to MHWL) cannot be rerouted to avoid the nest.

In All Counties:

C5. To the maximum extent possible within the travel corridor, all ruts shall be filled or leveled to the natural beach profile prior to completion of daily construction.

C6. Exterior lighting shall not be permanently installed in association with the project. Temporary lighting of the construction area during the sea turtle nesting season shall be reduced to the minimum standard required by OSHA for general construction areas. Lighting on all equipment including offshore 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, Corps 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 and to the adjacent sea turtle nesting beach in line-of-sight of the dredge (**Figure 15**).

C7. If entrapment of sea turtle hatchlings occurs in the groin or jetty system during construction, the Corps shall contact the Service immediately.

C8. A report describing the work 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 electronically to seaturtle@fws.gov by December 31 of each year when the activity has occurred. This report will include the following information:

Table 22. Information to include in the report following the project completion.

All projects	Project location (include Florida DEP R-monuments and latitude and longitude coordinates)
	Project description
	Dates of actual construction activities
	Names and qualifications of personnel involved in sea turtle nesting surveys and mark and avoid activities
	Nesting survey, mark and avoid activities, and nest relocation results

The Service believes that incidental take will be limited to the 8.8 miles of shoreline per year within the northwest portion of Florida for the NGMRU (38 miles during an emergency year) and 18.9 miles of shoreline within the PFRU (64 miles during an emergency year) 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 project areas; (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 projects; (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 sand placement areas or on adjacent beaches during and after sand placement or construction activities; (5) misdirection of nesting and hatchling turtles on beaches adjacent to the sand placement or construction area as a result of project lighting including the ambient lighting from dredges; (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 8.8 miles of shoreline per year within the northwest portion of Florida for the NGMRU (38 miles during an emergency year) and 18.9 miles of shoreline within the PFRU (64 miles during an emergency year) of sand on the 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. For sand placement projects in Nassau, Duval, St. Johns, Flagler, Volusia, Miami-Dade, Monroe, Collier, Lee, Charlotte, Sarasota, Manatee, Hillsborough, Pinellas, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa and Escambia Counties, construction activities should be planned to take place outside the main part of the sea turtle nesting and hatching season (May 1 through October 31).
2. Work cooperatively with the Service, FWC, County or Municipality, to reduce sea turtle disorientations in the sand placement areas. After the annual report is completed, a meeting shall be set up with the Applicant, county or municipality, FWC, Corps, and the Service to discuss the survey report, as well as any documented sea turtle disorientations in or adjacent to the project area.
3. Work cooperatively with the Service to mimic the native beach berm elevation and beach slopes landward and seaward of the equilibrated berm crest. For all high density green turtle nesting beaches (http://ocean.floridamarine.org/SeaTurtleNesting/), the formation of a dune, either through direct creation or natural accretion, will be included in the project design. Prior to drafting the plans and specifications for a beach nourishment project, the Corps must meet with the Service, FWC, and FDEP to discuss the beach profile surveys, dune formation (specifically on high density green turtle nesting beaches), and the sea turtle monitoring reports from previous placement events.
4. If public driving is allowed on the project beach, and if the Corps has the authority, we recommend it exercise its discretionary authority to require the local sponsor or Applicant to have authorization from the Service for incidental take of sea turtles, their nests, and hatchlings and beach mice, as appropriate, due to such driving or provide written documentation from the Service that no incidental take authorization is required. If required, the incidental take authorization for driving on the beach should be obtained prior to any subsequent sand placement events.
5. Beach nourishment should not occur on publicly owned conservation lands during the sea turtle nesting season.
6. All created dunes should be planted with at least three species of appropriate native salt-resistant dune vegetation. Examples along the Atlantic coast include: bitter panicgrass, sea oats (grown from local genetic stock), beach morning-glory, or railroad vine. Examples along the Northwest Florida coast includes: bitter panicgrass, little bluestem (Schizachyrium scoparium), sea oats (grown from local genetic stock), beach morning-glory, or railroad vine. Examples along the Southwest Florida coast include: sea oats (grown from local genetic stock), bitter panicgrass, beach morning-glory, and railroad vine.
7. If the project area is within a local municipality that has not adopted a lighting ordinance, and lighting is shown to be an issue on a nourished beach, and if the Corps has the authority, we recommend it exercise its discretionary authority to require an ordinance be adopted prior to any subsequent sand placement event.

8. To increase public awareness about sea turtles and beach mice, informational signs should be placed at beach access points where appropriate. The signs should explain the importance of the beach to sea turtles and beach mice.
9. If the Corps has the authority, we recommend it exercise its discretionary authority to require predator control programs (including education of pet owners and cat colony supporters) should be implemented that target free-roaming cats.

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. Reinitiation of formal consultation is also required ten years after the issuance of this SPBO. In instances where the amount or extent of incidental take is exceeded, any operations causing such take shall cease pending reinitiation.

The above findings and recommendations constitute the report of the Service. If you have any questions about this SPBO, please contact Ann Marie Lauritsen of this office at (904) 525-0661, Richard Zane of the Panama City Field Office at (850) 769-0552, or Jeffrey Howe of the South Florida Field Office at (772) 562-3909.

Sincerely,

for Larry Williams
State Supervisor

cc:
FWC, Lake City, Florida (Melissa Tucker)
FWC, Lake City, Florida (Nancy Douglass)
FWC, Lake City, Florida (Terry Doonan)
FWC, Panama City, Florida (John Himes)
FWC, Tallahassee, Florida, (Robbin Trindell)
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Service, Panama City, Florida, (Patricia Kelly, Lisa Lehnhoff)
Service, St. Peteresburg, Florida (Ann Marie Lauritsen)
Service, Vero Beach, Florida (Jeffrey Howe)

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Appendix A

PREVIOUS FORMAL CONSULTATIONS/BIOLOGICAL OPINIONS WITHIN FLORIDA THAT HAVE BEEN ISSUED FOR ALL PROJECTS THAT HAD ADVERSE IMPACTS TO THE SEA TURTLES ON THE NESTING BEACH

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
STATEWIDE	Nassau, Duval, St. Johns, Flagler, Volusia, Brevard, Indian River, St. Lucie, Martin, Palm Beach, Broward, Monroe, Miami-Dade, Collier, Lee, Charlotte, Sarasota, Manatee, Pinellas, Pasco, Franklin, Gulf, Bay, Walton, Okaloosa, Santa Rosa, Escambia	FEMA Emergency Beach Berm Repair	2007-F-0430		Repair of 5-year beach berms post-disaster	75 miles
JAX FIELD OFFICE						
1991	Brevard	Lighting at Cape Canaveral Air Force and Patrick Air Force Station	4-1-91-028	Lighting at both installations	Sea turtle lighting	75 disoriented loggerhead nests; 2 green turtles nests at CCAFS and 2 loggerhead nests at PAFB
1993	Brevard	Beach nourishment on Cape Canaveral	4-1-93-073C		Beach nourishment	2 miles
1995	Brevard	Inlet Bypass on Brevard County Beach at Cape Canaveral		R-1 to R-14	Inlet bypass	
1996	Brevard	Canaveral Port Authority Dredge and Beach Disposal		R-34 to R-38	Dredge and beach restoration	
1998	Brevard	Inlet bypass on Brevard County Beach at Cape Canaveral		R-1 to R-14		
2000	Brevard	Amended Lighting at Cape Canaveral Air Force and Patrick Air Force Station	00-0545	Lighting at both installations	Sea turtle lighting	2 percent hatchling and nesting female disorientations at each installation.
2001	Brevard	Brevard County Shore Protection Project (North Reach)		R-5 to R-12 and R-13 to R-54.5	Beach nourishment	9.4 miles
2001	Brevard	Patrick Air Force Base Beach Restoration		R-53 to R-70	Beach nourishment	

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
2002	Brevard	Brevard County Shore Protection Project (South Reach)		R-123.5 to R-139	Beach nourishment	3.02 miles
2002	Brevard	Brevard County Shore Protection Project (North Reach)		R-4 to R-20	Beach nourishment	
2002	Brevard	Permanent Sand Tightening of North Jetty at Canaveral Harbor	02-1090	North jetty at Canaveral Inlet	Sand tightening and extension of existing jetty	500 feet
2003	Brevard	Brevard County Shore Protection Project (South Reach)		R-118.3 to R-123.5		0.94 mile
2004	Brevard	Canaveral Harbor Federal Sand Bypass and Beach Placement	04-0077	R-14 to R-20	Inlet bypass and beach nourishment	18,600 linear feet
2005	Brevard	Brevard County Shore Protection Project (North and South Reach)	05-0443	R-5 to R-20 and R-21 to R-54.5 and R-118 to R-139	Beach nourishment	13.2 miles
2005	Brevard	Brevard County FEMA Berm and Dune Restoration	05-1054	R-75 to R-118	Dune repair	12 miles
2005	Brevard	Patrick Air Force Base Beach Restoration	05-0258	R-54.5 to R-75.3	Beach nourishment	
2005	Brevard	Sloped Geotexile Revetment Armoring Structures	05-0454	5 tubes along north and south Melbourne beach	Protec tube installation	4,600 linear feet
2006	Brevard	Brevard County FEMA Berm and Dune Restoration	41910-2006-F-0189	R-75 to R-118	Dune repair	12 miles
2006	Brevard	Amended Lighting at Cape Canaveral Air Force and Patrick Air Force Station	41910-2006-F-0841		Sea turtle lighting	3 percent hatchling and nesting female disorientations at each installation
15 Feb 2008	Brevard	Patrick Air Force Base Dune Restoration	41910-2008-F-0150	R-65 to R-70	Dune restoration	6,000 linear feet
25 Jan 2008	Brevard	Brevard County's Dune Restoration	41910-2008-F-0189	R-75 to R-118 and R-138 to R-202	Dune restoration	140,000 cy along 3,000 linear feet
2009	Brevard	Brevard County's Dune Restoration	41910-2009-F-0125	R 75.4 to R 118.3 and R-139 to R-213	Dune restoration	22 miles
2009	Brevard	Mid Reach		R-75 to R119	Beach berm repair (permanent)	40,748 linear feet
2009	Brevard	South Beach		R-139 to R-215	Beach berm repair (permanent)	70,385 linear feet

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
2009	Brevard	Patrick Air Force Base Dune Restoration and Beach Nourishment	41910-2009-F-0336	R-36 to R-75, R-53 to R-65	Sand placement	8,500 linear feet for dune restoration and 11,235 linear feet for beach nourishment.
2009	Brevard	Brevard Dune Restoration	41910-2009-F-0125	R-75.4 to R-118.3, R-139 to R-213	Dune restoration	Periodically on no more than 22 miles.
2009	Brevard	Mid Reach Shore Protection	41910-2008-F-0547	R-119 to R-75.4	Sand placement	7.7 linear miles
2009	Brevard	Canaveral Harbor Sand Bypass	41910-2008-F-0547	Canaveral Harbor	Sand bypass	18,600 linear no more than every 2 years
2009	Brevard	Kennedy Space Center Lighting	41910-2009-F-0306			3% of all hatchling disorientation events
2009	Brevard	South Beach Renourishment	41910-2009-F-0327			7.8 miles
1991	Duval	Duval County Beach Erosion Control		R-44 to R-52.5	Beach nourishment	9,000 linear feet
1996	Duval	Duval County Beach Erosion Control		R-47 to R-80	Beach nourishment	5 miles
2003	Duval	Duval County Beach Erosion Control		R-72 to R-80	Beach nourishment	
2005	Duval	Duval County Beach Erosion Control	05-1544	R-43 to R-53 and R-57 to R-80	Beach nourishment	5.7 miles
2010	Duval	Duval County Hurricane and Storm Damage Reduction	2010-CPA-0045	V-501 to R-80	Beach nourishment	52,800 linear feet
2005	Flagler	Road Stabilization from SR A1A	41910-2006-IE-0173		Seawall	140 linear feet
2009	Flager	State Road (SR) A1A Shoreline Stabilization	41910-2007-F-0495	200 feet south of South 28th Street to 980 feet south of Osprey Point Drive	Sand placement, revetments, and seawalls	5.2 miles = length of take; 3,000 linear feet of anticipated incidental take
2005	Hillsborough	Egmont Key Nourishment	05-1845	R-2 to R-10	Beach nourishment	8,000 linear feet
1993	Manatee	Anna Maria Island Beach Restoration		R-2 to R-36	Beach nourishment	4.7 miles
1997	Manatee	Dredge Material Disposal and Longboat Key Beach Restoration		R-48 to R-51	Dredge and beach nourishment	
2002	Manatee	Anna Maria Island Beach Restoration		R-7 to R-10 and R-12 to R-36	Beach nourishment	5.2 miles
2005	Manatee	Anna Maria Island Shore Protection Project	41910-2006-F-0079	R-7 to R-10	Beach nourishment	3,000 linear feet

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
2005	Manatee	Anna Maria Island Emergency Beach Restoration	05-1227	R-2 to R-41	Beach nourishment	4.2 miles
2005	Manatee	Town of Longboat Key Beach Renourishment	4-1-04-TR-4529	R-44.5 to R-46	Beach nourishment	0.34 mile
2007	Manatee	Longboat Key Groin Installation	41910-2007-F-0521		Groin installation	2,210 linear feet
2009	Manatee	Anna Maria Island Beach Nourishment	41910-2008-F-456	R-7 to R-10, R-35 +790 feet and R-41 +365 feet	Sand placement	8,000 linear feet
2010	Manatee	Longboat Key North End Nourishment	41910-2010-F-0301			4,015 linear feet of beach
1994	Nassau	South Amelia Island Beach Restoration		R-60 to R-78	Beach nourishment	
1997	Nassau	Dredging of Sawpit Creek Cut and Beach Disposal		R-73.5 to R-78	Dredge and beach nourishment	2,900 linear feet
2002	Nassau	South Amelia Island Beach Restoration		R-50 to R-80	Beach nourishment	3.4 miles
2002	Nassau	Fernandina Harbor Dredge and Beach Disposal		R-1 to R-9	Dredge and beach nourishment	8,000 linear feet
2004	Nassau	Nassau County Shore Protection Project at Amelia Island	05-1355	R-9 to R-33	Beach nourishment	3.6 miles
2005	Nassau	Nassau County Shore Protection Project at Amelia Island	05-1355	R-11 to R-34	Beach nourishment	4.3 miles
2005	Nassau	Dredging of Sawpit Creek Cut and Beach Disposal	41910-2006-F-0254	R-73.5 to R-78	Dredge and beach nourishment	2,900 linear feet
1988	Pinellas	Sand Key/Redington Beach Restoration		R-99 to R-107	Beach nourishment	
1990	Pinellas	Sand Key/Indian Rocks Beach Restoration		R-72 to R-85	Beach nourishment	
1991	Pinellas	Long Key Beach Restoration		R-144 to R-147	Beach nourishment	0.45 mile
1991	Pinellas	Johns Pass Dredge Material Disposal		R-127 to R-130	Dredge disposal and sand placement	
1992	Pinellas	Sand Key/Redington Beach Restoration		R-99 to R-107	Beach nourishment	
1992	Pinellas	Sand Key/Indian Shore Beach Restoration		R-85 to R-99	Beach nourishment	
1996	Pinellas	Treasure Island Beach Restoration		R-138 to R-142	Beach nourishment	2,500 linear feet
1996	Pinellas	Long Key Beach Restoration		R-144 to R-146	Beach nourishment	0.45 mile

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
1998	Pinellas	Sand Key/Belleair Beach Restoration		R-56 to R-66	Beach nourishment	
1999	Pinellas	Sand Key Beach Restoration		R-71 to R-107	Beach nourishment	
2000	Pinellas	Treasure Island Beach Restoration		R-136 to R-141	Beach nourishment	2.0 miles
2000	Pinellas	Terminal Groin at North End of Treasure Island			Groin construction	
2000	Pinellas	Long Key Beach Restoration		R-144 to R-145.6	Beach nourishment	2,800 linear feet
2000	Pinellas	Dredge Material Disposal and Honeymoon Island Beach Restoration		R-10 to R-12	Dredge disposal and sand placement	
2004	Pinellas	Treasure Island Beach Restoration	04-1247	R-136 to R-141	Beach nourishment	5,000 feet
2004	Pinellas	Long Key Beach Restoration	04-1247	R-144 to R-148	Beach nourishment	4,000 linear feet
2005	Pinellas	Sand Key Emergency Renourishment	05-0627	R-56 to R-66 and R-72 to R-106	Beach nourishment	8.6 miles
2006	Pinellas	Treasure Island, Sunset, Long Key, Pass a Grill Emergency Renourishment	41910-2006-F-0480	R-126 to R-146	Beach nourishment	9.5 miles
2006	Pinellas	Dredge Material Disposal and Mullet Key and Fort DeSoto Beach Restoration	41910-2006-F-0692	R-177 to R-179.5 and R-181 to R-183	Dredge disposal and sand placement	4,500 linear feet
2009	Pinellas	Treasure Island Beach Nourishment	41910-2009-F-0250	R-136 to R-141, R-144 to R-148	Sand placement	11,375 linear feet
1997	St. Johns	Maintenance Dredging of Matanzas Inlet and Sand Placement at Summer Haven	98-171D	R-197 to R-209		
2001	St. Johns	Maintenance Dredging of Matanzas Inlet and Sand Placement at Summer Haven	98-171D			
2002	St. Johns	St. Johns County Shore Protection Project at St. Augustine		R-137 to R-152	Beach nourishment	2.5 miles
2003	St. Johns	St. Johns County Shore Protection Project at St. Augustine		R-132 to R-152	Beach nourishment	3.8 miles

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2003	St. Johns	Maintenance Dredging of Matanzas Inlet and Sand Placement at Summer Haven	98-171D	R-197 to R-209	Beach nourishment	
2005	St. Johns	St. Johns County Shore Protection Project at St. Augustine	05-0446	R-137 to R-150	Beach nourishment	2.5 miles
2006	St. Johns		TE091980-0		Beach driving	41.1 linear miles
2007	St. Johns	Maintenance Dredging of Matanzas Inlet and Sand Placement at Summer Haven	41910-2007-F-0305	R-200 to R-208	Beach nourishment	4,000 linear feet
2009	St. Johns	Beach berm repair		R-201 to R-203, R-207 to R-208	Beach berm repair	7,000 linear feet
2009	St. Johns	Matanzas Inlet Maintenance Dredge and Summer Haven Sand Placement	41910-2009-F-0462	R-200 to R-208	Sand placement	8,000 linear feet
2009	St. Johns	St. Augustine Shore Protection Project	41910-2009-F-0444	600 feet north of R-137 and 600 feet south of R-151	Sand placement	15,280 linear feet
2010	St. Johns	St. Augustine Inlet Dredge and Sand Placement	41910-2010-F-0105			20,000 linear feet
2004	Volusia	Volusia County FEMA Berm	05-1074	R-40 to R-145 and R-161 to R-208	Beach nourishment	
2005	Volusia	Ponce de Leon Dredge and Beach Placement	05-0884	R-143 to R-145	Dredge and sand placement	3,000 linear feet
2005	Volusia		TE811813-11		Beach driving	50 miles
2006	Volusia	New Smyrna/Silver Sands Dune Restoration	05-1007	R-161 to R-175	Beach restoration	5.4 miles
2006	Volusia	Volusia County FEMA Berm	41910-2006-F-0831		Repair of right of way and beach placement	230 linear feet
2007	Volusia	Ponce de Leon Dredge and Beach Placement	41910-2007-F-0109	R-158 to R-175	Dredge and sand placement	3.2 miles
2009	Volusia	Ponce de Leon Inlet Maintenance Dredging and Sand Placement	41910-2009-F-0362	R-143 to R-145	Sand placement	8,000 linear feet
PANAMA CITY FIELD OFFICE						
8 April 1998	Bay	Panama City Beach Beach Nourishment	4-P-97-108	R-4.4 and R-93.2	Beach nourishment new project	16 miles
24 June 1998	Bay	Tyndall AFB Driving on the Beach	4-P-98-020	V-9 (virtual) to R-122	Driving on the beach for military missions	18 miles

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
31 July 1998	Bay	Lake Powell Emergency Opening	4-P-97-089	R- 0.5	Emergency outlet opening	1,500 feet
16 April 1999	Bay	Panama City Beach Beach Nourishment Amendment 1	4-P-97-108	R-0.5 to R-9	Beach nourishment completion	16 miles (no additional take provided from original)
9 March 2000	Bay	Panama City Beach Beach Nourishment Amendment 2	4-P-97-108	R-35 to R-71	Relief from tilling requirement beach nourishment	16 miles (no additional take provided from original)
10 April 2000	Bay	Panama City Beach Beach Nourishment Amendment 3	4-P-97-108	R-35 to R-71	Relief from tilling requirement beach nourishment	16 miles (no additional take provided from original)
18 December 2000	Bay	Panama City Beach Beach Nourishment Amendment 4	4-P-97-108	R-35 to R-71	Relief from tilling depth requirement and compaction testing sample numbers beach nourishment	16 miles (no additional take provided from original)
4 January 2001	Bay	East Pass Re-Opening	4-P-00-211	No R-monuments	Dredging of a closed inlet and dredged material placement on beach	2 miles
29 March 2001	Bay	Panama City Beach Beach Nourishment Amendment 5	4-P-97-108	R-35 to R-71	Relief from tilling depth requirement beach nourishment	16 miles (no additional take provided from original)
7 Sept 2001	Bay	City of Mexico Beach Sand Bypass System	4-P-01-178	Mexico Beach canal	Dredging and spoil disposal	3,700 feet 2.0 acres
14 January 2005	Bay	Panama City Beach Beach Nourishment Amendment 5	4-P-97-108	R-4.4 and R-93.2	Post hurricane restoration	16 miles (no additional take provided from original)
2006	Bay	Tyndall Air Force Base INRMP	4-P-05-240	V-9 (virtual) to R-122	Integrated Natural Resources Management Plan	18 miles
26 March 2006	Bay	Mexico Beach Canal Sand By Pass Amendment 1	4-P-05-281 2007-F-0205	R-127 to R-129	By pass system improvements	5,000 feet
24 May 2007	Bay	Panama City Beach Beach Nourishment Amendment 6	4-P-97-108 2007-TA-0127	R-4.5 to R-30 and R-76 to R-88	New work and post hurricane restoration	31,500 feet of 16 miles total no additional take provided
25 October 2007	Bay	Panama City Beach Nourishment Amendment 8	2008-F-0004	2008 project: R-74 to R-91; Entire project: R-0.5 to R-91	Beach nourishment	17.9 miles
29 Feb 2008	Bay	Panama City Harbor (revised BO)	2008-F-0168	R-97	Navigation channel maintenance dredging and beach placement of dredged material.	500 ft of beachfront at St. Andrew State Park

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
8 June 2009	Bay	Panama City Harbor Navigation Channel Amendment 1	2009-F-0175	R-92 to R-97	Maintenance navigation channel dredging and dredged material placement	0.85 mile
2009	Bay	City of Mexico Beach		R-128.5 to R-138.2	Beach berm repair (emergency)	9,393 linear feet
06 Jan 2010	Bay	Lake Powell Outlet Emergency Opening	2009-F-0226	R-0-A and R-1	Emergency opening of the outlet to the Gulf of Mexico	2,400 feet
7 August 2000	Escambia, Santa Rosa, Okaloosa, Walton, Bay, Gulf, Franklin	Destin Dome OCS Offshore Oil and Gas Drilling	4-P-00-003	Gulf of Mexico federal waters	Oil and gas offshore exploration	Formal consultation with no take
3 June 2002	Escambia	Pensacola Beach Beach Nourishment	4-P-02-056	R-108 to R-143	Beach nourishment	8.3 miles Loggerhead 14 nests Green 1 nest Leatherback < 1 nest Kemp's ridley <1 nest
9 June 2009	Escambia	Perdido Key Beach Nourishment	2008-F-0059	R-1 to R-34	New beach nourishment	6.5 miles
9 Sept 2010	Escambia	Pensacola Navigation Channel	2009-F-0205; using statewide programmatic 41910-2010-F-0547	R-32 to R-64	Navigation channel maintenance and dredge material disposal	6.3 miles
11 Jan 2010	Escambia	FEMA Perdido Key Upland Berm	Using statewide programmatic 41910-2010-F-0547	R-21.5 to R-31.5	Post Tropical Storm Gustav berm	2.0 miles
8 April 2005	Escambia, Santa Rosa, Okaloosa, Walton, Bay, Gulf	FEMA Beach Berms Post Hurricane Ivan Emergency Coordination (consultation incomplete)		UK	Emergency beach berms	Walton 20 miles Okaloosa 4.2 miles Mexico Bch 1 mile Panama City Bch UK St Joseph peninsula UK Perdido Key UK Navarre UK
10 May 2004	Franklin	Alligator Point Beach Nourishment	4-P-02-163	R-207 to R-210	Beach nourishment	2,500 feet Loggerhead,: 2 nests, green 1 nest; leatherback 1 nest
17 May 2007	Gulf	St. Joseph Peninsula Beach Nourishment	4-P-07-056 2007-F-0220	R-67 to R-105.5	Beach nourishment	7.5 miles
31 Jan 2008	Gulf	St. Joseph Peninsula Beach Nourishment; Amendment 2	2008-F-0161	R-67 to R-105.5	Beach nourishment – change from work in 2 to 1 season.	7.5 miles; no increase in IT.
2009	Gulf	St. Joseph Peninsula Beach		R-95.3 to R-105.5	Beach berm repair (emergency)	10,300 linear feet

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
25 April 2001	Okaloosa	Eglin AFB Porous Groin within Season	4-P-00-207	Eglin AFB Test Sites 1 and 3	Experimental porous groin system	
18 June 2002	Okaloosa	Eglin 737 Sensor Test Site 13-A SRI	4-P-02-088	V-507	Military testing	0.01 acre 0.12 mile
2009	Okaloosa	City of Destin		R-17.37 to R-19	Beach berm repair (emergency)	1,260 linear feet
23 Dec 2009	Okaloosa	East Pass at Destin Navigation Channel	2009-F-0096	R-17 to R-25.5	Navigational channel maintenance	1.7 miles
21 March 2003	Okaloosa Santa Rosa	Eglin Marine Expeditionary Unit Training	4-P-03-052	V-621 to V-501	Military marine training	
9 October 2003	Okaloosa Santa Rosa	Eglin AFB U.S. Army Ranger Los Banos	4-P-03-289	V-502 to V-533	Military army training	7 miles
25 February 2004	Okaloosa, Santa Rosa	Eglin AFB Advance Skills Training	4-P-03-264	R-502 to R-534	Military training	7 miles 70 acres
4 June 2004	Okaloosa Santa Rosa	Eglin AFB Airborne Littoral Reconnaissance Test	4-P-04-225	V-501 to V-514	Military naval testing	0.5 mile 15.2 acres
1 December 2005	Okaloosa Santa Rosa	Eglin Air Force Base Military Mission & Training Santa Rosa Island Programmatic	4-P-05-242	V-621 to V-501	Military missions	17 miles
6 December 2007	Okaloosa Santa Rosa	Eglin AFB Airborne Littoral Reconnaissance Test	2008-F-0056	V-501 to V-514 Test Site A-15	Military naval testing	0.7 acre
3 June 2008	Okaloosa Santa Rosa	Eglin AFB Beach and Dune Restoration	2008-F-0139	V-551 to V-609 excluding non-AF lands and V-512 to V-518	Beach nourishment including dune restoration (new)	5.0 miles
28 August 2008	Okaloosa, Santa Rosa	Eglin Air Force Base Armoring Santa Rosa Island Test Sites A-3, A-6, A-13B	2008-F-061	Test Sites A-3, A-6, A-13B	Storm protection at air force facilities, Santa Rosa island	0.57 miles
21 April 2009	Okaloosa, Santa Rosa	East Pass Destin Navigation Channel	2009-F-0295	V-619.5 to V-621 and R-17	Maintenance navigation channel dredging and dredged material placement	1.6 miles
28 Dec 2009	Okaloosa, Santa Rosa	Eglin Air Force Base protection of Test Sites A-3, A-13, and A-13b	2008-F-061 amendment 1	V-608 and V-512	Sand placement 100% proposed at sites A-3 and 50% of proposed between sites A-13b and A-13.	A-3, = 7,000 feet; between A-13b and A-13.5=5,500-7,000 feet

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
28 Dec 2009	Okaloosa, Santa Rosa	Eglin Air Force Base	2008-F-039 amendment 1	V-608 and V-512	Sand placement 100% proposed at sites A-3 and 50% of proposed between sites A-13b and A-13.	A-3, = 7,000 feet; between A-13b and A-13.5=5,500-7,000 feet
26 March 2002	Santa Rosa, Okaloosa, Gulf	Eglin AFB INRMP		V-621 to V-501	Integrated natural resources management program	17 miles
19 July 2005	Santa Rosa	Navarre Beach Nourishment Emergency Coordination (consultation incomplete)	4-P-04-244	R-192.5 to R-213.5	Emergency beach nourishment	4.1 miles
24 Aug 2006	Santa Rosa	Navarre Beach Restoration Amendment 1	4-P-04-244 2007-F-0139		Walkover construction associated with beach nourishment	4.1 miles (no additional take provided from original)
30 Aug 2006	Santa Rosa	Navarre Beach Restoration Amendment 1	4-P-04-244 2007-F-0139		Walkover construction associated with beach nourishment	4.1 miles (no additional take provided from original)
29 Nov 2006	Santa Rosa	Navarre Beach Restoration Amendment 1	4-P-04-244 2007-F-0139		Walkover construction associated with beach nourishment	4.1 miles (no additional take provided from original)
28 August 2008	Santa Rosa	Eglin AFB SRI Armoring at Test Sites	2008-F-0061	V-608, V-551, and V-512	Bulkheads around test sites A-3, A-6, and A-13B	0.57 mile
7 Dec 2006	Santa Rosa	Navarre Beach Restoration Amendment 1	4-P-04-244 2007-F-0139		Walkover construction associated with beach nourishment	4.1 miles (no additional take provided from original)
9 October 2009	Santa Rosa	Navarre Beach Restoration Amendment 7	2010-F-0036	R-192 to R-194	Emergency beach restoration	1,800 feet
30 April 2004	Walton, Okaloosa	Walton County-Destin Beach Nourishment	4-P-01-149	R-39 (Okaloosa Co.) to R-21.93 (Walton Co.)	New beach nourishment	6.7 miles Loggerhead: 11 nests; green 1 nests; leatherback & Kemp's ridley: < 1 nests
8 May 2006	Walton	Western Lake Emergency Opening	4-P-01-105	R-72 to R-73	Emergency outlet opening	0.5 miles 3.0 acres
26 October 2007	Walton	Eastern Lake Emergency Opening	2007-F-0627	R-94 to R-95	Emergency opening of coastal dune lake to GOM	0.5 mile

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
9 November 2007	Walton	Alligator Lake Emergency Opening	2007-F-0031	R-68 to R-70	Emergency opening of coastal dune lake to GOM	0.5 mile
2 October 2008	Walton	Walton County Beach Nourishment Phase 2	2008-F-060	R-41 to R-67, R-78 to R-98, R-105.5 to R-127	Beach nourishment (new)	13.5 miles
SOUTH FLORIDA FIELD OFFICE						3,390 feet
11 March 2003	Broward	Broward County Shore Protection Project	4-1-99-F-506		Port Everglades dredging and beach nourishment	
4 Dec 2003	Broward	Diplomat Beach Nourishment	4-1-00-F-743		Nourishment and 200 feet of riprap	
25 Aug 2004	Broward	Fishermen's Pier	4-1-04-F-8366		Pier repair	14,910 square feet
18 June 2007	Broward	Hillsboro Inlet Maintenance Dredging and Sand Placement	41420-2006-FA-0896	315 feet of the Inlet and 500 feet of shoreline at R-25.	Inlet dredging and sand nourishment	500 feet
10 Dec 2007	Broward	Town of Hillsboro Beach Pressure Equalizing Modules (PEMs) Pilot Project	41420-2007-F-0859	300 feet north of R-7 to 100 feet south of R-12 1 mile of shoreline	Pilot project to investigate the effectiveness of the PEMs	1 mile
7 Mar 2008	Broward	Broward County Glass Cullet Pilot Project	41420-2007-FA-0599	Centered at R-103	Pilot project to examine the effectiveness of glass cullet as potential beach fill supplement material for shoreline stabilization.	333 feet
28 April 2008	Broward	Town of Hillsboro Truck Haul Beach Nourishment Project	41420-2008-FA-0187	330 feet north and 100 feet south of R-7	Temporary beach nourishment	0.08 mile (430 feet)
3 Sept 2008	Broward	Hillsboro Inlet Maintenance Dredging and Sand Placement	41420-2006-FA-0896	500 feet south of R-25	Inlet dredging and sand placement. This is an amended BO in regard to the original BO completed on 18 June 2007.	500 feet
28 May 2010	Broward	Port Everglades Jetty Repair	41420-2010-CPA-0144	South Jetty	Repair of the south jetty.	0.15 mile

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
18 June 2010	Broward	Hillsboro Beach Sand Placement	41420-2008-FA-0187	R-5 +300 to R-12 +450 feet	Beach nourishment	1.35 miles
23 March 2005	Charlotte	Manasota Key Groin Construction	4-1-04-F-8338	R-19 to R-20	Stump Pass dredging (material placed on beach); and groin construction	1,000 feet
29 March 2006	Charlotte	Stump Pass Dredging and Beach Nourishment	4-1-04-F-8338	R-16.5 to R-18	Stump Pass dredging and beach nourishment	1,500 feet
26 April 2010	Charlotte	Stump Pass Dredging and Sand Placement	41420-2008-FA-0425	R-14.4 to R-20 R-22 to R-23 R-29 to R-39	Stump Pass dredging and sand placement	3.5 miles
3 April 2003	Collier	Keewaydin Island Limited Partnership T-Groin Project	4-02-F-1099	R-90 to R-91	Gordon Pass – maintenance dredge; nourish the section of beach where groins are to be constructed; construct three t-groins	1,000 feet
14 March 2005	Collier	Hideaway Beach	4-1-04-F-6342	H-1 to H-5 and H-9 to H-12	Beach nourishment and t-groin construction	1.4 miles
20 Sept 2005	Collier	Collier County Beach Re-Nourishment Project	4-1-04-TR-8709	Segments within R-22 and R-79	Beach nourishment	13.4 miles
14 Nov 2005	Collier	South Marco Island Beach Re-Nourishment	4-1-04-TR-11752	R-144 to G-2	Beach nourishment	0.83 mile
28 August 2008	Collier	Doctor's Pass North Jetty Repair	41420-2008-FA-0432	R-57 plus 500 feet south	Removing the existing 240 feet of existing jetty and constructing a new jetty within generally the same footprint.	0.25 mile
27 October 2009	Collier	Hideaway Beach Erosion Control	41420-2008-FA-0935	H-4 to H-9	Sand placement and construction of six T-head groins.	0.47 mile
18 August 2010	Collier	Gordon Pass Erosion Control Project – Phase 2 (T-head groins)	41420-2008-FA-0765	R-91 to R-92	Construction of two T-head groins.	0.19 mile
28 Oct 2010	Collier	Collier County Truck Haul Sand Placement (Park Shore & Naples Beach)	41420-2010-F-0225	R-45 +600 feet to R-46 +400 feet; R-58A -500 feet to R-58	A truck haul sand placement project	0.37 mile

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
12 Oct 2004	Indian River	Issuance of Permits to Homeowners for Emergency Coastal Armoring	10(a)(1)(B) permit			3,196 feet
28 Feb 2005	Indian River	Indian River County Beach Nourishment - Sectors 3 and 5	4-1-05-F-10922	Gaps between R-21 and R-107	Dune restoration and beach nourishment	5.90 miles dunes 0.8 mile beach
22 Nov 2005	Indian River	Indian River County Beach Nourishment – Sector 7	4-1-05-TR-9179	R-97 to R-108	Beach nourishment	2.2 miles
31 Oct 2006	Indian River	Indian River County Beach Nourishment – Sectors 1 and 2	41420-2006-FA-1491	R-3.5 to R-12	Dune enhancement and beach nourishment	1.62 miles
10 Sept 2007	Indian River	Sebastian Inlet Channel and Sand Trap Dredging, Sectors 1 and 2 Beach Nourishment	41420-2007-F-0864	R-3 to R-12	Sand trap dredging and beach nourishment	1.61 miles
10 October 2008	Indian River	Baytree and Marbrisa Condominium Dune Restoration	41420-2008-FA-0007	200 feet south of R-46 to 200 feet south of R-48	Dune restoration/enhancement	0.38 mile
16 October 2009	Indian River	City of Vero Beach, Outfall Pipe Installation	41420-2009-FA-0255	220 feet north and 930 feet south of R-83	Outfall pipe installation	0.22 mile
2 December 2009	Indian River	Indian River County Beach Nourishment Sector 3	41420-2007-F-0839	Phase 1 = R-32 to R-55 Phase 2 = R-20 to R-32	Beach and dune nourishment	Phase 1 = ~4.4 miles Phase 2 = ~2.3 miles
24 July 2002	Lee	Gasparilla Island Beach Nourishment	4-01-F-765	R-10 to R-26.5 R-25, R-25.5, R-26	Beach nourishment; breakwater construction; and two t-head groins	3.2 miles
19 June 2003	Lee	Bonita Beach Re-nourishment	4-1-02-F-1736		Beach nourishment	3,922 feet
4 March 2005	Lee	Sanibel and Captiva Island Beach Nourishment	4-1-04-F-9180	R-83 to R-109 and R-110 to R-118	Beach nourishment	6.0 miles
14 March 2007	Lee	Gasparilla Island Beach Nourishment (BO amendment)	41420-2007-FA-0509	South of R-26A	Beach nourishment	
27 August 2007	Lee	North Captiva Island Beach Nourishment	41420-2007-FA-1023	R-81 and 208 feet south of R-81A	Beach nourishment	0.23 mile
5 August 2009	Lee	Matanzas Pass Reopening	41420-2009-FA-0132	North end of Estero Island	Channel dredging	0.14 mile

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
21 March 2008	Lee	Blind Pass Reopening	41420-2006-FA-1549	R-109 to R-114	Reopening Blind Pass and then nourishing the shoreline between R-112 and R-114.	0.95 mile
7 Dec 2009	Lee	Sanibel Island Sand Placement	41420-2009-FA-0066	R-174A to Bay 1A	Beach nourishment	0.25 mile
15 Sept 2010	Lee	Big Hickory Island Sand Placement and Groin Construction	41420-2010-CPA-0100	R-222.3 to R-223.8	Beach nourishment and groin construction	0.47 mile
31 Jan 2002	Martin	Jupiter Island	4-1-05-TR-13281	R-75 to R-117	Beach nourishment	6.5 miles
5 Jan 2005	Martin	Martin County Shore Protection Project	4-1-05-F-10476	R-1 to R-25.6	Beach nourishment	4.1 miles
2 Dec 2005	Martin	Jupiter Island Modification	4-1-05-TR-13281	R-76 to R-84 and R-87 to R-11	Beach nourishment	5 miles
2 Feb 2007	Martin	Sailfish Point Marina Channel Dredging and Beach Nourishment	41420-2007-FA-0196	R-36 to R-39	Channel dredging and beach nourishment	0.66 mile
6 October 2009	Martin	Bathtub Beach Park Sand Placement	41420-2009-FA-0110	R-34.5 to R-36	Beach nourishment	0.24 mile
8 June 2010	Martin	Martin County Beach Erosion Control Project	41420-2009-FA-0190	R-1 to R-25	Beach nourishment	~ 4 miles
23 Sept 2005	Miami-Dade	Bal-Harbour T-Groin Reconstruction	4-1-05-12842	R-27 to R-31.5	Groin removal and reconstruction	0.85 mile
11 Oct 2005	Miami-Dade	Bakers Haulover AIW Maintenance Dredging	4-1-04-TR-8700	R-28 to R-32	Dredging and beach nourishment	0.85 mile
7 June 2006	Miami-Dade	Miami-Dade Beach Nourishment	41420-2006-FA-0028	3 segments within R-48.7 and R-61	Beach nourishment	3,716 feet
25 July 2007	Miami-Dade	Miami Beach Nourishment	41420-2006-F-0028	R-67 to R-70	BO modification to June 7, 2006 BO	3,000 feet
5 Nov 2008	Miami-Dade	Baker's Haulover Dredging and Sand Placement	41420-2008-FA-0729	R-28 to R-32	BO modification to the October 11, 2005 BO. Dredging and sand placement events will be biannual.	4,000 feet
12 Nov 2008	Miami-Dade	DERM Truck Haul Sand Placement	41420-2008-FA-0776	R-27 to R-29 R-7 to R-12 R-43 to R-44+500 feet	Beach nourishment	1.78 miles
25 Nov 2009	Miami-Dade	DERM 27th Street Sand Placement	41420-2009-FA-0045	R-60 to R-61	Beach nourishment	0.19 mile
17 Dec 2009	Miami-Dade	32nd and 63rd Streets Sand Placement	41420-2009-FA-0415	R-37.75 to R-46.25 R-53.7 to R-55.5 R-60 to R-61	Sand placement	2.14 miles

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
31 March 2010	Miami-Dade	55th Street Sand Placement	41420-2009-FA-0046	R-48.7 to R-50.7	Sand placement	0.38 mile
30 April 2010	Miami-Dade	44th Street Sand Placement	41420-2009-FA-0047	R-53.7 to R-55.5	Sand placement	0.34 mile
25 June 2010	Miami-Dade	Bal Harbour Sand Placement	41420-2009-FA-0593	R-29 to R-32	Sand Placement – truck haul	0.60 mile
28 June 2010	Miami-Dade	Sunny Isles BeachSand Placement	41420-2009-FA-0594	R-12 to R-15)	Sand Placement – truck haul	0.58 mile
30 July 2010	Miami-Dade	Miami Beach sand placement	41420-2009-FA-0595	R-45 to R-48 +700 feet	Sand Placement – truck haul	0.78 mile
13 Sept 2010	Miami-Dade	Miami Beach sand placement	41420-2009-FA-0527	R-43 to R-44 + 500 feet	Sand Placement – truck haul	0.26 mile
8 October 2010	Miami-Dade	Sunny Isles Beach Sand Placement	41420-2009-FA-0526	R-7 to R-12	Sand Placement – truck haul	0.95 mile
8 October 2010	Miami-Dade	Bal Harbour Sand Placement	41420-2009-FA-0525	R-27 to R-29	Sand Placement – truck haul	0.38 mile
2009	Monroe	Reclaimed sand placement and sand cleaning (seaweed removal)	41420-2010-F-0006	No R-monuments	Sand placement and cleaning	1,462 linear feet
2009	Monroe	City of Key West (South Beach)	41420-2010-F-0013	No R-monuments	Beach repair (emergency)	235 linear feet
2009	Monroe	City of Key West (Rest Beach)	41420-2010-F-0014	No R-monuments	Beach repair (emergency)	640 linear feet
2009	Monroe	City of Marathon, Sombrero Beach	41420-2010-F-0001	No R-monuments	Beach repair (emergency)	1,380 linear feet
5 March 2010	Monroe	City of Key West – Simonton Beach	41420-2010-FC-0412	Approximately 350 feet ENE of V-416 (latitude 24.562, longitude -81.8054	Emergency beach repair	95 linear feet
5 March 2010	Monroe	City of Key West – Dog Beach	41420-2010-FC-0413	Between V-414 and V-413 (latitude 24.5473, longitude -81.7929	Emergency beach repair	35 linear feet
13 May 2010	Monroe	City of Key West, Smathers Beach	41420-2008-FA-0185	No R-monuments	Sand placement	0.57 mile
27 March 2003	Palm Beach	Palm Beach Harbor M & O	4-1-03-F-139	200 feet south of the south jetty	Jetty sand tightening	200 feet
16 March 2004	Palm Beach	Boca Raton Inlet Sand Bypassing	4-1-04-F-4688	200 feet south of R-223	Inlet sand bypassing and beach nourishment	500 feet
11 Feb 2005	Palm Beach	Palm Beach Shoreline Protection Project - Delray Segment	4-1-05-F-10767	R-175 to R-188	Beach restoration	2.7 miles

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
24 Feb 2005	Palm Beach	Palm Beach Shoreline Protection Project - Ocean Ridge Section	4-1-05-F-10787	R-153 to R-159	Beach nourishment	1.12 miles
11 April 2005	Palm Beach	South Lake Worth Inlet Sand Transfer Plant Reconstruction and Bypassing	4-1-04-F-8640	135 feet south of R-151, to 275 feet south of R-152	STP reconstruction and bypassing	900 feet
5 Dec 2005	Palm Beach	Mid-Town Beach Nourishment Project (Reach 3 & 4)	4-1-00-F-742	R-90.4 to R-101.4	Beach nourishment	2.4 miles
23 Dec 2005	Palm Beach	Palm Beach Harbor M & O	4-1-05-TR-13258	R-76 to R-79	Dredging and beach nourishment	3,450 feet
23 Feb 2006	Palm Beach	Boca Raton Central Beach Nourishment Project	4-1-01-F-1795	R-216 to R-222	Dredge shoal fronting Boca Raton Inlet and beach nourishment	1.3 miles
23 Feb 2006	Palm Beach	Boca Raton South Beach Nourishment Project	41420-2008-FA-0777 Old database number 41-01-F-652	R-223.3 to R-227.9	Dredge shoal fronting Boca Raton Inlet and beach nourishment	Approx. 1 mile
28 April 2006	Palm Beach	Palm Beach Nourishment Project – Reach 8	41420-2006-F-0018	R-125 to R-134	Beach nourishment	2.17 miles
31 July 2006	Palm Beach	Sea Dunes Condominium Seawall	41420-2006-FA-1108		Seawall construction	0.03 acre
15 Dec 2006	Palm Beach	North Ocean Boulevard Rock Revetment	41420-2006-FA-1490	290 feet north of R-84; 1,150 feet south of R-85	Rock revetment construction	0.34 mile
5 Feb 2007	Palm Beach	Palm Beach Sand Transfer Plant Reconstruction	41420-2006-FA-1447	R-76 to R-79	Sand transfer plant reconstruction and discharge pipe extension	0.57 mile
28 March 2007	Palm Beach	Lake Worth Inlet Jetty Repair	41420-2007-FA-0221	200 feet north of R-75 and 200 feet south of R-76	Jetty repair	400 feet
25 May 2007	Palm Beach	Singer Island and South Palm Beach Emergency Dune Restoration	41420-2007-FA-1001	385’ south of R-137 to 500’ north of R-136; 500’south of R-60 to 850’ south of R-65	Dune Restoration	6,135 feet
25 May 2007	Palm Beach	Jupiter Island ICWW Maintenance Dredging and Beach Nourishment	41420-2006-FA-1582	16,000 feet (130,000 cy) of the ICWW dredged; material placed between R-13 and R-19.	Channel dredging and beach nourishment	1.04 miles
20 July 2007	Palm Beach	North Boca Raton Beach Nourishment	41420-2007-FA-0477	T-205 to 181 feet south of R-212	Beach nourishment	1.45 miles

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
9 Nov 2007	Palm Beach	Jupiter Inlet and channel dredging	41420-2006-FA-1582	R-13 to R-17	Dune restoration	~ 4,000 linear feet
14 Nov 2007	Palm Beach	Jupiter Inlet Sand Trap Dredging and Sand Placement	41420-2007-FA-0600	Maintenance dredging of the inlet; beach compatible placed R-13 to R-19	Inlet dredging and beach nourishment	1.02 miles
28 Nov 2007	Palm Beach	Modification to a Sheet Pile and Rubble-Mound T-Head Groin System	41420-2007-FA-0574	500 feet north of R-94 south to R-95	T-groin repair, extension, construction	0.4 mile
5 Feb 2008	Palm Beach	Reach 8 Dune Restoration	41420-2006-F-0018	R-125 to 350 feet south of R-134	Dune restoration	2.17 miles
9 Sept 2008	Palm Beach	Juno Beach Sand Placement	41420-2008-FA-0081	R-26 to R-38	Sand placement	2.45 miles
4 Nov 2008	Palm Beach	Palm Beach Harbor M&O and Sand Placement	41420-2008-FA-0524	R-76 to R-79	Biannual Inlet dredging and sand placement events.	3,450 feet
2009	Palm Beach	Beach berm repair	41420-2010-F-0008	R-60 to R-68	Beach berm repair (permanent work)	6,880 linear feet
2009	Palm Beach	Beach berm repair	41420-2010-F-0009	R-135 to R-138	Beach berm repair (permanent work)	3,590 linear feet
2009	Palm Beach	Beach berm repair	41420-2010-F0010	R-137 to R-138	Beach berm repair (emergency)	125 linear feet
21 June 2010	Palm Beach	Mid-Town Reaches 3 & 4 Sand Placement	41420-2006-F-0011-R001	R-95 to R-100	Beach nourishment	0.95 mile
2 July 2010	Palm Beach	Phipps Ocean Park Reaches 7&8	41420-2010-CPA-0110	R-116 to R-125	Sand Placement	3.4 miles
3 Sept 2010	Palm Beach	Singer Island Breakwater	41420-2008-FA-0019	R-60.5 to R-66	Segmented, submerged breakwater	1.1 miles
19 June 2003	St. Lucie	Fort Pierce Shoreline Protection	4-1-03-F-1867 41420-2006-FA-1575	R-33.8 to R-41	Beach nourishment; berm expansion; and six t-head groins	1.3 miles
9 March 2006	St. Lucie	Blind Creek Restoration and South St. Lucie Emergency Berm Remediation Project	41420-2006-FA-0075	R-98 to R-115 R-88 to R-90	Wetland restoration and beach nourishment	3.6 miles
27 June 2008	St. Lucie	Fort Pierce Shoreline Protection Project	41420-2006-FA-1575	R-34 to R-41	Beach nourishment, berm expansion, and six t-head groins	1.3 miles
25 Aug 2004	Sarasota and Manatee	Longboat Key Beach Nourishment	4-1-04-F-4529	R-46A to R-29.5	Beach nourishment	9.45 miles
4 Oct 2005	Sarasota and Manatee	Longboat Key Beach Nourishment Project – BO Amendment	4-1-04-TR-4529	R-44 to R-44.5 and R-46A to R-44.5	Beach nourishment	0.47 mile

YEAR	COUNTY	PROJECT NAME	SERVICE FEDERAL ACTIVITY CODE	PROJECT LOCATION	PROJECT TYPE	ANTICIPATED INCIDENTAL TAKE (linear footage, no. of eggs, etc.)
20 Oct 2005	Sarasota	South Siesta Key	4-1-05-TR-12691	R-67 to R-77 plus 200 feet	Beach nourishment	2.1 miles
7 Dec 2007 (original BO) 28 July 08 (BO mod)	Sarasota	Lido Key Beach Fill Placement Project	41420-2007-F-0841	R-35.5 to R-44.2 2.27 miles	Beach nourishment with 425,000 cy of fill material.	2.27 miles
13 August 2008	Sarasota	Longboat Key Permeable Adjustable Groins	41420-2007-FA-0205	R-13 to R-13.5	Construction of two permeable adjustable groins.	0.09 mile project area 0.43 mile action area
2009	Sarasota		41420-2010-F-0003	R-77 to midpoint between R-77 and R-76	Beach restoration	700 linear feet
2009	Sarasota	Longboat Key Beach	41420-2010-F-0007	R-13 to R-14 Sarasota County; R-44 to R-5, and R-48.5 to R-49.5 Manatee County	Beach berm repair	951, 1,197, and 1,142 linear feet, respectively

Appendix B

NMFS Consultations

CONSULTATION ACTIVITY	TYPE OF ACTION	DATE SIGNED	ACTION AREA	INCIDENTAL TAKE STATEMENT (ANTICIPATED TAKE)									
				Loggerhead (NWAO & NP DPS)		Green Turtle		Leatherback		Hawksbill		Kemp's Ridley Olive Ridley	
				Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
Non-Fishery Consultations													
North Carolina DENR Inshore Gillnet-Incidental Take Permit	Section 10(a)(1)(B)	9/6/13	North Carolina Inshore Waters	1-yr Estimate									
						330	165					98	49
				1-yr Observed									
				24		18		8		8		12	
Removal of Offshore Structures in the Gulf of Mexico Outer Continental Shelf	Oil & Gas	8/28/2006	Gulf of Mexico	6-yr Estimate									
				15*	0	3*	0	3*	0	3*	0	3*	0
Sinking Exercises (SINKEX) in the Western North Atlantic Ocean	Military	9/22/2006	Western North Atlantic Ocean	1-yr Estimate									
				ITS - We do not have information to determine an amount of take. Survey data for the SINKEX location is extremely limited and the densities or abundance of sea turtles within the area is not known. Therefore, we anticipate the extent of take would be within the water column that would be affected by the shock and pressure waves above levels of 12 psi and 182 dB re 1 µ Pa2-sec in the greatest 1/3 octave band. For the largest underwater detonations, the extent includes the volume within 2 nmi of the detonation. Thus, the extent of take includes the "exclusion zone" of the SINKEX.									
Issuance of multiple permits to conduct scientific research on Atlantic sturgeon pursuant to section 10 (a)(1) of the Endangered Species Act of 1973	Section 10(a)(1)(A) for Sturgeon Research	4/2/2012	U.S. Atlantic Coast (from ME to FL)	Anticipated take for the entire research permit (5 years)									
				4*	0	4*	0	4*	0	4*	0	4*	0
National Science Foundation - Marine Seismic Survey in the Central Pacific Ocean	Seismic	11/23/2011	Central Pacific Ocean	Anticipated take for the entire project period									
				ITS - We do not have information to determine an amount of take. Harassment of these sea turtles is expected to occur at received levels of seismic sounds above 166 dB re 1 µPa. Because density estimates of sea turtles in the survey area are unknown, we estimate take as the number of turtles exposed to seismic operations above 166 dB re 1 µPa during the proposed activities. These turtles could be of all ages and life stages in the survey area.									
Navy - Conduct of training in the Virginia Capes, Cherry Point and Jacksonville Range Complexes June 2011 to June 2012	Navy Activities	6/1/2011	Central Pacific Ocean	Anticipated take for the entire project period									
				485	9	311*	3*	20	1	311*	3*	557	5

Appendix C

ASSESSMENTS: DISCERNING PROBLEMS CAUSED BY ARTIFICIAL LIGHTING

LIGHTING INSPECTIONS

WHAT ARE LIGHTING INSPECTIONS?

During a lighting inspection, a complete census is made of the number, types, locations, and custodians of artificial light sources that emit light visible from the beach. The goal of lighting inspections is to locate lighting problems and to identify the property owner, manager, caretaker, or tenant who can modify the lighting or turn it off.

WHICH LIGHTS CAUSE PROBLEMS?

Although the attributes that can make a light source harmful to sea turtles are complex, a simple rule has proven to be useful in identifying problem lighting under a variety of conditions:

An artificial light source is likely to cause problems for sea turtles if light from the source can be seen by an observer standing anywhere on the nesting beach.

If light can be seen by an observer on the beach, then the light is reaching the beach and can affect sea turtles. If any glowing portion of a luminaire (including the lamp, globe, or reflector) is directly visible from the beach, then this source is likely to be a problem for sea turtles. But light may also reach the beach indirectly by reflecting off buildings or trees that are visible from the beach. Bright or numerous sources, especially those directed upward, will illuminate sea mist and low clouds, creating a distinct glow visible from the beach. This “urban skyglow” is common over brightly lighted areas. Although some indirect lighting may be perceived as nonpoint-source light pollution, contributing light sources can be readily identified and include sources that are poorly directed or are directed upward. Indirect lighting can originate far from the beach. Although most of the light that sea turtles can detect can also be seen by humans, observers should realize that some sources, particularly those emitting near-ultraviolet and violet light (e.g., bug-zapper lights, white electric-discharge lighting) will appear brighter to sea turtles than to humans. A human is also considerably taller than a hatchling; however, an observer on the dry beach who crouches to the level of a hatchling may miss some lighting that will affect turtles. Because of the way that some lights are partially hidden by the dune, a standing observer is more likely to see light that is visible to hatchlings and nesting turtles in the swash zone.

HOW SHOULD LIGHTING INSPECTIONS BE CONDUCTED?

Lighting inspections to identify problem light sources may be conducted either under the purview of a lighting ordinance or independently. In either case, goals and methods should be similar.

GATHER BACKGROUND INFORMATION

Before walking the beach in search of lighting, it is important to identify the boundaries of the area to be inspected. For inspections that are part of lighting ordinance enforcement efforts, the jurisdictional boundaries of the sponsoring local government should be determined. It will help to have a list that includes the name, owner, and address of each property within inspection area so that custodians of problem lighting can be identified. Plat maps or aerial photographs will help surveyors orient themselves on heavily developed beaches.

PRELIMINARY DAYTIME INSPECTIONS

An advantage to conducting lighting inspections during the day is that surveyors will be better able to judge their exact location than they would be able to at night. Preliminary daytime inspections are especially important on beaches that have restricted access at night. Property owners are also more likely to be available during the day than at night to discuss strategies for dealing with problem lighting at their sites.

A disadvantage to daytime inspections is that fixtures that are not directly visible from the beach will be difficult to identify as problems. Moreover, some light sources that can be seen from the beach in daylight may be kept off at night and thus present no problems. For these reasons, daytime inspections are not a substitute for nighttime inspections. Descriptions of light sources identified during daytime inspections should be detailed enough so that anyone can locate the lighting. In addition to a general description of each luminaire (e.g., HPS floodlight directed seaward at top northeast corner of the building at 123 Ocean Street), photographs or sketches of the lighting may be necessary. Descriptions should also include an assessment of how the specific lighting problem can be resolved (e.g., needs turning off; should be redirected 90° to the east). These detailed descriptions will show property owners exactly which luminaries need what remedy.

NIGHTTIME INSPECTIONS

A nighttime survey shall be conducted of all lighting visible from the beach placement area by the FWC permit holder, using standard techniques for such a survey. During the nighttime lighting surveys, the surveyor shall walk the length of the beach placement area looking for light from artificial sources. During the nighttime lighting surveys, a complete census shall be made of the number, types, locations, and custodians of artificial light sources that emit light visible from the beach. Because problem lighting will be most visible on the darkest nights, lighting inspections are to be conducted when there is no moon visible. Descriptions of light sources identified during the survey should be detailed enough so that anyone can locate the lighting. In addition to a general description of each luminaire (e.g., HPS floodlight directed seaward at top northeast corner of the building at 123 Ocean Street), photographs or sketches of the lighting may be necessary. Descriptions should also include an assessment of how the specific lighting problem can be resolved (e.g., needs turning off; should be redirected 90° to the east, etc.). A summary report of the survey shall be submitted to the Corps, FWC, and the Service.

Surveyors orienting themselves on the beach at night will benefit from notes made during daytime surveys. During nighttime lighting inspections, a surveyor walks the length of the nesting beach looking for light from artificial sources. There are two general categories of artificial lighting that observers are likely to detect:

1. **Direct lighting**. A luminaire is considered to be direct lighting if some glowing element of the luminaire (e.g., the globe, lamp [bulb], reflector) is visible to an observer on the beach. A source not visible from one location may be visible from another farther down the beach. When direct lighting is observed, notes should be made of the number, lamp type (discernable by color; style

of fixture), mounting (pole, porch, *etc.*), and location (street address, apartment number, or pole identification number) of the luminaire(s). If exact locations of problem sources were not determined during preliminary daytime surveys, this should be done during daylight soon after the nighttime survey. Photographing light sources (using long exposure times) is often helpful.

2. **Indirect lighting**. A luminaire is considered to be indirect lighting if it is not visible from the beach but illuminates an object (e.g., building, wall, tree) that is visible from the beach. Any object on the dune that appears to glow is probably being lighted by an indirect source. When possible, notes should be made of the number, lamp type, fixture style, and mounting of an indirect-lighting source. Minimally, notes should be taken that would allow a surveyor to find the lighting during a follow-up daytime inspection (for instance, which building wall is illuminated and from what angle?).

WHEN SHOULD LIGHTING INSPECTIONS BE CONDUCTED?

Because problem lighting will be most visible on the darkest nights, lighting inspections are ideally conducted when there is no moon visible. Except for a few nights near the time of the full moon, each night of the month has periods when there is no moon visible. Early-evening lighting inspections (probably the time of night most convenient for inspectors) are best conducted during the period of two to 14 days following the full moon. Although most lighting problems will be visible on moonlit nights, some problems, especially those involving indirect lighting, will be difficult to detect on bright nights.

A set of daytime and nighttime lighting inspections before the nesting season and a minimum of three additional nighttime inspections during the nesting-hatching season are recommended. The first set of day and night inspections should take place just before nesting begins. The hope is that managers, tenants, and owners made aware of lighting problems will alter or replace lights before they can affect sea turtles. A follow-up nighttime lighting inspection should be made approximately two weeks after the first inspection so that remaining problems can be identified. During the nesting-hatching season, lighting problems that seemed to have been remedied may reappear because owners have been forgetful or because ownership has changed. For this reason, two midseason lighting inspections are recommended. The first of these should take place approximately two months after the beginning of the nesting season, which is about when hatchlings begin to emerge from nests. To verify that lighting problems have been resolved, another follow-up inspection should be conducted approximately one week after the first midseason inspection.

WHO SHOULD CONDUCT LIGHTING INSPECTIONS?

Although no specific authority is required to conduct lighting inspections, property managers, tenants, and owners are more likely to be receptive if the individual making recommendations represent a recognized conservation group, research consultant, or government agency. When local ordinances regulate beach lighting, local government code-enforcement agents should conduct lighting inspections and contact the public about resolving problems.

WHAT SHOULD BE DONE WITH INFORMATION FROM LIGHTING INSPECTIONS?

Although lighting surveys serve as a way for conservationists to assess the extent of lighting problems on a particular nesting beach, the principal goal of those conducting lighting inspections should be to ensure that lighting problems are resolved. To resolve lighting problems, property managers, tenants, and owners should be give the information they need to make proper alterations to light sources. This information should include details on the location and description of problem lights, as well as on how the lighting problem can be solved. One should also be prepared to discuss the details of how lighting affects sea turtles. Understanding the nature of the problem will motivate people more than simply being told what to do.

Appendix D
Sea Turtle Lighting Survey Form

Lighting Survey Form

The lighting survey must be conducted to include a landward view from the seaward most extent of the beach profile. The survey must occur after 9 p.m. The survey must follow standard techniques for such a survey and include the number and type of visible lights, location of lights and photo documentation.

Date: _____

Contact information of person conducting the lighting survey: _____

_____

Location (name of beach): _____

Lighting ordinance (applicable County or Municipality): _____

Compliance Officer name and contact information: _____

Survey start time: _____

Survey end time: _____

Survey start location (include address or GPS location):_____

_____

_____

Survey end location (include address or GPS location): _____

_____

Date summarizing report sent to the following: marineturtle@myfwc.com, JCPCompliance@dep.state.fl.us, and seaturtle@fws.gov:_____

County or Municipality contact information for follow up meeting with the FWS and FWC:

_____

For each light visible from the nesting beach provide the following information:

Location of light (include cross street and nearest beach access)	GPS location of light	Description of light (type and location)	Photo take (YES/ NO)	Notification letter with recommendations sent? (YES/NO)

Location of light (include cross street and nearest beach access)	GPS location of light	Description of light (type and location)	Photo take (YES/ NO)	Notification letter with recommend ations sent? (YES/NO)

Appendix E

Nesting Seabird and Shorebird Protection Conditions

a. Selection of Bird Monitors. The Permittee or designated representative ("Permittee") shall hire one or more Bird Monitors, depending on the size of the area to be affected, who shall monitor shorebird and seabird (shorebird) activity before, during, and after construction. Bird Monitors shall have proven seabird and shorebird identification skills and avian survey experience. Before hiring any Bird Monitors, the Representative shall provide a list of candidate Bird Monitors with (1) their contact information and (2) a summary of their qualifications, including bird identification skills and avian survey experience, to the FWC Regional Species Conservation Biologist (see the attached FWC contact information exhibit) and copied to JCPCompliance@dep.state.fl.us for FWC approval before the Permittee hires the Bird Monitor(s).

b. The Bird Monitor(s) shall review and become familiar with the general information on the FWC's Florida Shorebird Database (FSD) website (www.FLShorebirdDatabase.org). They shall use the data-collection protocol and implement data-entry procedures as outlined in that website. An outline of data to be collected, including downloadable field data sheets, is available on the website.

c. Breeding season varies by species. Most species have completed the breeding cycle by September 1, but flightless young may be present through September. The following dates are based on the best available information regarding ranges and habitat use by species for this project: February 15 – September 1.

   Surveys during the breeding season shall begin on the first day of the breeding season or 10 days before any site work begins, whichever is later. Surveys shall be conducted through August 31 or until all breeding activity has concluded, whichever is later.

d. During the breeding season, the Bird Monitor(s) shall survey all potential beach-nesting bird habitats that may be affected by construction or pre-construction activities. The Bird Monitor(s) shall establish one or more shorebird survey routes in the FSD website to cover these areas.

e. During the pre-construction and construction phases of the project, the Bird Monitor(s) shall complete surveys on a daily basis to detect breeding activity and the presence of flightless chicks before (1) equipment is moved to the area, (2) vehicles are operated in the area, or (3) any other activities occur that have the potential to disrupt breeding behavior or cause harm to the birds or their eggs or young. Once construction is completed and all personnel and equipment have been removed from the beach, surveys may be conducted at weekly intervals.

f. The Bird Monitor(s) shall survey the project area by walking and looking for evidence of (1) shorebirds exhibiting breeding behavior, (2) shorebird chicks, or (3) shorebird juveniles, as outlined in the FSD's Breeding Bird Protocol for Shorebirds and Seabirds. The Bird Monitor(s) shall use binoculars for these surveys.

g. If an ATV or other vehicle is needed to cover large project areas, operators shall adhere to the FWC's Best Management Practices for Operating Vehicles on the Beach (http://myfwc.com/conservation/you-conserve/wildlife/beach-driving/). Specifically, the vehicle shall be operated at a speed under 6 mph and only on beaches at or below the high-tide line. The Bird Monitor(s) shall stop at no greater than 200-meter intervals to look for breeding activity.

h. Once the Bird Monitor(s) confirms that birds are breeding, as evidenced by the presence of a scrape, eggs, or young, the Bird Monitor(s) shall notify the FWC Regional Species Conservation Biologist (see the attached FWC contact information exhibit) within 24 hours. The Bird Monitor(s) shall report all breeding activity to the FSD website within one week of data collection.

Seabird and Shorebird Buffer Zones and Travel Corridors

The Bird Monitor(s) shall establish a disturbance-free buffer zone around any location within the project area where shorebirds have been engaged in breeding behavior, including territory defense. The FWC considers a 300-foot-wide buffer to be adequate based on published studies; however, a smaller, site-specific buffer may be established if approved by the FWC Regional Species Conservation Biologist (see the attached FWC contact information exhibit). All sources of human disturbance (including pedestrians, pets, and vehicles) shall be prohibited in the buffer zone.

a. The Bird Monitor(s) shall keep breeding sites under sufficient surveillance to determine if birds appear agitated or disturbed by construction or other activities in adjacent areas. If birds do appear to be agitated or disturbed by these activities, then the Bird Monitor(s) shall widen of the buffer zone immediately to a sufficient size to protect breeding birds.

b. The Bird Monitor(s) shall ensure that reasonable and traditional pedestrian access is not blocked in situations where breeding birds will tolerate pedestrian traffic. This is generally the case with lateral movement of beach-goers walking parallel to the beach at or below the highest tide line. Pedestrian traffic may also be tolerated when breeding was initiated within 300 feet of an established beach access pathway. The Bird Monitor(s) shall work with the FWC Regional Species Conservation Biologist to determine if pedestrian access can be accommodated without compromising nesting success.

c. The Bird Monitor(s) shall ensure that the perimeters of designated buffer zones are marked with posts, twine, and signs stating "Do Not Enter, Important Nesting Area" or similar language. The signs shall include the name and a phone number of the entity responsible for posting. Posts shall not be higher than 3 feet once installed. "Symbolic fencing" (i.e., twine, string, or rope) shall be placed between all posts and be clearly visible to pedestrians. In areas where marine turtles nest, the ropes shall be at least 2.5 feet above the ground. If pedestrian pathways are approved by the FWC Regional Species Conservation Biologist within the 300-foot buffer zone, these shall be clearly marked. The Bird Monitor(s) shall ensure that the posting is maintained in good repair until breeding is completed or terminated. Although solitary nesters may leave the buffer zone with their chicks, the posted area continues to provide a potential refuge for the family until breeding is complete. Breeding is not considered to be completed until all chicks have fledged.

d. The Bird Monitor(s) shall ensure that no construction activities, pedestrians, moving vehicles, or stockpiled equipment are allowed within the buffer area.

e. The Bird Monitor(s) shall designate and mark travel corridors outside the buffer areas so as not to cause disturbance to breeding birds. Heavy equipment, other vehicles, or pedestrians may go past breeding areas in these corridors. However, other activities such as stopping or turning heavy equipment and vehicles shall be prohibited within the designated travel corridors adjacent to the breeding site.

f. When flightless chicks are present on the beach, the Bird Monitor(s) shall accompany any moving vehicles or equipment to ensure that no chicks are in the path of the moving vehicle and no tracks are left that could trap flightless chicks.

g. The FWC recommends that the Bird Monitor(s) ensure that some activity in the travel corridor is maintained on a daily basis in order to discourage birds from nesting within the travel corridor. These activities shall not be allowed to disturb shorebirds nesting on site or interfere with marine turtle nesting, especially if the corridors are established before construction has started.

h. *Notification.* If the Bird Monitor(s) find that shorebirds are breeding within the project area, he or she shall ensure that an informational bulletin board is placed and maintained in the construction staging area. This bulletin board shall display the location map of the construction site, depict the location(s) of the bird breeding areas, and include a clearly visible warning stating: "NESTING BIRDS ARE PROTECTED BY LAW INCLUDING THE FLORIDA ENDANGERED AND THREATENED SPECIES ACT AND THE STATE AND FEDERAL MIGRATORY BIRD ACTS".

Post-construction Conditions, Monitoring and Reporting

i. Shorebird: If beach cleaning will occur on the nourished beach, a minimum of 30 percent of the biotic material within the wrack line shall be left on the beach post-cleaning at the strand line in a natural configuration to ensure that the nourished beach re-establishes its function as foraging habitat for shorebirds. This shall occur for as long as the placed sand remains on the beach.

Appendix F

EXAMPLES OF PREDATOR PROOF TRASH RECEPTACLES

Example of predator proof trash receptacle at Gulf Islands National Seashore. Lid must be tight fitting and made of material heavy enough to stop animals such as raccoons.

Example of trash receptacle anchored into the ground so it is not easily turned over.

Example of predator proof trash receptacle at Perdido Key State Park. Metal trash can is stored inside. Cover must be tight fitting and made of material heavy enough to stop animals such as raccoons.

Example of trash receptacle must be secured or heavy enough so it is not easily turned over.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960
May 22, 2013

Eric P. Summa
Chief, Environmental Branch (PD-E)
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Summa:

This document transmits the U.S. Fish and Wildlife Service's (Service) Programmatic Piping Plover Biological Opinion (P^3BO) for the effects of U.S. Army Corps of Engineers (Corps) planning and regulatory shore protection activities on the non-breeding piping plover (*Charadrius melodus*) and its designated Critical Habitat in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.). The current status of the federally listed piping plover is threatened, and the Service designated Critical Habitat for wintering piping plovers on July 10, 2001. This P^3BO is for the North Florida Ecological Services Office (NFESO) and the South Florida Ecological Services Office (SFESO) areas of responsibility (AORs). You requested formal consultation by letter of May 7, 2013.

This P^3BO is based on the information provided in the Corps May 7, 2013, letter, the Statewide Programmatic Biological Assessment of February 17, 2011, subsequent meetings between Corps and Service personnel, and other sources of information. We have assigned Consultation Code 04EF1000-2013-F-0124 to this consultation. A complete administrative record of this consultation is on file at the NFESO. Each project proposing to utilize this P^3BO will undergo an evaluation process by the Corps to determine if it properly fits within this programmatic approach. If it is determined that the minimization measures, Reasonable and Prudent Measures, and Terms and Conditions in the P^3BO are applicable to the project, the Service will concur within 30 days and it will be covered by this programmatic consultation. The Corps will consult separately on individual projects that do not fit within this programmatic approach unless the Service grants an exception in accordance with the Incidental Take Statement in the P^3BO.

This consultation includes the following proposed activities conducted in the AORs of the NFESO and the SFESO:

1. Operations and maintenance dredging activities of navigational channels and sand placement on the sandy beach and dune (including up to or over hardened structures), the swash zone, and the nearshore regions associated with both shore protection projects and maintenance dredging;
2. Sand placement as an associated authorization of sand extraction from the outer continental shelf by the Bureau of Ocean Energy Management (BOEM);
3. Sand by-passing/back-passing; and
4. Groins and jetty repair, or replacement.

For Civil Works activities, the Corps specified during the consultation process that "fish and wildlife enhancement" activities beyond mitigation of project impacts must be authorized as a project purpose, be authorized as a project feature, or be otherwise approved through Corps headquarters (Engineer Regulation ER 1105-2-100 Appendix G, Amendment #1, 30 June 2004). At the present time, no beach fill placement or shore protection activity in Florida has fish and wildlife enhancement as a project purpose or project feature. Since adding fish and wildlife enhancement as a project purpose or feature is not a budgetary priority [ER 1105-2-100 22 Apr 2000, Appendix C, part C-3b.(3)], the Corps does not expect to receive authorization and funding for it. However, the Corps proposes to implement the following Conservation Measures to reduce impacts on piping plovers for all projects (those in both non-optimal and optimal piping plover habitat) included in this consultation with the potential to affect piping plovers or their critical habitat:

1. Adhere to appropriate seasonal windows to the maximum extent practicable;

2. Implement survey guidelines for non-breeding shorebirds when appropriate. For Corps Civil Works projects, the "surveys" must be limited to the term of the construction unless they are otherwise authorized and funded by Congress;

   [Note: The term of the construction is considered to be the time in which the construction contractor is working on the beach. This usually starts soon after the "notice to proceed" and ends when the contractor finishes placing sand or finishes conducting other shore protection activities on/near the beach.]

3. Pipeline alignment and associated construction activities may be modified to reduce impacts to foraging, sheltering, and roosting;

4. Avoid impacts to the primary constituent elements (PCEs) of piping plover Critical Habitat to the maximum extent practicable;

5. The Corps or Applicant will evaluate the project area prior to consultation for the presence of piping plover PCEs as a basis for making their initial determination of effect;

6. The Corps will work with the Service to develop shore protection design guidelines and/or mitigation measures that can be utilized during future project planning to protect and/or enhance high value piping plover habitat locations (*i.e.*, washover fans). For Corps Civil Works projects, "enhancement" must be limited to the extent authorized and funded as a project feature or project purpose;

7. The Corps will attempt to time the construction of Civil Works sand placement and dredging projects to prevent two adjacent beaches or inlets from being constructed in the same year;

8. The Corps Civil Works program will work with the Florida Department of Environmental Protection (FDEP) to consider the value and context of inlet habitat features (*i.e.*, emergent spits, sand bars, etc.) within each inlet's management plan and adjust future dredging frequencies, to the maximum extent practicable and consistent with applicable law, so that adjacent habitats are made available and total habitat loss would not occur at one time within a given inlet complex; and

9. The Corps Civil Works program will consider placing dredged materials in the nearshore region as an alternative to beach placement to minimize effects to piping plovers and their habitat.

With the implementation of these Conservation Measures, the Corps has determined the proposed activities may affect, but are not likely to adversely affect the piping plover in areas not identified as Optimal Piping Plover Areas. Optimal Piping Plover Areas are defined as having documented use by piping plovers, and they include coastal habitat features that function mostly unimpeded. Optimal Piping Plover Areas include:

1. Designated piping plover Critical Habitat Units (see Appendix A);

2. All Federal, State, and County publicly owned land where coastal processes are allowed to function, mostly unimpeded, that have any of the following features in the Action Area:

    a. Located within 1 mile of an inlet;
    b. Emergent nearshore sand bars;
    c. Washover fans;
    d. Emergent bayside and Ocean/Gulf-side shoals and sand bars;
    e. Bayside mudflats, sand flats, and algal flats; or
    f. Bayside shorelines of bays and lagoons.

[Publicly owned land where coastal processes are allowed to function, mostly unimpeded, generally does not include public lands that are solely state-owned water bottoms, street ends, parking lots, piers, beach accesses, or shoreline developed for commercial or residential purposes. It generally does include public lands consisting of parks, preserves, and natural undeveloped shoreline and dunes.]; and

3. The following additional areas are also considered optimal piping plover habitat (FDEP Range Monuments provided in parentheses):

    a. Charley Pass, south of Critical Habitat Unit FL-23 on North Captiva Island, Lee County (R-75.5 and R-83);
    b. Stump Pass and the beaches adjacent to it, Charlotte County (R-15.5 to R-33);
    c. Palmer Point Park, Sarasota County (R-77 to R-83);

d. St. Lucie Inlet and associated shoals, Martin County (R-42 to R-78);
e. Crandon Park, Miami-Dade County (R-89 to R-101); and
f. Sanibel Island, Lee County (R-109 to R-174).

The Service concurs with this determination as it applies to projects in non-optimal habitat, and the Corps will reinitiate consultation if they are unable to implement the Conservation Measures as described above. No additional consultation is required for projects located in habitat determined to be non-optimal for piping plovers. The attached P^3BO addresses projects located in optimal piping plover habitat, as defined above.

As with the Service's Statewide Programmatic Biological Opinion (SPBO), the Corps and the Service will meet annually during the fourth week of August to review the proposed activities, assess new data, identify information needs, and scope methods to address those needs, including, but not limited to, evaluations and monitoring specified in this P^3BO, reviewing results, formulating or amending actions that minimize take of listed species, and monitoring the effectiveness of those actions. This programmatic consultation will be reviewed every 5 years. If new information concerning the projects or the piping plover arises, this consultation will be reviewed sooner than 5 years. Reinitiation of formal consultation is required 10 years after the issuance of this P^3BO.

We are available to meet with agency representatives to discuss this consultation. If you have any questions, please contact Dawn Jennings at the NFESO (904-731-3103) or Craig Aubrey in the SFESO (772-469-4309).

Sincerely yours,

Larry Williams
State Supervisor

SHORE PROTECTION ACTIVITIES IN THE GEOGRAPHICAL REGION OF THE NORTH AND SOUTH FLORIDA ECOLOGICAL SERVICES FIELD OFFICES

Programmatic Piping Plover Biological Opinion

May 22, 2013

Prepared by:

U.S. Fish and Wildlife Service

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ACRONYMS AND ABBREVIATIONS

Act	Endangered Species Act
AOR	Area of Responsibility
BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
Corps	U.S. Army Corps of Engineers
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FWC	Florida Fish and Wildlife Conservation Commission
FR	Federal Register
MBTA	Migratory Bird Treaty Act
NFESO	U.S. Fish and Wildlife Service's North Florida Ecological Services Office
P^3BO	Programmatic Piping Plover Biological Opinion
PCE	Primary Constituent Elements
Service	U.S. Fish and Wildlife Service
SFESO	U.S. Fish and Wildlife Service's South Florida Ecological Services Office
SPBO	Statewide Programmatic Biological Opinion
USGS	U.S. Geological Survey

CONSULTATION HISTORY

1980s and 1990s	Beach nourishment projects in Florida began to occur frequently in the late 1980s and early 1990s.
April 19, 2011	The Service issued the original SPBO concerning planning and regulatory sand placement projects in Florida and their effects on nesting sea turtles.
August 22, 2011	The Service issued their revised SPBO. The SPBO did not include take for the non-breeding piping plover or its designated Critical Habitat. Consultation for plovers was conducted on a case-by-case basis.
October 30, 2012	The Service and the Corps held the first annual meeting on the progress of the SPBO. The agencies discussed outstanding piping plover issues, including the proposed terms and conditions. The agencies agreed to conduct a separate re-initiation of consultation for piping plovers limited to peninsular Florida to programmatically address take of piping plovers.
May 7, 2013	The Corps sent a letter to the Service formally requesting a Programmatic Piping Plover Biological Opinion.
Other Collaboration	Numerous telephone conversations and e-mails were conducted between the Corps and the Service concerning the content of the P^3BO and initiation of consultation.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action includes activities associated with the placement of compatible sediment on beaches or in the nearshore region of Optimal Piping Plover Areas. Optimal Piping Plover Areas are defined as having documented use by piping plovers, and include coastal habitat features that function mostly unimpeded. Below is a list of currently known Optimal Piping Plover Areas:

1. Designated piping plover Critical Habitat Units (see Appendix A);

2. All Federal, State, and County publicly owned land where coastal processes are allowed to function, mostly unimpeded, that have any of the following features in the Action Area:

    a. Located within 1 mile of an inlet;
    b. Emergent nearshore sand bars;
    c. Washover fans;
    d. Emergent bayside and Ocean/Gulf-side shoals and sand bars;
    e. Bayside mudflats, sand flats, and algal flats; or

f. Bayside shorelines of bays and lagoons.

[Publicly owned land where coastal processes are allowed to function, mostly unimpeded, generally does not include public lands that are solely State-owned water bottoms, street ends, parking lots, piers, beach accesses, or shoreline developed for commercial or residential purposes. It generally does include public lands consisting of parks, preserves, and natural undeveloped shoreline and dunes.]; and

3. The following additional areas are also considered optimal piping plover habitat (FDEP Range Monuments provided in parentheses):

    a. Charley Pass, south of Critical Habitat Unit FL-23 on North Captiva Island, Lee County (R-75.5 and R-83);
    b. Stump Pass and the beaches adjacent to it, Charlotte County (R-15.5 to R-33);
    c. Palmer Point Park, Sarasota County (R-77 to R-83);
    d. St. Lucie Inlet and associated shoals, Martin County (R-42 to R-78);
    e. Crandon Park, Miami-Dade County (R-89 to R-101); and
    f. Sanibel Island, Lee County (R-109 to R-174).

ACTION AREA

The Action Area includes sandy beaches; emergent bayside and Ocean/Gulf-side shoals and sand bars; bayside mudflats, sand flats, and algal flats; bayside shorelines of bays and lagoons; and emergent nearshore sand bars of the Atlantic Coast (Nassau County to Miami-Dade County) and the Gulf Coast (Monroe County to Taylor County) of Florida (Figures 1 and 2). The proposed action includes the replacement and rehabilitation of groins utilized as design components of beach projects for longer retention time and stabilization of associated sediment placed on the beach. This P^3BO includes both Corps Regulatory and Civil Works activities. Both Corps Regulatory and Civil Works activities may include the involvement of other Federal agencies, such as the Department of Defense, BOEM, and the Federal Emergency Management Agency. The activities covered in the P^3BO encompass the following:

1. Operations and maintenance dredging activities of navigational channels and sand placement on the sandy beach and dune (including up to or over hardened structures), the swash zone, and the nearshore regions associated with both shore protection projects and maintenance dredging;
2. Sand placement as an associated authorization of sand extraction from the outer continental shelf by the BOEM;
3. Sand by-passing/back-passing; and
4. Groins and jetty repair, or replacement.

The history of shore protection activities throughout the Atlantic and Gulf Coasts of Florida is extensive and consists of a myriad of actions performed by local, State, and Federal entities. Future sand placement actions addressed in this P^3BO may include maintenance of these existing projects or beaches that have not experienced a history of sand placement activities. Maintenance

dredging activities include dredging of both deep draft harbors and shallow draft inlets when these activities affect optimal piping plover habitat.

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/Critical Habitat description

The piping plover is a small, pale sand-colored shorebird, about 7 inches long with a wingspan of about 15 inches (Palmer 1967). Cryptic coloration is a primary defense mechanism for piping plovers where nests, adults, and chicks all blend in with their typical beach surroundings. Piping plovers on wintering and migration grounds respond to intruders (*e.g.*, pedestrian, avian and mammalian) usually by squatting, running, and flushing (flying).

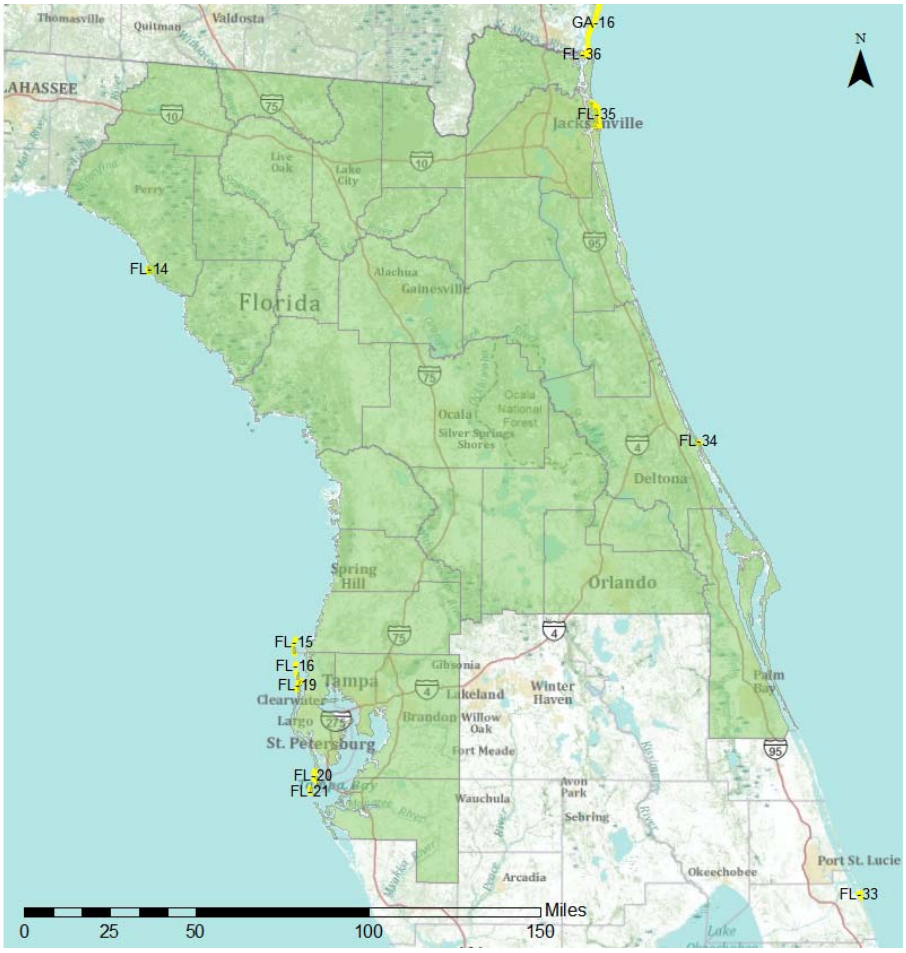

Figure 1 Piping plover designated Critical Habitat in the North Florida Ecological Services Field Office's area of responsibility**.**

On January 10, 1986, the piping plover was listed as endangered in the Great Lakes watershed and threatened elsewhere within its range, including migratory routes outside of the Great Lakes watershed and wintering grounds (Service 1985). Piping plovers were listed principally because of habitat destruction and degradation, predation, and human disturbance. Protection of the species under the Act reflects the species' precarious status range-wide.

Three separate breeding populations have been identified, each with its own recovery criteria: the northern Great Plains (threatened), the Great Lakes (endangered), and the Atlantic Coast (threatened). The piping plover winters in coastal areas of the U.S. from North Carolina to Texas, and along the coast of eastern Mexico and on Caribbean islands from Barbados to Cuba and the Bahamas (Haig and Elliott-Smith 2004). Piping plovers in the Action Area include individuals from all three breeding populations. Piping plover subspecies are phenotypically indistinguishable, and most studies in the nonbreeding range report results without regard to breeding origin. Although a recent analysis shows strong patterns in the wintering distribution of piping plovers from different breeding populations, partitioning is not complete and major information gaps persist.

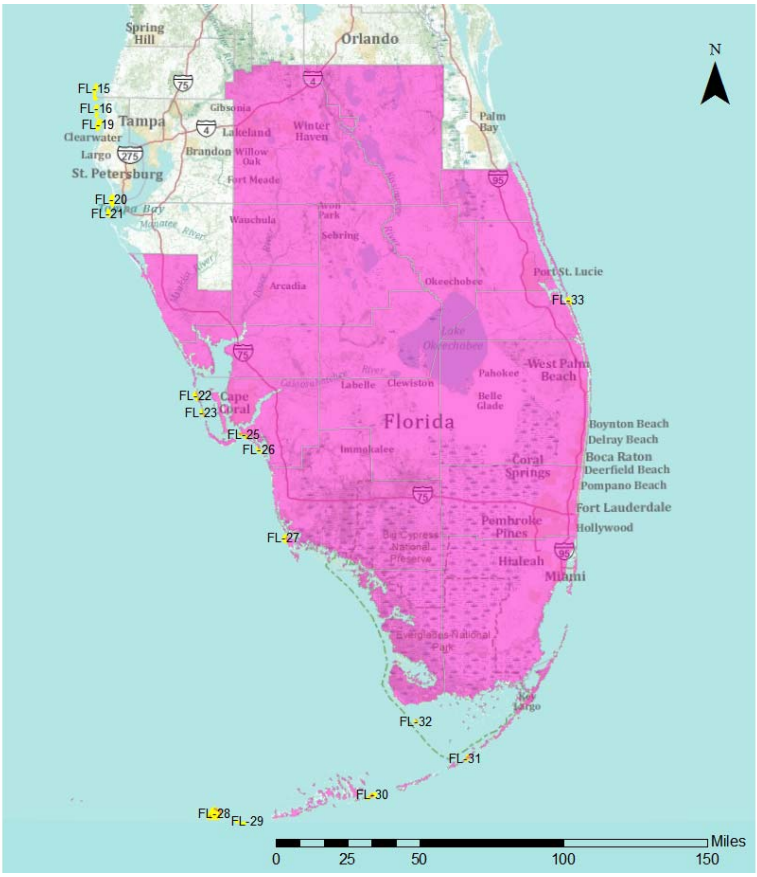

Figure 2 Piping plover designated Critical Habitat in the South Florida Ecological Services Field Office's area of responsibility.

The Service has designated Critical Habitat for the piping plover on three occasions. Two of these designations protected different piping plover breeding populations. Critical Habitat for the Great Lakes breeding population was designated May 7, 2001 (66 Federal Register [FR] 22938, Service 2001a), and Critical Habitat for the northern Great Plains breeding population was designated September 11, 2002 (67 FR 57637, Service 2002). The Service designated Critical Habitat for wintering piping plovers on July 10, 2001 (66 FR 36038, Service 2001b). Wintering piping plovers may include individuals from the Great Lakes and northern Great Plains breeding populations as well as birds that nest along the Atlantic Coast. The three separate designations of piping plover Critical Habitat demonstrate diversity of PCEs between the two breeding populations as well as diversity of PCEs between breeding and wintering populations.

Designated wintering piping plover Critical Habitat originally included 142 areas (the rule states 137 units; this is an error) encompassing approximately 1,793 miles of mapped shoreline and 165,211 acres of mapped areas along the coasts of North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas.

The PCEs for piping plover wintering habitat essential for the conservation of the species are those habitat components that support foraging, roosting, and sheltering, and the physical features necessary for maintaining the natural processes that support these habitat components. The PCEs are found in geographically dynamic coastal areas that support intertidal beaches and flats (between annual low tide and annual high tide), and associated dune systems and flats above annual high tide (Service 2001a). PCEs of wintering piping plover Critical Habitat include sand or mud flats, or both, with no or sparse emergent vegetation. Adjacent unvegetated or sparsely vegetated sand, mud, or algal flats above high tide are also important, especially for roosting piping plovers (Service 2001a). Important components of the beach/dune ecosystem include surf-cast algae, sparsely vegetated back beach and salterns, spits, and washover areas. Washover areas are broad, unvegetated zones, with little or no topographic relief, that are formed and maintained by the action of hurricanes, storm surge, or other extreme wave action. The units designated as Critical Habitat are those areas that have consistent use by piping plovers and that best meet the biological needs of the species. The amount of wintering habitat included in the designation appears sufficient to support future recovered populations, and the existence of this habitat is essential to the conservation of the species. Additional information on each specific unit included in the designation can be found at 66 FR 36038 (Service 2001a).

Life history

Piping plovers live an average of 5 years, although studies have documented birds as old as 11 (Wilcox 1959) and 15 years. Plovers are known to begin breeding as early as 1 year of age (MacIvor 1990; Haig 1992); however, the percentage of birds that breed in their first adult year is unknown. Piping plover breeding activity begins in mid-March when birds begin returning to their nesting areas (Coutu et al. 1990; Cross 1990; Goldin et al. 1990; MacIvor 1990; Hake 1993). Piping plovers generally fledge only a single brood per season, but may re-nest several times if previous nests are lost. The reduction in suitable nesting habitat due to a number of

factors is a major threat to the species, likely limiting reproductive success and future recruitment into the population (Service 2009).

Plovers depart their breeding grounds for their wintering grounds between July and late August, but southward migration extends through November. More information about the three breeding populations of piping plovers can be found in the following documents:

a. Piping Plover, Atlantic Coast Population: 1996 Revised Recovery Plan (Service 1996);
b. 2009 Piping Plover (*Charadrius melodus*) 5-Year Review: Summary and Evaluation (Service 2009);
c. 2003 Recovery Plan for the Great Lakes Piping Plover (*Charadrius melodus*) (Service 2003);
d. Questions and Answers about the Northern Great Plains Population of Piping Plover (Service 2002).

Piping plovers use habitats in Florida primarily from July 15 through May 15. Below (2010) surveyed plovers north of Marco Island, Florida, and found plovers color-banded during the surveys to have very high wintering site fidelity. Both spring and fall migration routes of Atlantic Coast breeders are believed to occur primarily within a narrow zone along the Atlantic Coast (Service 1996). The pattern of both fall and spring counts at many Atlantic Coast sites demonstrates that many piping plovers make intermediate stopovers lasting from a few days up to 1 month during their migrations (Noel and Chandler 2005; Stucker and Cuthbert 2006). Some midcontinent breeders travel up or down the Atlantic Coast before or after their overland movements (Stucker and Cuthbert 2006). Use of inland stopovers during migration is also documented (Pompei and Cuthbert 2004). The source breeding population of a given wintering individual cannot be determined in the field unless it has been banded or otherwise marked. Information from observation of color-banded piping plovers indicates that the winter ranges of the breeding populations overlap to a significant degree. While piping plover migration patterns and needs remain poorly understood, and occupancy of a particular habitat may involve shorter periods relative to wintering, information about the energetics of avian migration indicates that this might be a particularly critical time in the species' life cycle.

Review of published records of piping plover sightings throughout North America by Pompei and Cuthbert (2004) found more than 3,400 fall and spring stopover records at 1,196 sites. Published reports indicated piping plovers do not concentrate in large numbers at inland sites and they seem to stop opportunistically. In most cases, reports of birds at inland sites were single individuals.

Piping plovers migrate through and winter in coastal areas of the U.S. from North Carolina to Texas and in portions of Mexico and the Caribbean. Data based on four rangewide mid-winter (late January to early February) population surveys, conducted at 5-year intervals starting in 1991, show that total numbers have fluctuated over time, with some areas experiencing increases and others decreases. Regional and local fluctuations may reflect the quantity and quality of suitable foraging and roosting habitat, which vary over time in response to natural coastal formation processes as well as anthropogenic habitat changes (*e.g.*, inlet relocation, dredging of

shoals and spits). Fluctuations may also represent localized weather conditions (especially wind) during surveys, or unequal survey coverage. For example, airboats facilitated first-time surveys of several central Texas sites in 2006 (Elliott-Smith et al. 2009). Similarly, the increase in the 2006 numbers in the Bahamas is attributed to greatly increased census efforts; the extent of additional habitat not surveyed remains undetermined (Elliott-Smith et al. 2009). Changes in wintering numbers may also be influenced by growth or decline in the particular breeding populations that concentrate their wintering distribution in a given area. Opportunities to locate previously unidentified wintering sites are concentrated in the Caribbean and Mexico (Elliott-Smith et al. 2009). Further surveys and assessment of seasonally emergent habitats (*e.g.*, seagrass beds, mudflats, oyster reefs) within bays lying between the mainland and barrier islands in Texas are also needed.

Midwinter surveys may underestimate the abundance of nonbreeding piping plovers using a site or region during other months. In late September 2007, 104 piping plovers were counted at the south end of Ocracoke Island, North Carolina (National Park Service 2007), where none were seen during the 2006 International Piping Plover Winter Census (Elliott-Smith et al. 2009). Noel et al. (2007) observed up to 100 piping plovers during peak migration at Little St. Simons Island, Georgia, where approximately 40 piping plovers wintered in 2003 to 2005. Differences among fall, winter, and spring counts in South Carolina were less pronounced, but inter-year fluctuations (*e.g.*, 108 piping plovers in spring 2007 versus 174 piping plovers in spring 2008) at 28 sites were striking (Maddock et al. 2009). Even as far south as the Florida Panhandle, monthly counts at Phipps Preserve in Franklin County ranged from a midwinter low of 4 piping plovers in December 2006, to peak counts of 47 in October 2006 and March 2007 (Smith 2007). Pinkston (2004) observed much heavier use of Texas Gulf Coast (ocean-facing) beaches between early September and mid-October (approximately 16 birds per mile) than during December to March (approximately 2 birds per mile).

Local movements of non-breeding piping plovers may also affect abundance estimates. At Deveaux Bank, one of South Carolina's most important piping plover sites, 5 counts at approximately 10-day intervals between August 27 and October 7, 2006, oscillated from 28 to 14 to 29 to 18 to 26 (Maddock et al. 2009). Noel and Chandler (2008) detected banded Great Lakes piping plovers known to be wintering on their Georgia study site in 73.8 $\pm$ 8.1 percent of surveys over 3 years.

Abundance estimates for non-breeding piping plovers may also be affected by the number of surveyor visits to the site. Preliminary analysis of detection rates by Maddock et al. (2009) found 87 percent detection during the midwinter period on core sites surveyed three times a month during fall and spring and one time per month during winter, compared with 42 percent detection on sites surveyed three times per year (Cohen 2009).

Gratto-Trevor et al. (2009) found strong patterns (but no exclusive partitioning) in winter distribution of uniquely banded piping plovers from four breeding populations (Figure 3).

All eastern Canada and 94 percent of Great Lakes birds wintered from North Carolina to southwest Florida. However, eastern Canada birds were more heavily concentrated in North Carolina, and a larger proportion of Great Lakes piping plovers were found in South Carolina and Georgia. Northern Great Plains populations were primarily seen farther west and south, especially on the Texas Gulf Coast. Although the great majority of Prairie Canada individuals were observed in Texas, particularly southern Texas, individuals from the U.S. Great Plains were more widely distributed on the Gulf Coast from Florida to Texas.

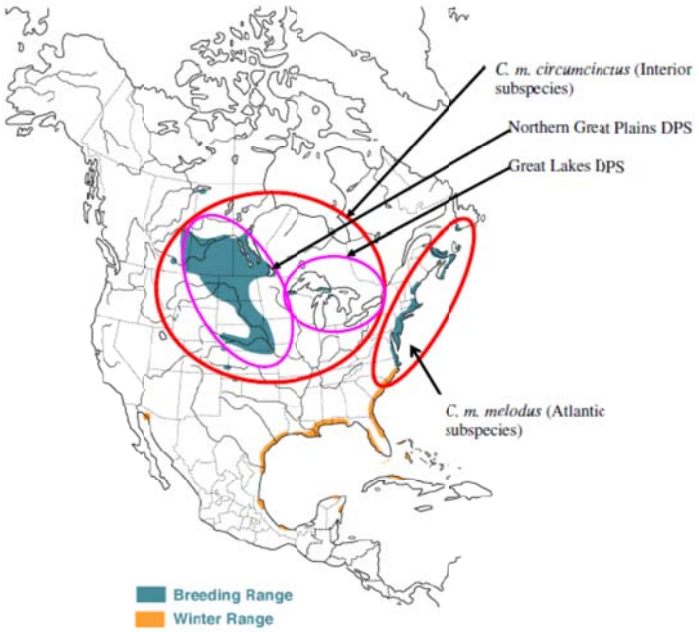

Figure 3 Distribution and range of *C. m. melodus:* Great Lakes DPS of *C. m. circumcinctus*, Northern Great Plains DPS of *C. m. circumcinctus* (base map from Elliott-Smith and Haig 2004 by permission of Birds of North America Online, http://bna.birds.cornell.edu/bna, maintained by the Cornell Lab of Ornithology). Note that this map is a conceptual presentation of subspecies and DPS ranges, and is not intended to convey precise boundaries.

The findings of Gratto-Trevor et al. (2009) provide evidence of differences in the wintering distribution of piping plovers from these four breeding areas. However, the distribution of birds by breeding origin during migration remains largely unknown. Other major information gaps include the wintering locations of the U.S. Atlantic Coast breeding population (banding of U.S. Atlantic Coast piping plovers has been extremely limited) and the breeding origin of piping plovers wintering on Caribbean islands and in much of Mexico.

Banded piping plovers from the Great Lakes, Northern Great Plains, and eastern Canada breeding populations showed similar patterns of seasonal abundance at Little St. Simons Island, Georgia (Noel et al. 2007). However, the number of banded plovers originating from the latter two populations was relatively small at this study area.

This species exhibits a high degree of intra- and interannual wintering site fidelity (Nicholls and Baldassarre 1990a; Drake et al. 2001; Noel and Chandler 2005; Stucker and Cuthbert 2006). Gratto-Trevor et al. (2009) reported that 6 of 259 banded piping plovers observed more than once per winter moved across boundaries of the 7 U.S. regions. Of 216 birds observed in different years, only 8 changed regions between years, and several of these shifts were associated with late summer or early spring migration periods (Gratto-Trevor et al. 2009). Total number of individuals observed on the wintering grounds was 46 for Eastern Canada, 150 for the U.S. Great Lakes, 169 for the U.S. Great Plains, and 356 for Prairie Canada.

Local movements are more common. In South Carolina, Maddock et al. (2009) documented many cross-inlet movements by wintering banded piping plovers as well as occasional movements of up to 11.2 miles by approximately 10 percent of the banded population. Larger movements within South Carolina were seen during fall and spring migration. Similarly, eight banded piping plovers that were observed in two locations during 2006 and 2007 surveys in Louisiana and Texas were all in close proximity to their original location (Maddock 2008).

In 2001, 2,389 piping plovers were located during a winter census, accounting for only 40 percent of the known breeding birds recorded during a breeding census (Ferland and Haig 2002). About 89 percent of birds that are known to winter in the U.S. do so along the Gulf Coast (Texas to Florida), while 8 percent winter along the Atlantic Coast (North Carolina to Florida).

The status of piping plovers on winter and migration grounds is difficult to assess, but threats to piping plover habitat used during winter and migration identified by the Service during its designation of Critical Habitat continue to affect the species. Unregulated motorized and pedestrian recreational use, inlet and shoreline stabilization projects, beach maintenance and nourishment, and pollution affect most winter and migration areas. Conservation efforts at some locations have likely resulted in the enhancement of wintering habitat.

The 2004 and 2005 hurricane seasons affected a substantial amount of habitat along the Gulf Coast. Habitats such as those along Gulf Islands National Seashore have benefited from increased washover events which created optimal habitat conditions for piping plovers. Conversely, hard shoreline structures are put into place following storms throughout the species range to prevent such shoreline migration (see *Factors Affecting the Species Habitat within the Action Area*). Four hurricanes between 2002 and 2005 are often cited in reference to rapid erosion of the Chandeleur Islands, a chain of low-lying islands in Louisiana where the 1991 International Piping Plover Census tallied more than 350 piping plovers. Comparison of imagery taken 3 years before and several days after Hurricane Katrina found that the Chandeleur Islands lost 82 percent of their surface area (Sallenger et al. in review), and a review of aerial photography prior to the 2006 Census suggested little piping plover habitat remained (Elliott-Smith et al. 2009). However, Sallenger et al. (in review) noted that habitat changes in the Chandeleurs stem not only from the effects of these storms, but rather from the combined effects of the storms, long-term (greater than 1,000 years) diminishing sand supply, and sea-level rise relative to the land.

The Service is aware of the following site specific conditions that affect the status of several habitats piping plover use while wintering and migrating, including Critical Habitat Units. In Texas, one Critical Habitat Unit was afforded greater protection due to the acquisition of adjacent upland properties by the local Audubon chapter. In another unit in Texas, vehicles were removed from a portion of the beach decreasing the likelihood of automobile disturbance to plovers. Exotic plant removal is occurring in another Critical Habitat Unit in South Florida. The Service and other government agencies remain in a contractual agreement with the U.S. Department of Agriculture for predator control within limited coastal areas in the Florida panhandle, including portions of some Critical Habitat Units. Continued removal of potential terrestrial predators is likely to enhance survivorship of wintering and migrating piping plovers. In North Carolina, one Critical Habitat Unit was afforded greater protection when the local Audubon chapter agreed to manage the area specifically for piping plovers and other shorebirds following the relocation of a nearby inlet channel.

Biogeography and Habitat Preferences

Wintering piping plovers prefer coastal habitats that include sand spits, islets (small islands), tidal flats, shoals (usually flood tidal deltas), and sandbars that are often associated with inlets (Harrington 2008). Sandy mud flats, ephemeral pools, and overwash areas are also considered primary foraging habitats. These substrate types have a richer infauna than the foreshore of high energy beaches and often attract large numbers of shorebirds (Cohen et al. 2008). Wintering plovers are dependent on a mosaic of habitat patches and move among these patches depending on local weather and tidal conditions (Nicholls and Baldassarre 1990a).

Recent study results in North Carolina, South Carolina, and Florida, complement information from earlier investigations in Texas and Alabama (summarized in the 1996 Atlantic Coast and 2003 Great Lakes Recovery Plans) regarding habitat use patterns of piping plovers in their coastal migration and wintering range. As documented in Gulf Coast studies, nonbreeding piping plovers in North Carolina primarily used sound (bay or bayshore) beaches and sound islands for foraging and ocean beaches for roosting, preening, and being alert (Cohen et al. 2008). The probability of piping plovers being present on the sound islands increased with increasing exposure of the intertidal area (Cohen et al. 2008). Maddock et al. (2009) observed shifts to roosting habitats and behaviors during high-tide periods in South Carolina.

LeDee et al. (2008) conducted a remote analysis of piping plover wintering sites, measuring 11 ecological parameters to determine their correlation to piping plover presence. Piping plover abundance was negatively correlated with urban area and total road length, and positively correlated with inter-tidal area, presence on the mainland (as opposed to the peninsula/island feature), and total inter-tidal and beach area (LeDee et al. 2008).

Recent geographic analysis of piping plover distribution on the upper Texas coast noted major concentration areas at the mouths of rivers, washover passes (low, sparsely vegetated barrier island habitats created and maintained by temporary, storm-driven water channels), and major bay systems (Arvin 2008). Earlier studies in Texas have drawn attention to washover passes,

which are commonly used by piping plovers during periods of high bayshore tides and during the spring migration period (Zonick 1997; Zonick 2000). Elliott-Smith et al. (2009) reported piping plover concentrations on exposed seagrass beds and oyster reefs during seasonal low water periods in 2006.

Of all the states and provinces in North America, Florida is most intimately linked with the sea. Florida's 1,200-mile coastline (exclusive of the Keys) is easily the longest in the continental U.S. Of the 1,200 miles, 745 miles are sandy and mostly in the form of barrier islands. The coastline is dynamic and constantly changing as a result of waves, wind, tides, currents, sea-level change, and storms. The entire state lies within the coastal plain, with a maximum elevation of about 400 feet, and no part is more than 60 miles from the Atlantic Ocean or the Gulf of Mexico.

The east coast of Florida consists of a dynamic shoreline, with a relatively sloped berm, coarse-grained sand, and moderate to high surf (Witherington 1986). West-central Florida beaches are considered to be low energy beaches with a gradual offshore slope and fine-grained, quartz sand beaches. The dynamics of the Florida shoreline are shaped by the occurrence of storm surges and seas from tropical storms that occur mainly during August through early October. The East coast may also experience erosion from late September through March due to nor'easters. Gulf beaches are largely protected from severe nor'easters. The impacts of these two types of storms may vary from event to event and year to year.

Coasts with greater tidal ranges are more buffered against storm surges than are those with low tidal ranges, except when the storm strikes during high tide. Mean tidal ranges decrease southward along the Atlantic coast from a mean of 7 feet at the Florida-Georgia line to less than 2 feet in Palm Beach County. The mean tidal range along the Gulf Coast is less than 3 feet (microtidal) except in the extreme south where it ranges from 3 to 4 feet. Because of its lower elevation and lower wave energy regime, the West Coast of the peninsula is subject to greater changes during storm events than is the east coast.

Foraging/Food Habits

Behavioral observations of piping plovers on the wintering grounds suggest that they spend the majority of their time foraging (Nicholls and Baldassarre 1990a; Drake 1999a, 1999b). Plovers forage on moist substrate features such as intertidal portions of ocean beaches, washover areas, mudflats, sand flats, algal flats, shoals, wrack lines, sparse vegetation, and shorelines of coastal ponds, lagoons, and ephemeral pools, and adjacent salt marshes (Gibbs 1986; Zivojnovich and Baldassarre 1987; Nicholls 1989; Coutu et al. 1990; Nicholls and Baldassarre 1990a; Nicholls and Baldassarre 1990b; Hoopes 1993; Loegering 1992; Goldin 1993; Elias-Gerken 1994; Wilkinson and Spinks 1994; Zonick 1997; Service 2001a). Studies have shown that the relative importance of various feeding habitat types may vary by site (Gibbs 1986; Coutu et al. 1990; McConnaughey et al. 1990; Loegering 1992; Goldin 1993; Hoopes 1993). Feeding activities may occur during all hours of the day and night (Staine and Burger 1994; Zonick 1997), and at all stages in the tidal cycle (Goldin 1993; Hoopes 1993). Wintering plovers primarily feed on invertebrates such as polychaete marine worms, various crustaceans, fly larvae, beetles, and

occasionally bivalve mollusks found on top of the soil or just beneath the surface (Bent 1929; Cairns 1977; Nicholls 1989; Zonick and Ryan 1996).

As observed in Texas studies, Lott et al. (2009) identified bay beaches (bay shorelines as opposed to ocean-facing beaches) as the most common landform used by foraging piping plovers in southwest Florida. However in northwest Florida, Smith (2007) reported landform use by foraging piping plovers about equally divided between Gulf of Mexico (ocean-facing) and bay beaches. Exposed intertidal areas were the dominant foraging substrate in South Carolina (accounting for 94 percent of observed foraging piping plovers; Maddock et al. 2009) and in northwest Florida (96 percent of foraging observations; Smith 2007). In southwest Florida, Lott et al. (2009) found approximately 75 percent of foraging piping plovers on intertidal substrates.

Home Range

Plovers seem to exhibit strong site fidelity to nonbreeding areas. Plovers vary their habitat use, and it is suggested heterogeneous habitats may be more important than specific habitat features for plovers (Drake et al. 2001; Nicholls and Baldassarre 1990b). Mean home range size (95 percent of locations) for 49 radio-tagged piping plovers in southern Texas in 1997 through 1998 was 3,113 acres, mean core area (50 percent of locations) was 717 acres, and the mean linear distance moved between successive locations (1.97 $\pm$ 0.04 days apart) averaged across seasons, was 2.1 miles (Drake 1999a; Drake et al. 2001). Seven radio-tagged piping plovers used a 4,967-acre area (100 percent minimum convex polygon) at Oregon Inlet in 2005 and 2006, and piping plover activity was concentrated in 12 areas totaling 544 acres (Cohen et al. 2008). Noel and Chandler (2008) observed high fidelity of banded piping plovers along a 0.62 and 2.8 mile section of beach on Little St. Simons Island, Georgia.

Life Cycle

Piping plovers spend up to 10 months of their life cycle on their migration and at wintering grounds, generally July 15 through as late as May 15. Piping plover migration routes and habitats overlap breeding and wintering habitats, and, unless banded, migrants passing through a site usually are indistinguishable from breeding or wintering piping plovers. Migration stopovers by banded piping plovers from the Great Lakes have been documented in New Jersey, Maryland, Virginia, and North Carolina (Stucker and Cuthbert 2006). Migrating breeders from eastern Canada have been observed in Massachusetts, New Jersey, New York, and North Carolina (Amirault et al. 2005). As many as 85 staging piping plovers have been tallied at various sites in the Atlantic breeding range (Perkins 2008), but the composition (*e.g.,* adults that nested nearby and their fledged young of the year versus migrants moving to or from sites farther north), stopover duration, and local movements are unknown. In general, distance between stopover locations and duration of stopovers throughout the coastal migration range remains poorly understood.

Predators and Competitors

Plovers face predation by avian and mammalian predators that are present year-round on the wintering grounds. There are minimal studies on the impacts of predation on migrating or wintering piping plovers, and investigations into effects of predation on nonbreeding piping plovers falls under the Great Lakes recovery plan. Predator control on their wintering and migration grounds is considered to be a low priority at this time, except for the threat of disturbance to roosting and feeding piping plovers posed by dogs off leash (Service 2009). Plovers must compete with other shorebirds for suitable foraging and roosting habitat.

Disease Factors

Neither the final listing rule nor the recovery plans state that disease is an issue for the species, and no plan assigns recovery actions to this threat factor. The Piping Plover 5-Year Review: Summary and Evaluation provides additional information on the limited concern of avian influenza and West Nile virus on the species (Service 2009).

Roosting

Several studies identified wrack (organic material including seaweed, seashells, driftwood, and other materials deposited on beaches by tidal action) as an important component of roosting habitat for nonbreeding piping plovers. Lott et al. (2009) found greater than 90 percent of roosting piping plovers in southwest Florida in old wrack with the remainder roosting on dry sand. In South Carolina, 18 and 45 percent of roosting piping plovers were in fresh and old wrack, respectively. The remainder of roosting birds used intertidal habitat (22 percent), backshore (defined as the zone of dry sand, shell, cobble and beach debris from the mean high water line up to the toe of the dune; 8 percent), washover (2 percent), and ephemeral pools (1 percent) (Maddock et al. 2009). Thirty percent of roosting piping plovers in northwest Florida were observed in wrack substrates with 49 percent on dry sand and 20 percent using intertidal habitat (Smith 2007). In Texas, seagrass debris (bayshore wrack) was an important feature of piping plover roosting sites (Drake 1999a). Mean abundance of two other plover species in California, including the listed western snowy plover, was positively correlated with an abundance of wrack during the nonbreeding season (Dugan et al. 2003).

Seven years of surveys, two to three times per month, along 8 miles of Gulf of Mexico (ocean-facing) beach in Gulf County, Florida, cumulatively documented nearly the entire area used at various times by roosting or foraging piping plovers. Birds were reported using the midbeach to the intertidal zone. Numbers ranged from 0 to 39 birds on any given survey day (Eells unpublished data).

Atlantic Coast and Florida studies highlighted the importance of inlets for nonbreeding piping plovers. Almost 90 percent of roosting piping plovers at ten coastal sites in southwest Florida were on inlet shorelines (Lott et al. 2009). Piping plovers were among seven shorebird species found more often than expected ($p = 0.0004$; Wilcoxon Test Scores) at inlet locations versus

noninlet locations in an evaluation of 361 International Shorebird Survey sites from North Carolina to Florida (Harrington 2008).

Population dynamics

Population Size

The International Piping Plover Breeding Census is conducted throughout the breeding grounds every 5 years by the Great Lakes/Northern Great Plains Recovery Team of the U.S. Geological Survey (USGS). The census is the largest known, complete avian species census, and is coordinated by Elise Elliott Smith and various state and provincial coordinators. It is designed to determine species abundance and distribution throughout its annual cycle. The last survey in 2006 documented 3,497 breeding pairs, with a total of 8,065 birds throughout Canada and the U.S. A more recent 2010 Atlantic Coast breeding piping plover population estimate was 1,782 pairs, which was more than double the 1986 estimate of 790 pairs. This was determined to be a net increase of 86 percent between 1989 and 2010 (Service 2011). An associated winter census documented a total of 454 piping plovers in Florida (Elliott-Smith et al. 2009). For the Gulf Coast of Florida, the surveys documented 321 piping plovers at 117 sites covering approximately 522 miles of suitable habitat (Elliott-Smith et al 2009). A total of 133 plovers were observed along the Atlantic Coast during the 2009 survey, and Northwest Florida numbers for the 2006 International Piping Plover Census were 111, with an increased survey effort from previous years. This represents an increase from the 53 piping plovers sighted in the 2001 effort. More information on the results of past International Piping Plover Censuses and an analysis of the data is found in the 2009 Service's Piping Plover 5-Year Review: Summary and Evaluation (Service 2009) and in the report published by the USGS (Elliott-Smith et al. 2009). In addition, bird populations throughout Florida are monitored by volunteers and The Conservancy of Southwest Florida. Launched in 2002 by the Cornell Lab of Ornithology and National Audubon Society, eBird provides data concerning bird abundance and distribution at a variety of spatial and temporal scales. eBird is sponsored in part by several Service programs, research groups, non-government offices, and the University of the Virgin Islands. From January through November 2012, 703 reports of piping plovers were documented in the Action Area by eBird members. Although multiple observations of the same bird may have been documented, these reports included observations totaling 3,466 individuals; 240 reports with observations of 752 individuals located in the NFESO AOR, and 337 reports with observations of 2,032 individuals located in the SFESO AOR.

Population Variability

The pattern of population growth among the recovery units along the Atlantic Coast was uneven, and was accompanied by periodic declines in both overall and regional populations (Service 2011). Although there is some indication of recovery in the Atlantic Coast population, any optimism should be tempered by observed geographic and temporal variability in population growth.

Population Stability

The most consistent finding in the various population viability analyses conducted for piping plovers (Ryan et al. 1993; Melvin and Gibbs 1996; Plissner and Haig 2000; Wemmer et al. 2001; Larson et al. 2002; Amirault et al. 2005; Calvert et al. 2006; Brault 2007) indicates even small declines in adult and juvenile survival rates will cause increases in extinction risk. A banding study conducted between 1998 and 2004 in Atlantic Canada concluded lower return rates of juvenile (first year) birds to the breeding grounds than was documented for Massachusetts (Melvin and Gibbs 1996), Maryland (Loegering 1992), and Virginia (Cross 1996) breeding populations in the mid-1980s and very early 1990s. This is consistent with failure of the Atlantic Canada population to increase in abundance despite high productivity (relative to other breeding populations) and extremely low rates of dispersal to the U.S. over the last 15 plus years (Amirault et al. 2005). This suggests maximizing productivity does not ensure population increases. However, other studies suggest that survivability is good at wintering sites (Drake et al. 2001). Please see the Piping Plover 5-Year Review: Summary and Evaluation for additional information on survival rates at wintering habitats (Service 2009).

Status and distribution

Reasons for Listing

The 1985 final rule stated the number of piping plovers on the Gulf of Mexico coastal wintering grounds might be declining as indicated by preliminary analysis of the Christmas Bird Count data. Independent counts of piping plovers on the Alabama coast indicated a decline in numbers between the 1950s and early 1980s. At the time of listing, the Texas Parks and Wildlife Department stated 30 percent of wintering habitat in Texas had been lost over the previous 20 years. The final rule also stated, in addition to extensive breeding area problems, the loss and modification of wintering habitat was a significant threat to the piping plover.

Threats to Piping Plovers

The Piping Plover 5-Year Review: Summary and Evaluation (Service 2009) provides an analysis of threats to piping plovers in their migration and wintering range. The threats identified in this document that were of primary concern included the loss and modification of wintering habitat (including shoreline development, beach maintenance and nourishment, inlet dredging, and the construction of jetties and groins).

The Piping Plover 5-Year Review: Summary and Evaluation noted that overutilization for commercial, recreational, scientific, or educational purposes was not a current threat to piping plovers on their wintering and migration grounds. Disease was identified as being only a minor threat. The impacts of predation on nonbreeding populations are largely undocumented, but they remain a potential threat. However, the Service considers predator control on piping plover wintering and migration grounds to be a low priority at this time (Service 2009).

Neither the final listing rule nor the recovery plans state disease is an issue for piping plover, and no plan assigns recovery actions to this threat factor. Based on information available to date, West Nile virus and avian influenza are a minor threat to piping plovers (Service 2009).

Habitat loss and degradation on winter and migration grounds from shoreline and inlet stabilization efforts, both within and outside of designated Critical Habitat, remains a serious threat to all piping plover populations. In some areas, beaches that abut private property are needed by wintering and migrating piping plovers. However, residential and commercial developments that typically occur along private beaches may pose significant challenges for efforts to maintain natural coastal processes. The threat of habitat loss and degradation, combined with the threat of sea-level rise associated with climate change, raise serious concerns regarding the ability of private beaches to support piping plovers over the long term.

Future actions taken on private beaches will determine whether piping plovers continue to use these beaches or whether the recovery of piping plovers will principally depend on public property. As Lott et al. (2009) concludes, "The combination of development and shoreline protection seems to limit distribution of non-breeding piping plovers in Florida. If mitigation or habitat restoration efforts on barrier islands fronting private property are not sufficient to allow plover use of some of these areas, the burden for plover conservation will fall almost entirely on public land managers."

While public lands may not be at risk of habitat loss from private development, significant threats to piping plover habitat remain on many municipal, State, and federally owned properties. These public lands may be managed with competing missions that include conservation of imperiled species, but this goal frequently ranks below providing recreational enjoyment to the public, readiness training for the military, or energy development projects.

Public lands remain the primary places where natural coastal dynamics are allowed. Of recent concern are requests to undertake beach nourishment actions to protect coastal roads or military infrastructure on public lands. If project design does not minimize impediments to shoreline overwash which are necessary to help replenish bayside tidal flat sediments and elevations, significant bayside habitat may become vegetated or inundated, thereby exacerbating the loss of preferred piping plover habitat. Conversely, if beach fill on public lands is applied in a way that allows for "normal" system overwash processes, and sediment is added back to the system, projects may be less injurious to barrier island species that depend on natural coastal dynamics.

Maintaining wrack for food and cover in areas used by piping plovers may help offset effects that result from habitat degradation due to sand placement associated with berm and beach nourishment projects and ensuing human disturbance. Leaving wrack on private beaches may improve use by piping plovers, especially during migration when habitat fragmentation may have a greater effect on the species. In addition, using recreation management techniques, Great Lakes recovery action 2.14 may minimize the effects of habitat loss. Addressing off-road vehicles and pet disturbance may increase the suitability of existing piping plover habitat.

The dredging and mining of sediment from inlet complexes threatens the piping plover on its wintering grounds through habitat loss and degradation. The maintenance of deep draft navigation channels by dredging can alter the natural coastal processes on inlet shorelines of nearby barrier islands (Service 2012). Forty-four percent of the tidal inlets within the U.S. wintering range of the piping plover have been or continue to be dredged, primarily for navigational purposes. The dredging of navigation channels or relocation of inlet channels for erosion-control purposes contributes to the cumulative effects of inlet habitat modification by removing or redistributing the local and regional sediment supply. Dredging can occur on an annual basis or every 2 to 3 years, resulting in continual perturbations and modifications to inlets and their adjacent shoreline habitats (Service 2012).

As sand sources for beach nourishment projects have become more limited, ebb tidal shoals are being utilized as borrow areas more frequently. Exposed ebb and flood tidal shoals and sandbars are prime roosting and foraging habitats for piping plovers. In general, these shoals are only accessible by boat and tend to receive less human recreational use than nearby mainland beaches. This mining of material from inlet shoals for use as beach fill is not equivalent to the natural sediment bypassing due to the virtually instantaneous movement of sand. In a natural system, the sand would gradually and continuously move through the inlet system, providing a greater opportunity for emergent shoals to form (Service 2012).

The Deepwater Horizon oil spill, which started April 20, 2010, discharged into the Gulf of Mexico through July 15, 2010. According to government estimates, the leak released between 100 and 200 million gallons of oil into the Gulf. The U.S. Coast Guard estimates that more than 50 million gallons of oil have been removed from the Gulf, or roughly a quarter of the spill amount. Additional effects to natural resources may be attributed to the 1.84 million gallons of dispersant applied to the spill. As of July 2010, approximately 625 miles of Gulf Coast shoreline was oiled (approximately 360 miles in Louisiana, 105 miles in Mississippi, 66 miles in Alabama and 94 miles in Florida) (Joint Information Center 2010). These numbers reflect a daily snapshot of shoreline that experienced effects from oil; however, they do not include cumulative effects to date, or shoreline that has already been cleaned.

Piping plovers have continued to winter within the Gulf of Mexico shorelines. Researchers have and continue to document oiled piping plovers stemming from this spill. Oiling of designated piping plover Critical Habitat has been documented. Affects to the species and its habitat are expected, but their extent remains difficult to predict. The U.S. Coast Guard, the states, and responsible parties from the Unified Command, with advice from Federal and State natural resource agencies, initiated protective and cleanup efforts per prepared contingency plans to deal with petroleum and other hazardous chemical spills for each state's coastline. The contingency plans identify sensitive habitats, including all federally listed species' habitats, which receive a higher priority for response actions. Those plans allow for immediate habitat protective measures for cleanup activities in response to large contaminant spills. While such plans usually ameliorate the threat to piping plovers, it is yet unknown how much improvement will result in this case given the breadth of the effects associated with the Deepwater Horizon incident.

Based on all available data prior to the Deepwater Horizon oil spill, the risk of effects from contamination to piping plovers and their habitat was recognized, but the safety contingency plans were considered adequate to alleviate most of these concerns. The Deepwater Horizon incident has brought heightened awareness of the intensity and extent of impacts to fish and wildlife habitat from large-scale releases. In addition to potential direct habitat degradation from oiling of intertidal habitats and retraction of stranded boom, effects to piping plovers may occur from the increased human presence associated with boom deployment and retraction, cleanup activities, wildlife response, and damage assessment crews working along shorelines. Research studies are documenting the potential expanse of effects to the piping plover.

Analysis of the species/Critical Habitat likely to be affected

The proposed action has the potential to adversely affect wintering and migrating piping plovers and their habitat from all three breeding populations that may use the Action Area. The Atlantic Coast and Great Plains breeding populations of piping plover are listed as threatened, while the Great Lakes breeding population is listed as endangered. Therefore, this P^3BO considers the potential effects of this project on this species and its designated Critical Habitat.

The July 10, 2001, FR notice designated approximately 27,328 acres (corresponding to approximately 47 miles of beach) as Critical Habitat for wintering piping plovers in peninsular Florida. There are no Corps civil works shore protection projects located in designated Critical Habitat. There are five Corps civil works navigation projects that typically place dredged material in Critical Habitat Units: King's Bay (Unit FL-36), Ponce Inlet (Unit FL-34), St. Lucie Inlet (Unit FL-33), Matanzas Pass (Unit FL-25), and Tampa Harbor (Unit FL-21). Maintenance dredging at these navigational channels typically occurs on 1 to 5 year intervals. These five units account for 1,749 acres (10 miles) of the 23,709 acres of total designated Critical Habitat in the Action Area (or 7.4 percent). These and other Critical Habitat Units may also be affected by non-Civil Works projects under Corps regulatory authority.

This P^3BO does not rely on the regulatory definition of "destruction or adverse modification" of Critical Habitat at 50 C.F.R. 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to Critical Habitat.

ENVIRONMENTAL BASELINE

Status of the species/Critical Habitat within the Action Area

As mentioned in Section II(C)1, the 2006 International Piping Plover Census surveys documented 321 wintering piping plovers at 117 sites covering approximately 522 miles of suitable habitat along the Gulf Coast of Florida, and an additional 133 plovers along the Atlantic Coast (Elliott-Smith et al 2009). In addition, bird populations throughout Florida are monitored by volunteers and The Conservancy of Southwest Florida. Launched in 2002, by the Cornell Lab of Ornithology and National Audubon Society, eBird provides data concerning bird abundance and distribution at a variety of spatial and temporal scales. eBird is sponsored in part by several

Service programs, research groups, non-government offices, and the University of the Virgin Islands. From January through November 2012, 703 reports of piping plovers were documented in the Action Area by eBird members. These reports included observations totaling 3,466 individuals; 240 reports with observations of 752 individuals located in the NFESO AOR, and 337 reports with observations of 2,032 individuals located in the SFESO AOR. It is important to note many of these observations may be multiple observations of the same specimen; therefore, these numbers do not represent a population estimate.

The Action Area encompasses 11 Critical Habitat Units in the NFESO's AOR (Figure 1), and an additional 11 Critical Habitat Units in the SFESO's AOR (Figure 2). The descriptions of the Critical Habitat Units associated with the proposed action vary, but generally include land from mean lower low water to where densely vegetated habitat or developed structures, not used by piping plovers, begin and where the PCEs no longer occur. The PCEs consist of intertidal flats including sand or mud flats with no or very sparse emergent vegetation. In addition, adjacent unvegetated or sparely vegetated sand, mud, or algal flats above high tide are important.

Factors affecting the species environment within the Action Area

Coastal development

Shoreline development throughout the wintering range poses a threat to all populations of piping plovers. Beach maintenance and nourishment, inlet dredging, and artificial structures, such as jetties and groins, can eliminate wintering areas and alter sedimentation patterns leading to the loss of nearby habitat. Structural development along the shoreline or manipulation of natural inlets upsets the dynamic processes and results in habitat loss or degradation (Melvin et al. 1991). Increased coastal development brings other recreational disturbances that are known to prevent bird usage of an area, including human disturbance, predation or disturbance by domestic animals, beach raking and cleaning, and habitat degradation by off-road vehicles (Service 2009).

Recreational management techniques, such as vehicle restrictions, pet restrictions, and symbolic fencing (usually sign posts and string) of roosting and feeding habitats, can help to address anthropogenic disturbances to wintering plovers. Educational materials, such as informational signs or brochures, can also provide valuable information to assist the public in understanding the need for conservation measures. Although these measures can be effective, they are not implemented consistently throughout the State.

Accelerated sea-level rise

Potential effects of sea-level rise on coastal beaches vary regionally due to subsidence or uplift as well as the geological character of the coast and nearshore (Service 2009). Low elevations and proximity to the coast make all nonbreeding coastal piping plover foraging and roosting habitats vulnerable to the effects of rising sea-level. Furthermore, areas with small astronomical tidal ranges (*e.g.*, portions of the Gulf Coast where intertidal range is less than 3.3 feet) are the most vulnerable to loss of intertidal wetlands and flats induced by sea-level rise (EPA 2009).

Inundation of piping plover habitat by rising seas could lead to permanent loss of habitat that lies immediately seaward of numerous structures or roads, especially if those shorelines are also armored with hardened structures. Without development or armoring, low undeveloped islands can migrate toward the mainland, pushed by the overwashing of sand eroding from the seaward side and being re-deposited in the bay (Scavia et al. 2002). Overwash and sand migration are impeded on developed portions of islands. Instead, as sea-level increases, the ocean-facing beach erodes and the resulting sand is deposited offshore. The buildings and the sand dunes then prevent sand from washing back toward the lagoons, and the lagoon side becomes increasingly submerged during extreme high tides (Scavia et al. 2002), diminishing both barrier beach shorebird habitat and protection for mainland developments.

A number of groups have met to discuss climate change and its potential impacts to Florida. In 2007, Governor Charlie Crist hosted "Serve to Preserve: A Florida Summit on Global Climate Change." To combat climate change, this summit focused on methods for reducing emissions to avoid contributing to climate change. It did not address efforts to limit coastal development or to encourage more natural coastal processes. Based on the present level of available information concerning the effects of global climate change on the status of the piping plover and its designated Critical Habitat, the Service acknowledges the potential for changes to occur in the Action Area.

Sand placement activities

Sand placement projects have the potential to alter piping plover habitat, including the PCEs of Critical Habitat. Beach nourishment can create a beach seaward of existing hard stabilization or heavy development, where the beach has been lost due to erosion and/or sea-level rise, restoring associated ecosystem functions. Although dredge and fill projects that place sand on beaches or dunes may restore lost or degraded habitat, these projects may degrade habitat by altering the natural sediment composition and depressing the invertebrate base in some areas. This hinders habitat migration with sea-level rise, and replaces the natural dune beach nearshore system with artificial geomorphology (Service 2012). Lott et al. (2009) found a strong negative correlation between sand placement projects and the presence of plovers on the Gulf Coast of Florida; however, he noted that additional research was needed to clarify whether the cause was the sand placement project or the tendency for these projects to be located on highly developed shorelines. Harrington (2008) noted the need for a better understanding of the potential effects of inlet-related projects, such as jetties, on bird habitats.

In areas where the shoreline is highly eroded, sand placement activities can improve piping plover foraging and roosting habitat (National Research Council 1995). Sand placement activities add sand to the sediment budget, increasing the beach width and providing a sand source for emergent nearshore features to form. Although there is some research related to the management of beach nourishment projects to better maintain the habitat for piping plovers, much of this research is focused on beaches in the northern U.S. where breeding occurs (Melvin et al. 1991; Houghton 2005; Maslo et al. 2010). In their wintering grounds, increasing beach

width is an important aspect of beach nourishment projects in highly developed, eroding areas. The timing of the project is also important in preventing impacts to piping plovers as a result of sand placement activities.

EFFECTS OF THE ACTION

This section is an analysis of the beneficial, direct, and indirect effects of the proposed actions on wintering piping plovers within the Action Area. The analysis includes effects of interrelated and interdependent 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 wintering piping plovers. Since piping plovers can be present on these beaches for up to 10 months per year, construction is likely to occur while the species is utilizing these beaches and associated habitats. Short-term and temporary impacts to piping plover activities could result from project work occurring on the beach that flushes birds from roosting or foraging habitat. Long-term impacts could include a hindrance in the ability of wintering plovers to recuperate from their migratory flight from their breeding grounds, survive on their wintering areas, or to build fat reserves in preparation for migration back to their breeding grounds. Long-term impacts may also result from changes in the physical characteristics of the beach from the placement of the sand.

Proximity of the action

Maintenance dredging of navigational inlets occurs throughout the state in both Federal and non-Federal channels. Sand placement activities (resulting from both shore protection projects and placement of dredged materials as a result of maintenance dredging activities) would occur within and adjacent to wintering piping plover foraging and roosting habitats. Groin and jetty repair or replacement would occur adjacent to inlets, or along beach habitats where they may be used to stabilize the beach and limit erosion.

Distribution

Sand placement activities that may impact piping plover roosting and foraging would occur along both the Gulf of Mexico and the Atlantic Ocean coasts. The Service expects the proposed construction activities could directly and indirectly affect the availability of habitat for migrating and wintering piping plovers to roost and forage. The proposed construction activities are also expected to cause piping plovers usage of Critical Habitat Units located within the Action Area to temporarily decrease.

Timing

The timing of maintenance dredging, sand placement, and groin/jetty repairs or replacement activities may occur during or outside of the migration and wintering period for piping plovers (July 15 to May 15). For projects occurring outside of the migration and wintering period, the Service expects indirect effects to occur later in time.

Nature of the effect

Although the Service expects direct short-term effects from disturbance during project construction, it is anticipated the action will also result in direct, and indirect, long term effects to piping plovers and Critical Habitat. The Service expects there may be morphological changes to piping plover habitat, including roosting and foraging habitat, and to Critical Habitat within the Action Area. Activities that affect or alter the use of optimal habitat, Critical Habitat, or increase disturbance to the species may decrease the survival and recovery potential of the piping plover. Effects to piping plovers and their habitat as a result of groin and jetty repair or replacement will primarily be due to construction ingress and egress when construction is required to be conducted from land. In addition, construction materials and equipment may need to be stockpiled on the beach. These effects would be more likely to be experienced with repair or replacement of groin structures that are located in shallower water, as the majority of work done to jetties is conducted from the water or from the crest of the structure (Martin 2013).

Duration

Time to complete the project construction varies depending on the project size, weather, and other factors (equipment mobilization and break downs, availability of fuel, lawsuits, etc.). According to Corps estimations, project work could take as little as 1 month and as long as 2 years. Piping plover habitats would remain disturbed until the project is completed and the habitats are restored. Beach restoration projects would typically be complete in 6 to 12 months. The direct effects would be expected to be short-term in duration, until the benthic community reestablishes within the new beach profile. Indirect effects from the activity, including those related to altered sand transport systems, may continue to occur as long as sand remains on the beach.

The effects of the proposed action are of a temporary quantitative and qualitative nature. The habitat will be temporarily unavailable to wintering plovers during the construction period, and the quality of the habitat will be reduced for several months following project activities. Dredging in inlets where emergent shoals have formed would result in a loss of optimal piping plover habitat, which may or may not reform in the same quality or quantity in the future. Dredging inlets, repairing and replacing groins or jetties, or sand placement during months when piping plovers are present causes disturbance that disrupts the birds' foraging efficiency and hinders their ability to build fat reserves over the winter and in preparation for migration, as well as their recuperation from migratory flights (Service 2009). The mean linear distance moved by wintering plovers from their core area is estimated to be approximately 2.1 miles (Drake et al.

2001), suggesting they could be negatively impacted by temporary disturbances anywhere in their core habitat area. The PCEs associated with designated Critical Habitat would be temporarily adversely affected during and following sand placement, but may also experience some positive benefits from the increase in available beach and its associated new wrack.

Disturbance frequency

The frequency of maintenance dredging activities varies greatly, and can be as often as annually or semiannually at some inlets that experience high rates of shoaling, or as infrequently as once every 7 years at inlets that do not experience high rates of shoaling. Sand placement activities as a result of shore protection activities typically occur once every 5 to 7 years. Dredging and sand placement can occur at any time during the year based on availability of funding, other applicable species' windows, and the availability of dredges to conduct the work.

The disturbance frequency related to groin and jetty repair and replacement varies greatly based on the original construction methodology, the construction materials, and the conditions under which the structure is placed. Most structures in Florida are constructed with Florida limerock or granite (preferred). Granite structures can last 50 years or more without requiring maintenance, while limerock structures may require maintenance on a slightly more frequent basis due to their lower densities. On average, hard structures are designed to require only minor repairs (such as replacing dislocated rock) that would only be expected approximately every 20 years (Martin 2013).

Disturbance severity

The Action Area encompasses a large percentage of the wintering range of the piping plover; however, the overall intensity of the disturbance is expected to be minimal. The intensity of the effect on piping plover habitat may vary depending on the frequency of the sand placement activities, the existence of staging areas, and the location of the beach access points. The severity is also likely to be slight, as plovers located within the Action Area are expected to move outside of the construction zone due to disturbance; therefore, no plovers are expected to be directly taken as a result of this action.

Analyses for effects of the action

The Action Area encompasses peninsular Florida within the AORs of the NFESO and the SFESO on both the Atlantic and Gulf coasts of Florida. It consists mostly of designated piping plover Critical Habitat Units and publicly owned land that exhibits the following features: located within 1 mile of an inlet; emergent nearshore sand bars; washover fans; emergent bayside and Ocean/Gulf-side shoals and sand bars; bayside mudflats, sand flats, and algal flats; or bayside shorelines of bays and lagoons.

Direct effects

Sand placement projects that utilize beach compatible material from either an appropriate borrow site or from the authorized Federal channel, have the potential to elevate the beach berm and widen the beach, providing storm protection and increasing recreational space. The construction window (*i.e.*, sand placement, dredging, groin and jetty repair/replacement) for each event is likely to extend through a portion of at least one piping plover migration and winter season. If material is placed on the beach, heavy machinery and equipment (*e.g.*, trucks and bulldozers operating on Action Area beaches, the placement of the dredge pipeline, and sand placement) may adversely affect migrating and wintering piping plovers in the Action Area by disturbing and disrupting normal activities such as roosting and feeding, and possibly forcing birds to expend valuable energy reserves to seek available habitat in adjacent areas along the shoreline. Sand placement may occur in and adjacent to habitat that appears suitable for roosting and foraging piping plovers, or that will become more optimal with time. Short-term and temporary construction effects to piping plovers will occur if the birds are roosting and feeding in the area during a migration stopover. The deposition of sand may temporarily deplete the intertidal food base along the shoreline and temporarily disturb roosting birds during project construction.

For some highly eroded beaches, sand placement will have a beneficial effect on the habitat's ability to support wintering piping plovers. Narrow beaches that do not support a productive wrack line may see an improvement in foraging habitat available to piping plovers following sand placement. The addition of sand to the sediment budget may also increase a sand-starved beach's likelihood of developing habitat features valued by piping plovers, including washover fans and emergent nearshore sand bars.

Maintenance dredging of shallow-draft inlets can occasionally require the removal of emergent shoals that may have formed at the location of the Federally-authorized channel from the migration of the channel over time. In these cases, the dredging activities would result in a complete take of that habitat. However, this take could be either temporary or more permanent in nature depending upon the location of future shoaling within the inlet.

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). 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 miles along the coast (Komar 1983). The proposed activities associated with this P^3BO only include the repair and replacement of existing groins and jetties. Since the primary effects associated with groins and jetties are associated with their alteration of sand movement, the effects would not change with the proposed action. Temporary

adverse effects to the piping plover from disruption in the immediate vicinity of the project would occur during construction.

Indirect effects

Indirect effects are a result of a proposed action that occur later in time and are reasonably certain to occur. During sand placement, suffocation of invertebrate species will occur and degrade the suitability of the habitat for foraging. The effects to the benthic communities and the indirect effects to the piping plover will occur even if sand placement activities occur outside the piping plover migration and wintering seasons. Timeframes projected for benthic recruitment and re-establishment following sand placement are between 6 months and 2 years. Tilling to loosen compacted sand, sometimes required following beach nourishment to minimize effects to nesting sea turtles, may affect wrack that has accumulated on the beach. However, tilling is usually conducted above the wrack line. This may affect feeding and roosting habitat for piping plovers since they often use wrack for cover and foraging.

Natural, undeveloped barrier islands need storms and overwash to maintain the physical and biological environments they support (Young et al. 2006). Sand placement may limit washover fans from developing, which could accelerate the successional state of sand flats such that they will likely become vegetated within a few years (Leatherman 1988). This may reduce an area's value to foraging and roosting piping plovers. The piping plover's rapid response to habitats formed by washovers from the hurricanes in 2004 and 2005 in the Florida panhandle at Gulf Islands National Seashore and Eglin Air Force Base's Santa Rosa Island, and similar observations of their preferences for overwash habitats at Phipps Preserve and Lanark Reef in Franklin County, Florida, and elsewhere in their range, demonstrate the importance of these habitats for wintering and migrating piping plovers.

Restoration of beaches through sand placement may increase recreational pressures within the project area. Recreational activities, including increased pedestrian use, have the potential to adversely affect piping plovers through disturbance and through increased presence of predators, including both domestic animals and feral animals attracted by the presence of people and their trash. Long-term effects could include a decrease in piping plover use of habitat due to increased disturbance levels.

Pilkey and Dixon (1996) stated 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 noted 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 buildings 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. Greater

development may also support larger populations of mammalian predators, such as foxes and raccoons, than undeveloped areas. Optimal habitat for the piping plover often occurs on publicly owned lands where human development may be limited; however, development of roads, bridges, and recreational facilities may be subject to scenarios similar to those described above.

Species' response to the proposed action

The Service bases this P^3BO on anticipated direct and indirect effects to piping plovers (wintering and migrating) and their Critical Habitat as a result of dredging, sand placement on beaches, and groin and jetty repair/replacement, which may prevent the maintenance or formation of habitat that piping plovers consider optimal for foraging and roosting. Heavy machinery and equipment (*e.g.*, trucks and bulldozers operating on project area beaches, the placement of the dredge pipeline along the beach, and sand disposal) may adversely affect migrating and wintering piping plovers in the project area by disturbance and disruption of normal activities such as roosting and forging, and possibly forcing piping plovers to expend valuable energy reserves to seek available habitat elsewhere. In addition, foraging in suboptimal habitat by migrating and wintering piping plovers may reduce the fitness of individuals. Furthermore, increased and continual disturbance within optimal habitat, including Critical Habitat Units, could have effects on all three breeding populations of piping plovers.

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.

It is reasonably certain coastal development, human occupancy, and recreational use along the Atlantic and Gulf coasts of Florida will increase in the future. However, areas identified as optimal piping plover habitat are not as likely to be affected by coastal development and human occupancy, since they are primarily protected areas that are relatively undeveloped compared to other beaches in Florida. Optimal Piping Plover Areas may still experience heavy recreational use. It is unknown how much influence beach nourishment will contribute to the development and recreational use of the shoreline. Most activities affecting designated piping plover Critical Habitat would require Federal permits or funding. The Service is unable to identify any specific activities that would be considered cumulative effects.

CONCLUSION

There are 2,340 miles of sandy shoreline available (although not necessarily suitable) throughout the piping plover wintering range within the conterminous U.S. The primary effects of the proposed activities are to piping plover foraging and roosting habitat, and these effects are typically limited to the first year following project construction. Beach wrack and the benthic community are often reestablished between 6 months and 1 year following project construction.

In the long-term, sand placement activities will add sediment to the system that could otherwise be removed as part of inlet maintenance, and increase the availability of suitable habitat for the species.

After reviewing the current status of the northern Great Plains, Great Lakes, and Atlantic Coast wintering piping plover populations, the environmental baseline for Action Area, the effects of the proposed activities, the Conservation Measures proposed by the Corps, and the cumulative effects, it is the Service's biological opinion that implementation of these actions, as proposed, is not likely to jeopardize the continued existence of the piping plover.

In addition, after reviewing the current status of the affected species, the environmental baseline for the Action Area, the effects of the proposed activities, and the cumulative effects, it is the Service's biological opinion the action, as proposed, will not adversely modify designated critical habitat for the reason given below.

Although some Critical Habitat Units may be impacted by project activities, these would most frequently be units or portions of units that are highly eroded and where habitat for piping plovers has become degraded. In these instances, the adverse effects of project activities would be offset over time by beneficial effects associated with the restoration of beaches. In all cases, neither the negative nor the positive effects of beach nourishment are likely to be permanent due to the dynamic nature of shoreline processes. Project activities would not affect a Critical Habitat Unit to the extent that, over time, the unit would be unable to serve its intended purposes. Therefore, any loss of habitat would not have a significant effect on the species' persistence or on the function of these Critical Habitat Units as a whole.

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 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 nondiscretionary, and must be implemented by the Corps so they become binding conditions of any permit issued, 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 adhere to the Terms and Conditions of the incidental take statement through enforceable terms that are added to the permit, the protective coverage of section 7(o)(2) may lapse. In order to monitor the effects of incidental take, the Corps must report the progress of the action and its effects on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

It is difficult for the Service to estimate the exact number of piping plovers that could be migrating through or wintering within the Action Area at any one point in time and place during project construction. Disturbance to suitable habitat resulting from both dredging and sand placement activities within the Action Area would affect the ability of an undetermined number of piping plovers to find suitable foraging and roosting habitat during the migrating and wintering periods of any given year. Because the number of piping plovers that would be affected by projects cannot be determined, the Service will use the annual disturbance in shoreline miles as a surrogate for take.

The FDEP's Critically Eroded Beaches in Florida report identified 204.2 miles of critically eroded beaches on the Atlantic Coast of Florida, and an additional 102.3 miles of critically eroded beaches on the Gulf Coast of Florida in the Action Area (FDEP 2012). FDEP's definition of "critically eroded" requires upland development, recreation, wildlife habitat, or important cultural resources to be threatened. Due to the threat to upland interests, it is anticipated that beaches identified by FDEP to be critically eroding would be the most likely to be affected by the proposed action. Of the 204.2 miles of critically eroded beaches on the Atlantic Coast, approximately 49.4 miles are located on public lands primarily managed for conservation purposes; on the Gulf Coast, approximately 14.7 miles of the 102.3 miles of critically eroded beaches are located on public lands, for a total of 64.1 miles in the Action Area that are most likely to be affected. We acknowledge some additional public lands that are not defined as critically eroded and not included in the estimate above may also be affected. However, not all public lands have habitat elements that support migrating or wintering piping plover on a regular basis; therefore, some public lands included in the estimate above are not optimal piping plover habitat.

The July 10, 2001, FR notice designated approximately 27,328 acres, corresponding to approximately 47 miles of beach, as Critical Habitat for wintering piping plovers in peninsular Florida. Most designated Critical Habitat is publicly owned (see Appendix A) and the Critical Habitat most likely to be disturbed would fall under the critically eroded, publicly owned category, part of the estimated 64.1 miles of beach cited above.

An additional 15.0 miles of beach in six units are defined as optimal piping plover habitat, but not located on publically-owned lands or Critical Habitat Units. Over time, most or all of these areas may be subject to project-related disturbance. Therefore, the total shoreline (optimal piping plover habitat) estimated to be effected by the proposed action is 79.1 miles, rounded for our purposes to 80 miles. It is estimated approximately 10 percent or less of the total 80 miles of

potentially affected optimal habitat would be impacted in any given year (or approximately 8 miles). In years following emergency events, the impacted area is expected to increase to approximately 25 percent or less of the total mileage, or 20 miles of shoreline. Over the past 10 years, two Congressional Orders occurred due to emergency events (2004-2005 hurricane season, and the 2012 hurricane season). The increased sand placement activities due to emergency events are anticipated to occur once in a 7-year period. This estimate is considered to be conservative, as many of the lands identified as optimal piping plover habitat are undeveloped. Since upland development is generally not threatened in these areas, the cost of placing sand on these shorelines is not justified.

Sand placement resulting from maintenance dredging projects is the most likely activity to affect these areas due to the preference to keep sand within the littoral system. It is expected the exact mileage of shoreline affected by the proposed action will vary from year to year. Maintenance dredging and sand placement activities may result in an unspecified number of piping plovers occupying these areas to be taken in the form of harm (*e.g.*, death, injury) and harassment as a result of this action.

EFFECT OF THE TAKE

In this P^3BO, the Service determined the proposed project is not likely to result in jeopardy to the piping plover.

REASONABLE AND PRUDENT MEASURES

The Service has determined the following Reasonable and Prudent Measures are necessary and appropriate to minimize take of the piping plover in the Action Area. If the Corps is unable to comply with the Reasonable and Prudent Measures and Terms and Conditions, the Corps as the construction agent or regulatory authority may:

1. Inform the Service why the Term and Condition is not reasonable and prudent for the specific project or activity and request exception under the P^3BO; or

2. Initiate consultation with the Service for the specific project or activity.

The Service may respond by either of the following:

1. Allowing an exception to the Terms and Conditions under the P^3BO; or

2. Recommending or accepting initiation of consultation (if initiated by the Corps) for the specific project or activity.

The post construction survey requirements are described in Reasonable and Prudent Measure #5 and Term and Condition #8. These requirements are subject to congressional authorization and

the allocation of funds. If the Corps or Applicant cannot fulfill these Reasonable and Prudent Measures, the Corps will notify the Service when initiating consultation for the project.

1. All sand placed on the beach or in the nearshore shall be compatible with the existing beach and will maintain the general character and functionality of the existing beach.

2. The Corps or the Applicant will notify the Service of the commencement of projects that utilize this P^3BO for the purposes of tracking incidental take of the species.

3. The Corps shall protect habitat features considered preferred by plovers outside of the project footprint in accordance with Terms and Conditions 3, 4, 5, and 6.

4. The Corps will facilitate awareness of piping plover habitat by educating the public on ways to minimize disruption to the species.

5. The Corps, the Applicant, or the local sponsor shall provide the mechanisms necessary to monitor impacts to piping plovers within the Action Area.

6. The Corps shall facilitate an annual meeting with the Service to assess the effectiveness of the protection and minimization measures outlined in this P^3BO.

TERMS AND CONDITIONS

1. Beach compatible fill shall be placed on the beach or in any associated dune system. Beach compatible fill must be sand that is similar to a native beach in the vicinity of the site that has not been affected by prior sand placement activity. The fill material must be similar in both coloration and grain size distribution to that native beach. 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. Fill material shall comply with FDEP requirements pursuant to the Florida Administrative Code (FAC) subsection 62B-41.005(15). A Quality Control Plan shall be implemented pursuant to FAC Rule 62B-41.008(1)(k)4.b.

2. The Corps or the Permittee must provide the following information to the Service Field Supervisor of the appropriate Field Office at least 10 business days prior to the commencement of work:

    a. Project location (include FDEP Range Monuments and latitude and longitude coordinates);
    b. Project description (include linear feet of beach, actual fill template, access points, and borrow areas);
    c. Date of commencement and anticipated duration of construction; and
    d. Names and qualifications of personnel involved in piping plover surveys.

3. Prior to construction, the Corps shall delineate preferred piping plover habitat (intertidal portions of ocean beaches, ephemeral pools, washover areas, wrack lines) adjacent to or outside of the project footprint that might be impacted by construction activities. Obvious identifiers shall be used (for example, pink flagging on metal poles) to clearly mark the beginning and end points to prevent accidental impacts to use areas.

4. Piping plover habitat delineated adjacent to or outside of the project footprint shall be avoided to the maximum extent practicable when staging equipment, establishing travel corridors, and aligning pipeline.

5. Driving on the beach for construction shall be limited to the minimum necessary within the designated travel corridor, which will be established just above or just below the primary "wrack" line.

6. Predator-proof trash receptacles shall be installed and maintained during construction at all beach access points used for the project construction to minimize the potential for attracting predators of piping plovers. Workers shall be briefed on the importance of not littering and keeping the project area trash and debris free. See Appendix B for examples of suitable receptacles.

7. Educational signs shall be installed at public access points within the project area with emphasis on the importance of the beach habitat and wrack for piping plovers. When the project area has a pet or dog regulation, the provisions of the regulation shall be included on the educational signs.

8. For one full piping plover migration and winter season (beginning July 15 to May 15) prior to construction, and 2 years following each dredging and sand placement event, bi-monthly (twice-monthly) surveys for piping plovers shall be conducted in the beach fill and in any other intertidal or shoreline areas within or affected by the project. If a full season is not available, at least 5 consecutive months with three surveys per month spaced at least 9 days apart are required. During emergency projects, the surveys will begin as soon as possible prior to, and up to implementing the project. Piping plover identification, especially when in non-breeding plumage, can be difficult. If pre-construction monitoring is not practicable, it will be so indicated in the notification to the Service (see Term and Condition #2 above) and the Service will decide whether to require a separate individual consultation. See introductory paragraph to Reasonable and Prudent Measures earlier in this document.

9. The person(s) conducting the survey must demonstrate the qualifications and ability to identify shorebird species and be able to provide the information listed below. The following will be collected, mapped, and reported:

a. Date, location, time of day, weather, and tide cycle when survey was conducted;
b. Latitude and longitude of observed piping plover locations (decimal degrees preferred);
c. Any color bands observed on piping plovers;
d. Behavior of piping plovers (*e.g.*, foraging, roosting, preening, bathing, flying, aggression, walking);
e. Landscape features(s) where piping plovers are located (*e.g.*, inlet spit, tidal creeks, shoals, lagoon shoreline);
f. Habitat features(s) used by piping plovers when observed (*e.g.*, intertidal, fresh wrack, old wrack, dune, mid-beach, vegetation);
g. Substrata used by piping plovers (*e.g.*, sand, mud/sand, mud, algal mat);
h. The amount and type of recreational use (*e.g.*, people, dogs on or off leash, vehicles, kite-boarders); and
i. All other shorebirds/waterbirds seen within the survey area.

All information shall be provided in an Excel spreadsheet. Monitoring results shall be submitted (datasheets, maps, database) on standard electronic media (*e.g.*, CD, DVD) to the appropriate Field Office by July 31 of each year in which monitoring is completed. If an appropriate web based reporting system becomes available, it would be used in lieu of hard copy/media.

[NOTE: As a condition to a permit from the FDEP, the bird monitor may also be required to report shorebird data to the Florida Fish and Wildlife Conservation Commission (FWC) https://public.myfwc.com/crossdoi/shorebirds/SigninExploreData.aspx.]

10. The Corps shall meet with the Service and the FWC (and BOEM as appropriate) annually to discuss the effectiveness of the avoidance measures and additional measures to include for future projects. The agencies will also review the projects utilizing this P^3BO the previous year to ensure that the reporting requirements for calculating the extent of take are adequate. This meeting will also explore:

    a. The possibility of using dredged materials to enhance potential or existing piping plover habitat within and adjacent to the project area;
    b. Methods for funding beneficial use opportunities for dredged materials that are not least-cost disposal to benefit piping plovers and their habitat;
    c. The development of shore protection design guidelines that can be utilized during future project planning to protect and/or enhance piping plover habitat; and
    d. Incorporating artificial lagoons or ephemeral pools into project designs adjacent to inlets where sand placement is proposed.

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. The Corps will facilitate a meeting between the Applicant or the local sponsor, the FWC, and the Service to discuss steps for the long-term protection of wrack within the project area; and

2. The Service encourages continued investigation into opportunities for increasing monitoring for Civil Works operations and maintenance projects.

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

The amount or extent of incidental take for piping plovers will be considered exceeded if sand is placed on more than 8 miles of optimal piping plover shoreline during a nonemergency year, and a maximum of 20 miles of optimal piping plover shoreline during or following an emergency event (declared disaster or Congressional Order) as a result of this programmatic action. If the anticipated level of incidental take is exceeded during the course of this action, 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.

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. Reinitiation of formal consultation is also required 10 years after the issuance of this P^3BO. In instances where the amount or extent of incidental take is exceeded, any operations causing such take shall cease pending reinitiation.

MIGRATORY BIRD TREATY ACT

Migratory Bird Treaty Act (MBTA) for all Projects:

Comply with the FWC's standard shorebird protection guidelines to protect against impacts to nesting shorebirds during implementation of these projects on the Gulf Coast during the periods from February 15-August 31 or on the Atlantic Coast from April 1- August 31. All sand placement events could impact nesting shorebirds protected under the MBTA.

***The MBTA implements various treaties and conventions between the U.S., Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the provisions of the MBTA it is unlawful by any means or manner to pursue, hunt, take, capture or kill any migratory bird except as permitted by regulations issued by the Service. The term "take" is not defined in the MBTA, but the Service has defined it by regulation to mean to pursue, hunt, shoot, wound, kill, trap, capture or collect any migratory bird, or any part, nest or egg or any migratory bird covered by the conventions or to attempt those activities.

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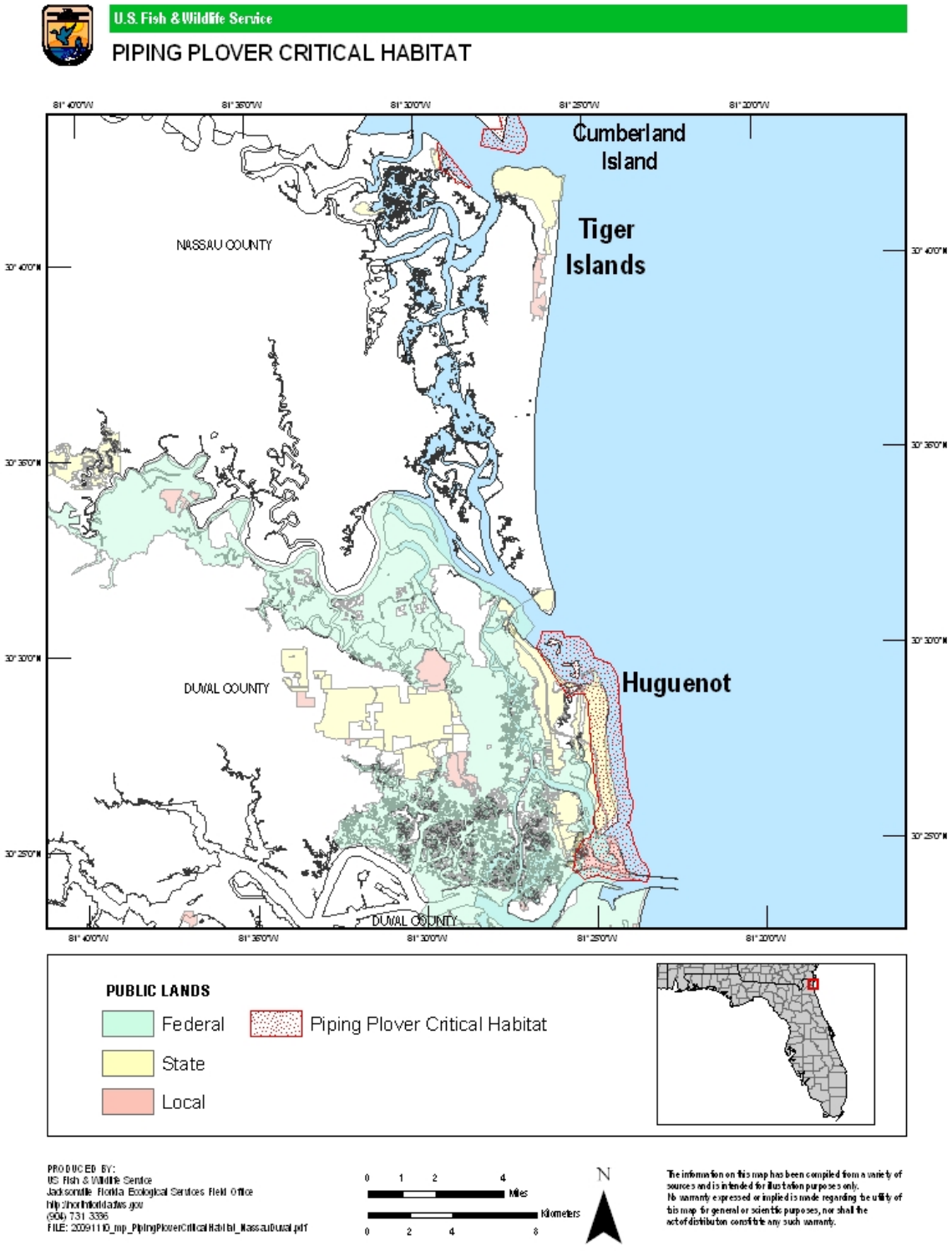
APPENDIX A: PIPING PLOVER CRITICAL HABITAT UNITS IN THE ACTION AREA


U.S. Fish & Wildlife Service
PIPING PLOVER CRITICAL HABITAT
Cumberland Island
Tiger Islands
Huguenot
NASSAU COUNTY
DUVAL COUNTY
DUVAL COUNTY
81° 40'0"W
81° 35'0"W
81° 30'0"W
81° 25'0"W
81° 20'0"W
30° 40'0"N
30° 35'0"N
30° 30'0"N
30° 25'0"N
PUBLIC LANDS
Federal
Piping Plover Critical Habitat
State
Local
PRODUCED BY:
US Fish & Wildlife Service
Jacksonville Florida Ecological Services Field Office
http://northfloridafws.gov
(904) 731 3336
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0 2 4 8 Kilometers
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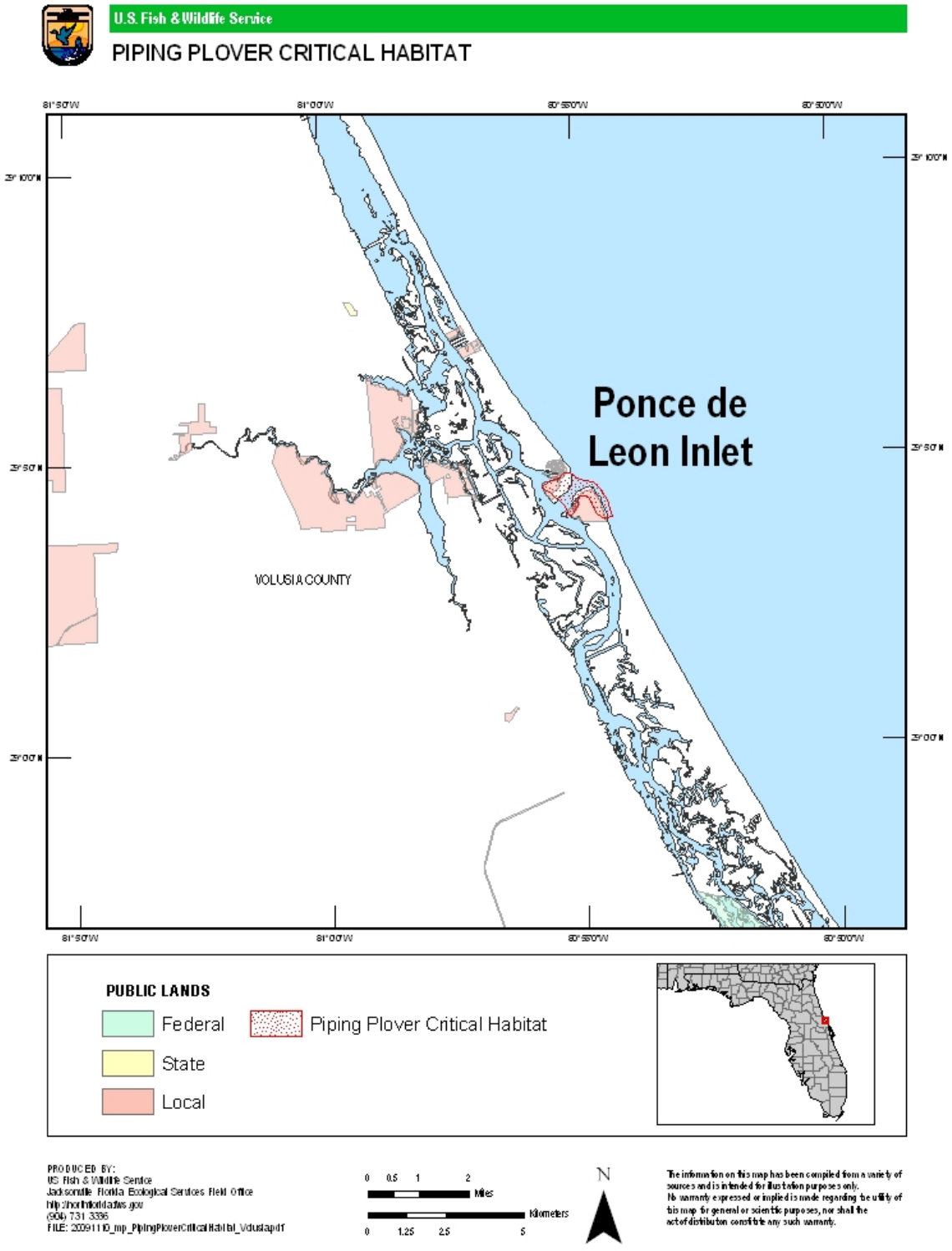
U.S. Fish & Wildlife Service
PIPING PLOVER CRITICAL HABITAT
81°50'W
81°00'W
80°50'W
80°50'W
29°10'N
29°50'N
29°00'N
Ponce de Leon Inlet
VOLUSIA COUNTY
PUBLIC LANDS
Federal
State
Local
Piping Plover Critical Habitat
PRODUCED BY:
US Fish & Wildlife Service
Jacksonville Florida Ecological Services Field Office
http://northfloridafws.gov
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Miles
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Kilometers
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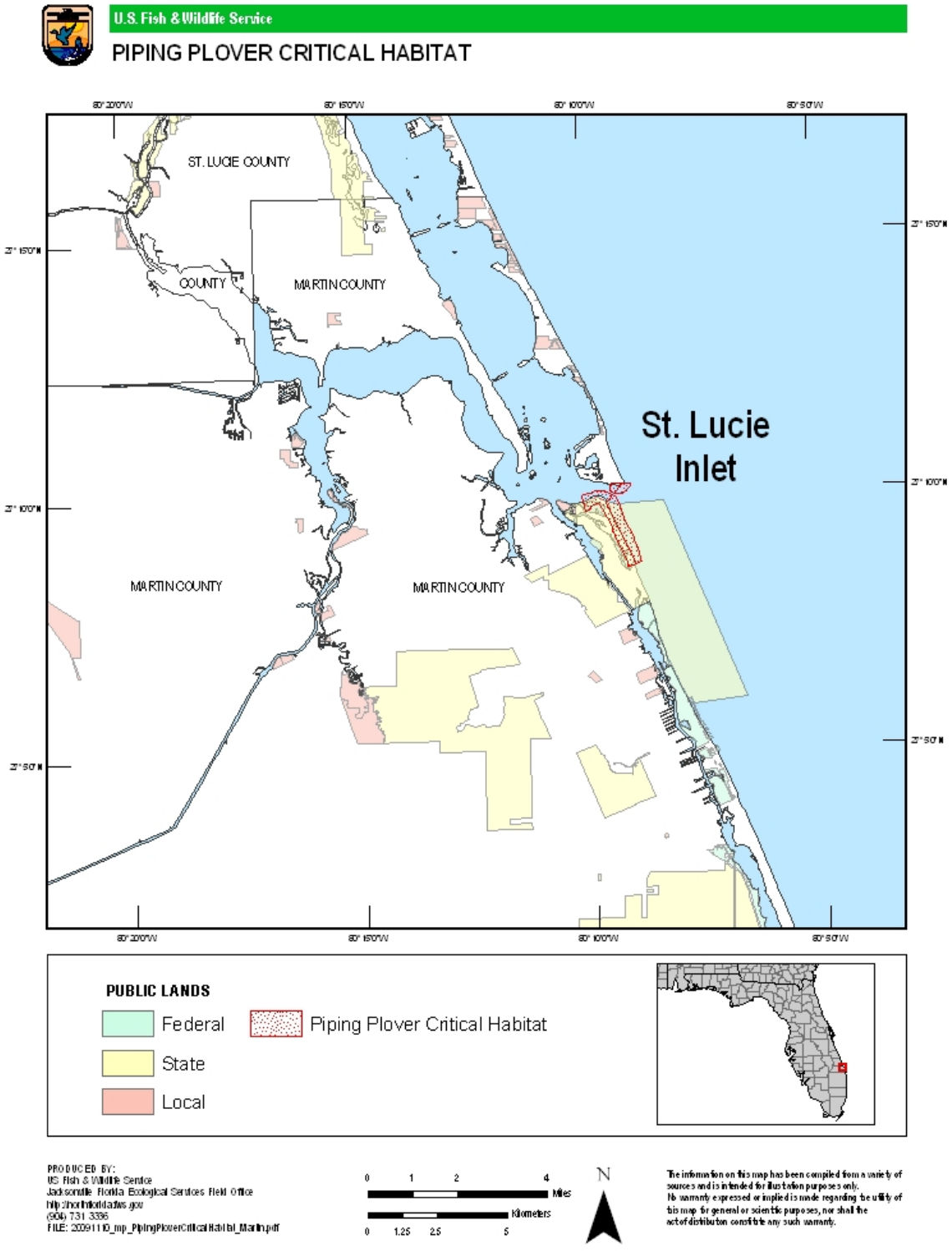
U.S. Fish & Wildlife Service
PIPING PLOVER CRITICAL HABITAT
ST. LUCIE COUNTY
COUNTY
MARTIN COUNTY
St. Lucie Inlet
MARTIN COUNTY
MARTIN COUNTY
PUBLIC LANDS
Federal
Piping Plover Critical Habitat
State
Local
PRODUCED BY:
US Fish & Wildlife Service
Jacksonville Florida Ecological Services Field Office
http://northfloridafws.gov
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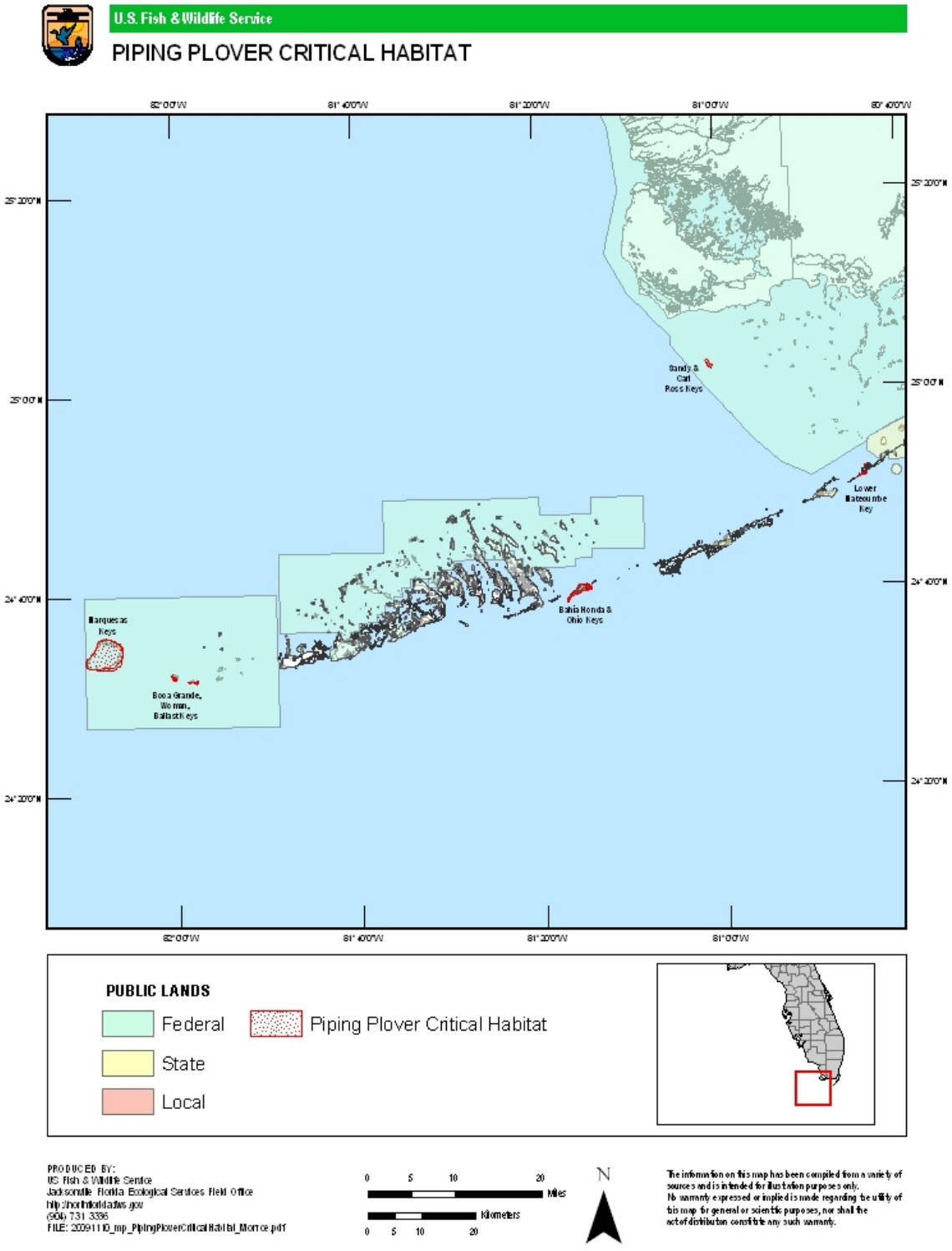
U.S. Fish & Wildlife Service
PIPING PLOVER CRITICAL HABITAT
82° 00'W
81° 40'W
81° 20'W
81° 00'W
80° 40'W
25° 20'N
25° 00'N
24° 40'N
24° 20'N
Sandy & Carl Ross Keys
Lower Matecumbe Key
Bahia Honda & Ohio Keys
Marquesas Keys
Boca Grande, Woman, Ballast Keys
PUBLIC LANDS
Federal
Piping Plover Critical Habitat
State
Local
PRODUCED BY:
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(904) 731 3336
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0 5 10 20
Miles
Kilometers
0 5 10 20
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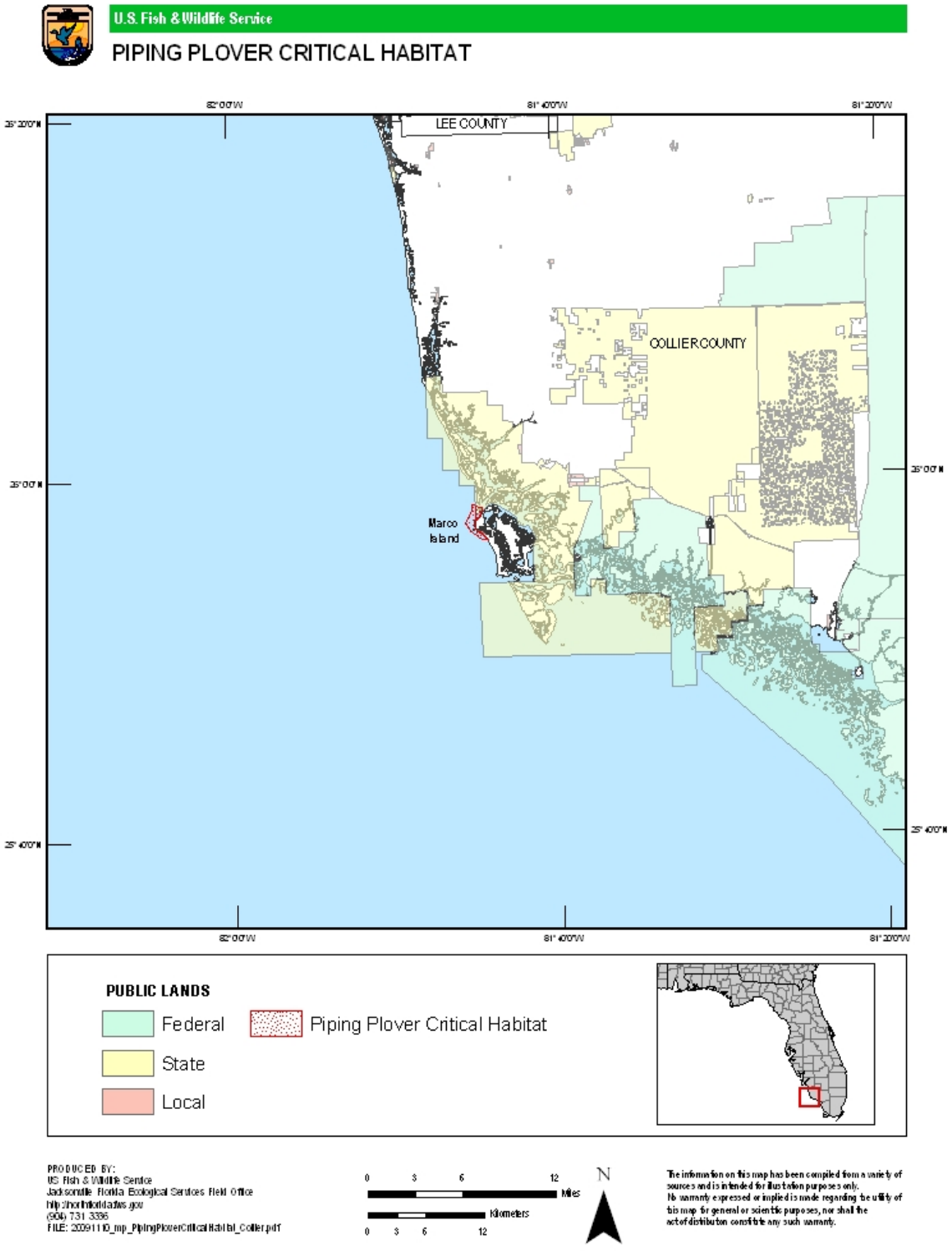
U.S. Fish & Wildlife Service
PIPING PLOVER CRITICAL HABITAT
82°0'0"W
81°40'0"W
81°20'0"W
26°20'0"N
26°0'0"N
25°40'0"N
LEE COUNTY
COLLIER COUNTY
Marco Island
PUBLIC LANDS
Federal
State
Local
Piping Plover Critical Habitat
PRODUCED BY:
US Fish & Wildlife Service
Jacksonville Florida Ecological Services Field Office
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Miles
Kilometers
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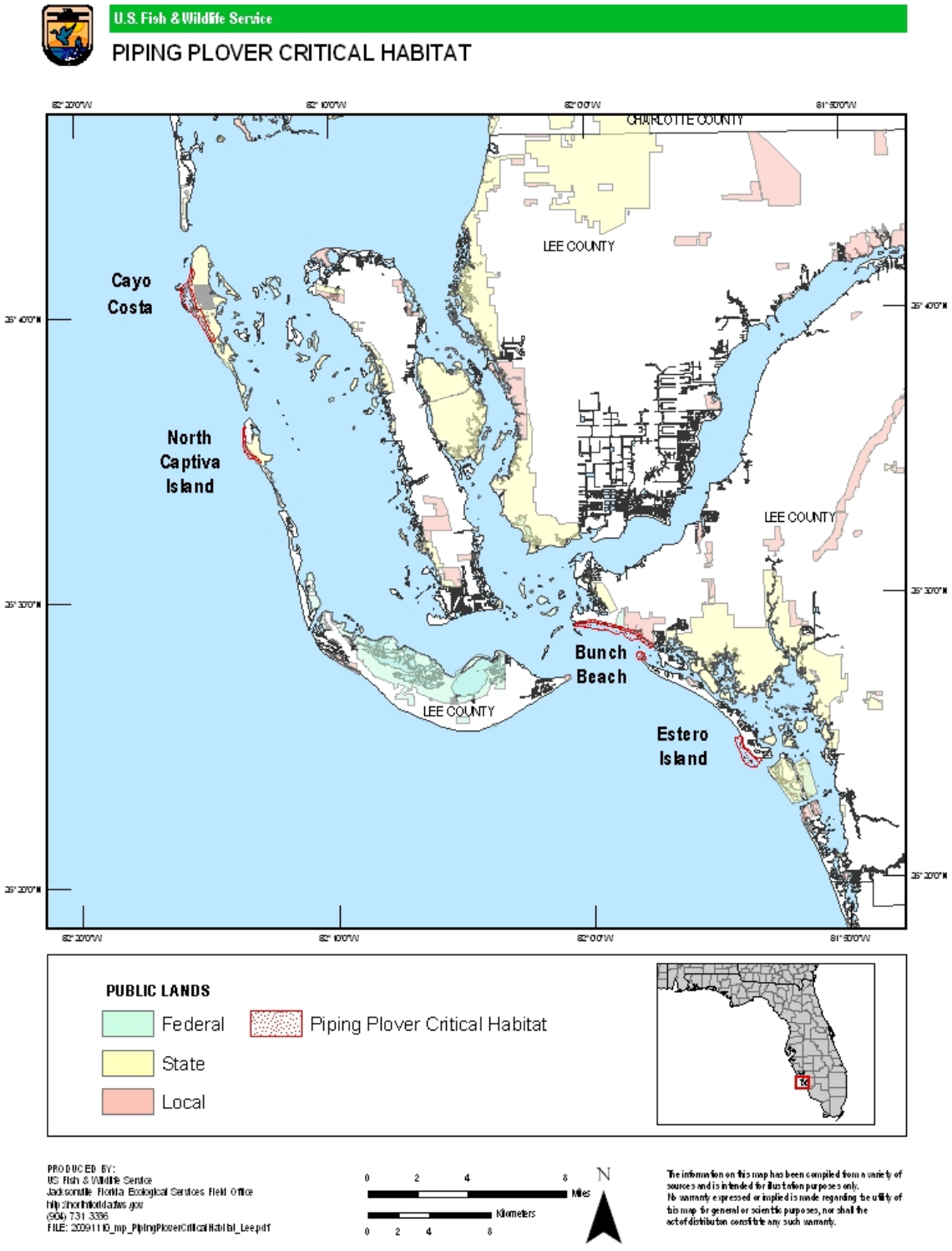
U.S. Fish & Wildlife Service
PIPING PLOVER CRITICAL HABITAT
CHARLOTTE COUNTY
LEE COUNTY
Cayo Costa
North Captiva Island
LEE COUNTY
Bunch Beach
LEE COUNTY
Estero Island
PUBLIC LANDS
Federal
State
Local
Piping Plover Critical Habitat
PRODUCED BY:
US Fish & Wildlife Service
Jacksonville Florida Ecological Services Field Office
http://northfloridafws.gov
(904) 731 3336
FILE: 20091110_mp_PipingPloverCriticalHabitat_Lee.pdf
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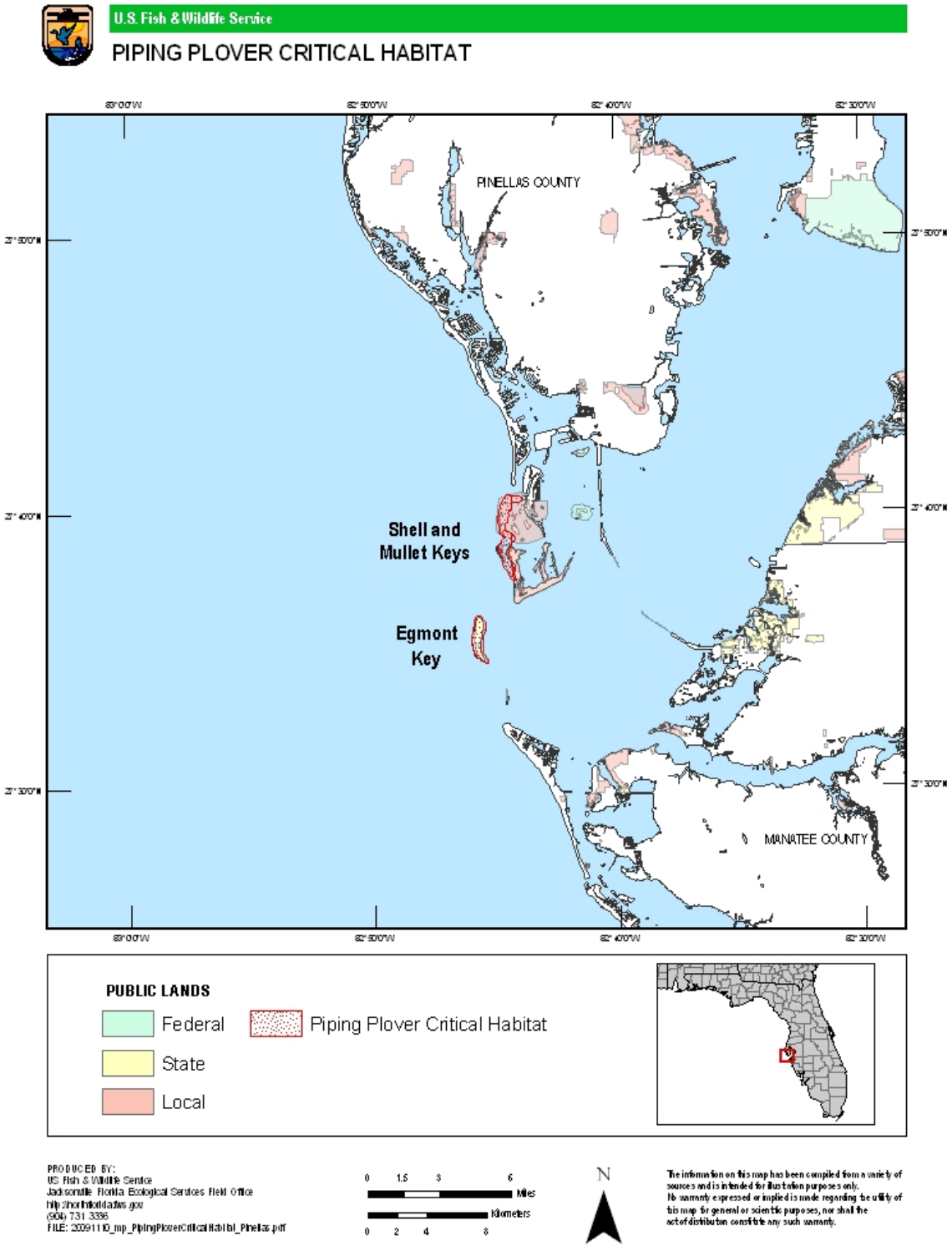
U.S. Fish & Wildlife Service
PIPING PLOVER CRITICAL HABITAT
PINELLAS COUNTY
Shell and Mullet Keys
Egmont Key
MANATEE COUNTY
PUBLIC LANDS
Federal
State
Local
Piping Plover Critical Habitat
PRODUCED BY:
US Fish & Wildlife Service
Jacksonville Florida Ecological Services Field Office
http://northfloridafws.gov
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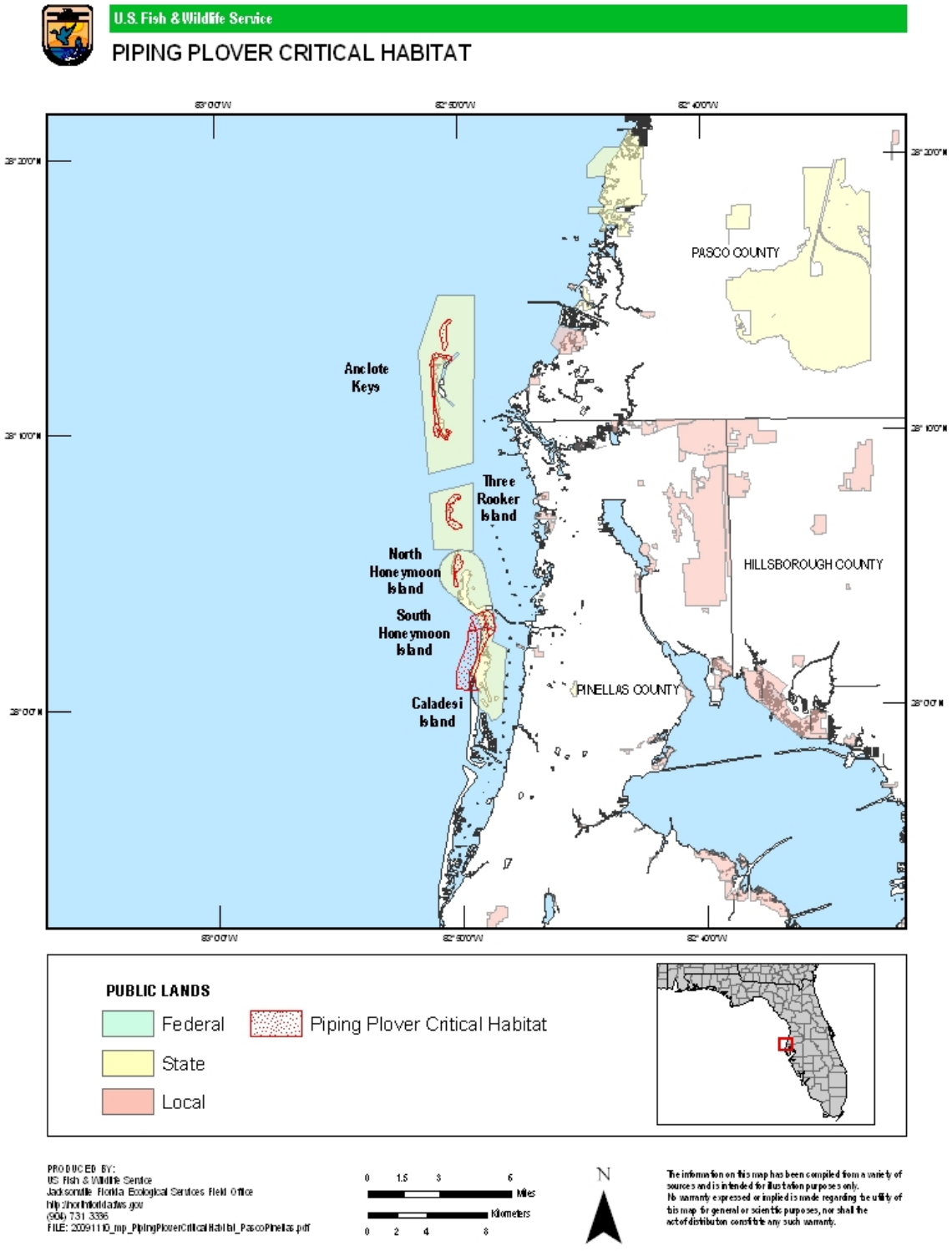
U.S. Fish & Wildlife Service
PIPING PLOVER CRITICAL HABITAT
83°00'W
82°50'W
82°40'W
28°20'N
28°10'N
28°00'N
PASCO COUNTY
Anclote Keys
Three Rooker Island
North Honeymoon Island
South Honeymoon Island
Caladesi Island
HILLSBOROUGH COUNTY
PINELLAS COUNTY
PUBLIC LANDS
Federal
State
Local
Piping Plover Critical Habitat
PRODUCED BY:
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Jacksonville Florida Ecological Services Field Office
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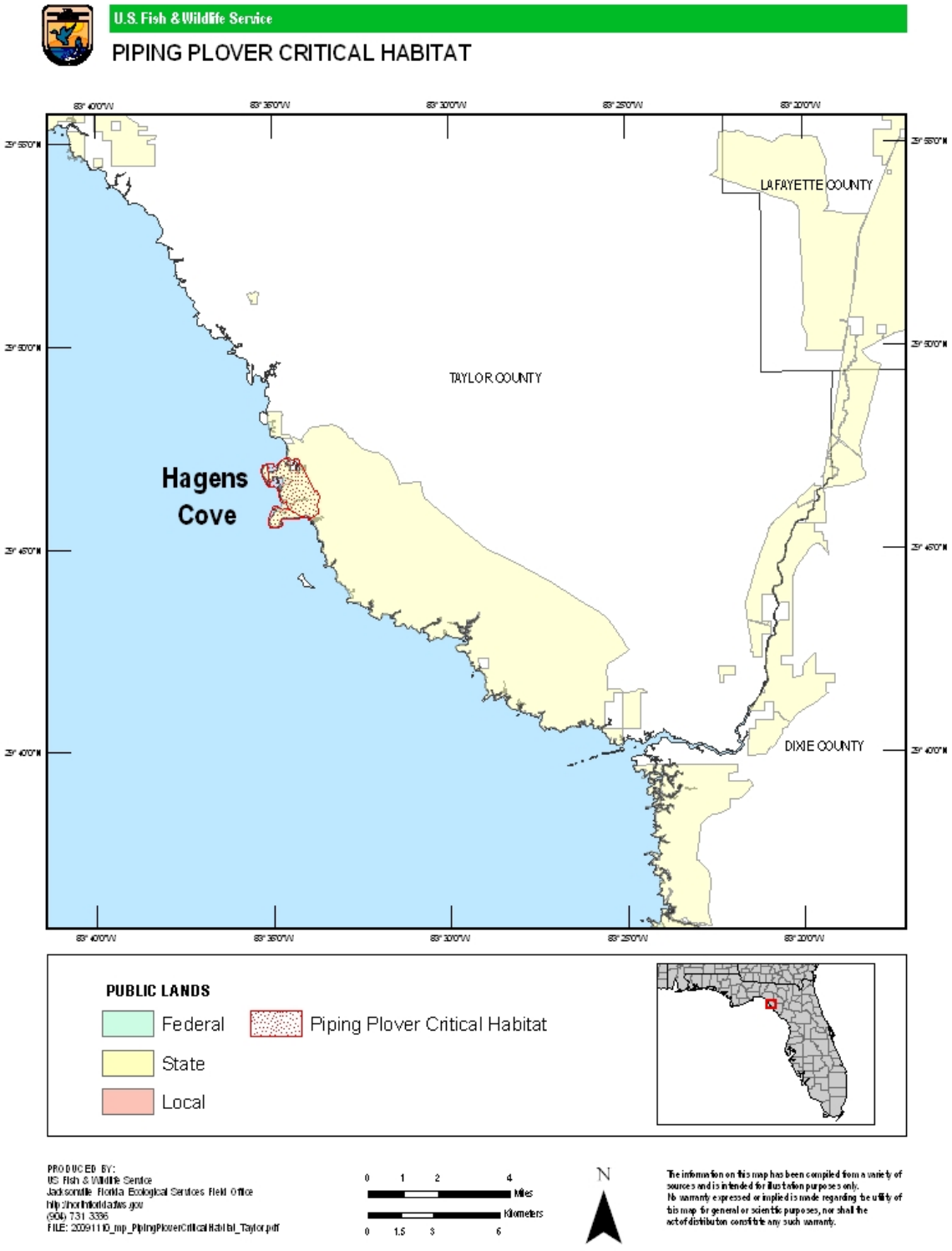
U.S. Fish & Wildlife Service
PIPING PLOVER CRITICAL HABITAT
LAFAYETTE COUNTY
TAYLOR COUNTY
DIXIE COUNTY
Hagens Cove
PUBLIC LANDS
Federal
State
Local
Piping Plover Critical Habitat
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APPENDIX B: EXAMPLE PREDATOR PROOF TRASH RECEPTACLES

Example of predator proof trash receptacle at Gulf Islands National Seashore. Lid must be tight fitting and made of material heavy enough to stop animals such as raccoons.

Example of trash receptacle anchored into the ground so it is not easily turned over.

Example of predator proof trash receptacle at Perdido Key State Park. Metal trash can is stored inside. Cover must be tight fitting and made of material heavy enough to stop animals such as raccoons.

Example of trash receptacle that is secured and heavy enough not to easily be turned over.

Loggerhead Sea Turtle Designated Critical Habitat Analysis to supplement the South Atlantic Regional Biological Opinion

10 November 2015

[Note: The text below is intended to replace relevant sections of the 2008 South Atlantic Regional Biological Assessment (SARBA) and was written to remain consistent with the language of the original document]

Section 3.01.2 Loggerhead Sea Turtle

Subsection "Critical Habitat"

On July 10, 2014, the National Marine Fisheries Service (NMFS) published a final rule in the Federal Register for the designation of critical habitat for the Northwest Atlantic Ocean Loggerhead Sea Turtle Distinct Population Segment (DPS) (Federal Register Vol. 79, No. 132). This ruling established the following 5 critical habitat types based on their Physical or Biological Features (PBFs) and the Primary Constituent Elements (PCEs) that support the PBFs (Figure 1, Table 1):

1. Nearshore reproductive
2. Overwintering
3. Breeding
4. Migratory
5. Sargassum

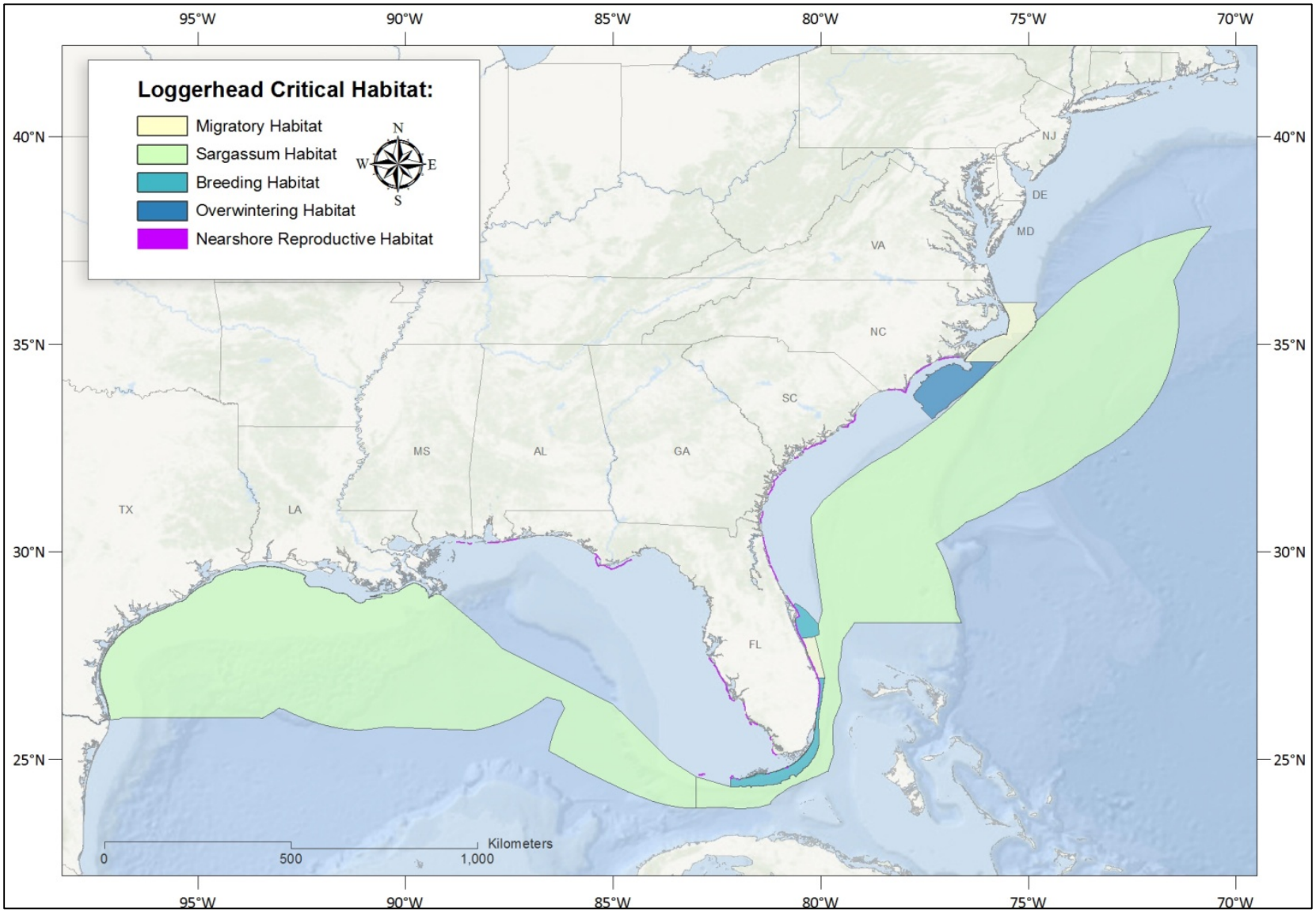

Figure 1. Critical Habitat for Loggerhead sea turtles

Table 1. Description of Critical Habitat types and the associated PCEs

Critical Habitat Type	Geographic Extent Identified by NMFS in Designation	PCEs that support this habitat type
Nearshore Reproductive Habitat	MHW to 1.6 km offshore of high density nesting beaches and adjacent beaches	1) Nearshore waters directly off the highest density nesting beaches and their adjacent beaches; 2) Waters sufficiently free of obstructions or artificial lighting to allow transit through the surf zone and outward toward open waters; and 3) Waters with minimal manmade structures that could promote predators, disrupt wave patterns necessary for orientation, and/or create excessive longshore currents.
Winter Habitat*	Warm water habitat south of Cape Hatteras, North Carolina near the western edge of the Gulf Stream used by a high concentration of juveniles and adults during the winter months.	1) Water temperatures above 10C from November through April; 2) Continental shelf waters in proximity to the western boundary of the Gulf Stream; and 3) Water depths between 20 and 100 m.
Breeding Habitat	The Southern Florida migration corridor from the shore out to the 200 m (656 ft) depth contour along the stretch of the corridor between the Marquesas Keys and the Martin County/Palm Beach County line, and the nearshore waters just south of Cape Canaveral, Florida.	1) High densities of reproductive male and female loggerheads; 2) Proximity to primary Florida migratory corridor; and 3) Proximity to Florida nesting grounds
Constricted Migratory Habitat	Off the coast of North Carolina and Southern Florida. The constricted migratory corridor off North Carolina consists of waters between 36° N. lat. and Cape Lookout (approximately 34.58° N. lat.) from the edge of the Outer Banks, North Carolina, barrier islands to the 200 m (656 ft.) depth contour (continental shelf). The constricted migratory corridor in Florida stretches from the westernmost edge of the Marquesas Keys (82.17° W. long.) to the tip of Cape Canaveral (28.46° N. lat.).	1) Constricted continental shelf area relative to nearby continental shelf waters that concentrate migratory pathways; and 2) Passage conditions to allow for migration to and from nesting, breeding, and/or foraging areas.
***Sargassum* Habitat**	Concentrations of *Sargassum* to support abundant prey and cover	1) Convergence zones, surface-water downwelling areas, the margins of major boundary currents (Gulf Stream), and other locations where there are concentrated components of the Sargassum community in water

		temperatures suitable for the optimal growth of Sargassum and inhabitance of loggerheads; 2) Sargassum in concentrations that support adequate prey abundance and cover; 3) Available prey and other material associated with Sargassum habitat including, but not limited to, plants and cyanobacteria and animals native to the Sargassum community such as hydroids and copepods; and 4) Sufficient water depth and proximity to available currents to ensure offshore transport and foraging and cover requirements by Sargassum for post-hatchling loggerheads, i.e., >10m depth

**Not directly or indirectly within the project action area*

Section 4.02 Sea Turtles

Section 4.02.6 Effect Determination

Subsection on "Critical Habitat"

Based on a review of existing critical habitat designation for leatherback, hawksbill, and green sea turtle species, as well as a review of previous and ongoing dredging project locations, no projects have been documented in or in the vicinity of any existing designated critical habitat. Therefore, the Corps and BOEM conclude that the proposed activities will not affect designated critical habitat for leatherback, hawksbill, and green sea turtle species. As described in Section 3.01.2, Critical Habitat exists for the Northwest Atlantic Ocean Loggerhead Sea Turtle DPS. The following activities and associated impact producing factors may have the potential to affect identified PCE's. Each of these activities is fully described in Section 2 "Proposed Activity" and Sections 4.02.1, 4.02.2, 4.02.3, and 4.02.4:

	Impact Producing Factors							
Proposed Activity	Beach Profile Slope Adjustment/ Equilibration	Turbidity	Sedimentation	Benthic Disturbance / Burial	Bathymetric Change	Temporary Obstructions		
						Submerged/Floating Pipeline	Lighting	Disturbance and/or Relocation Trawling
Beach Placement	X	X	X			X	X	
Bed Leveling		X		X				
Ocean Disposal		X	X	X	X			
Trawling				X				X
Dredging for navigation or beach placement (Hopper, Cutterhead, Mechanical)		X	X	X	X		X	

With the exception of wintering habitat off of North Carolina, each of the critical habitat types directly and/or indirectly overlap with USACE and/or BOEM activities in one or multiple locations. The below sections evaluate the impact producing factors associated with each proposed activity and their potential effect on the PCE's supporting each critical habitat type. It is important to note that within the Economic Analysis associated with the final rule, NMFS states the following:

"*NMFS' primary concerns relative to construction, dredging, and disposal activities include obstructions to transit through the surf zone in nearshore reproductive habitat, manmade structure that attract predators or disrupt wave patterns in nearshore reproductive habitat, artificial lighting in nearshore reproductive habitat, and barriers to passage in constricted migratory corridors. Existing regulations and recommendations provide significant baseline protections to loggerhead habitat. In particular, NMFS makes recommendations to reduce disturbance of loggerheads including timing restrictions, equipment requirements, lighting limits, and turtle monitoring as part of section 7 consultation due to the listing of the species. NMFS has not identified any conservation efforts that may be recommended to avoid adverse effects of these activities on the essential features of critical habitat that would not already be recommended to avoid potential adverse effects on the species itself. That is, NMFS anticipates that it is unlikely that critical habitat designation will generate a change in the outcome of future section 7 consultations due to the presence of critical habitat. This analysis accordingly does not forecast any changes to the scope, scale, or management of construction, dredging, or disposal activities due to critical habitat".*

For the purpose of this effects analysis, it is assumed that all existing terms and conditions outlined in the current 1997 SARBO consultation for the species would be adhered to in order to minimize and/or avoid adverse effects of proposed activities on the essential features of critical habitat. Additionally, only those impact producing factors which may affect the PCEs supporting each critical habitat type are discussed in the subsequent sections.

Nearshore Reproductive Habitat:

The PCEs for nearshore reproductive habitat include waters off the highest density nesting beaches, waters free from obstructions or artificial lighting to allow ingress/egress of turtles, and waters with minimal manmade structures to promote predators and disrupt wave patterns. Nearshore reproductive habitat corresponds to the location of the following proposed activities: Dredging for navigation or beach nourishment, bed leveling, trawling, ocean disposal, and beach placement of sediment.

NMFS states that the primary impacts to nearshore reproductive habitat would come from loss of habitat conditions that allow for "(a) hatchling egress from the water's edge to open water; and (b) nesting female transit back and forth between the open water and the nesting beach during nesting season.

Dredging for Navigation or Beach Placement:

In the designation of Critical Nearshore Reproductive Habitat, NMFS indicates that dredging and disposal activities may "affect habitat conditions for efficient passage of hatchlings or females by creating barriers or dramatically altering the slope of the beach approach". Existing navigation channels may overlap with portions of the nearshore reproductive habitat where the designated unit crosses a channel between two

high nesting beaches; however, no authorized channels are completely within a nearshore reproductive unit. For these channel portions within designated habitat, dredging would occur to excavate sediment to previously dredged and authorized depths and will not affect PCE's supporting Nearshore Reproductive Habitat.

Dredging of sand resource borrow areas located offshore of nesting beaches typically occurs far enough offshore and at dredging depths shallow enough to avoid modifying wave energy reaching the shoreline. Borrow sources for beach nourishment are typically analyzed using an appropriate engineering model to assess potential changes to wave transformation and possible effects on the shoreline associated with varying dredging depths. Based on this analysis and careful consideration of these factors in borrow area site selection and design to avoid adjacent shoreline impacts, dredging of offshore borrow sources would not "dramatically" alter the slope of the "beach approach" or disrupt wave patterns that would impact nesting female or hatchling ingress or egress to/from the beach. Additionally, in the final ruling for critical habitat, NMFS responded to a commenter that, "neither beach nourishment nor the dredging of sand from offshore borrow sites are expected to be significantly impacted by the critical habitat designation as proposed."

Lighting on-board dredges and associated ancillary equipment/vessels is required for safe and efficient operations at night. Lighting associated with navigation and beach nourishment dredging is a temporary occurrence. However, while dredging navigation channels and offshore borrow areas all lighting aboard dredges, support vessels, etc. operating within three nautical miles of sea turtle nesting beaches are limited to the minimal lighting necessary to comply with U.S. Coast Guard and/or OSHA requirements. All nonessential lighting on the dredge and supporting equipment/vessels shall be minimized through reduction, shielding, lowering, and appropriate placement of lights to minimize illumination of the water to reduce potential disorientation effects on female sea turtles approaching the nesting beaches and sea turtle hatchlings making their way seaward from their natal beaches. Through the implementation of minimal lighting requirements on board dredges and associated ancillary equipment, the PCEs that support nearshore reproductive habitat will not be affected.

Bed Leveling:

Bed leveling is occasionally used in navigation dredging in order to level peaks and valleys following dredging and redistribute sediment to achieve required depths within the channel limit. Since there is no change in bathymetry from the authorized depths bed leveling will not block or impede ingress or egress of nesting turtles or their hatchlings. Therefore, the PCEs that support nearshore reproductive habitat will not be affected.

Ocean Disposal:

Ocean disposal of sediments can consist of surfzone (roughly 0 to -5ft MLLW), nearshore (roughly -5 ft to -20 ft MLLW), or offshore placement (roughly seaward of -20 ft MLLW). Disposal or placement of beach compatible sediment associated with navigation dredging may occur within the nearshore environment in order to keep the sediment within the littoral system as a beneficial use. There are a myriad of factors considered when defining the placement location which may include direct placement within the surf zone and/or placement of sediment just offshore of the beach. Though rare, compatible sediment may

also be temporarily placed offshore for later re-handling to place the material on the beach (e.g., the Brevard County, Florida Shore Protection Project, South Reach. Placement both within the surf zone and nearshore system may directly overlap with designated Nearshore Reproductive Habitat whereas ocean disposal in the offshore environment and outside of the littoral system may only indirectly overlap.

Dredged sediment placed directly in the dynamic surf zone is quickly redistributed by breaking waves and associated alongshore and cross-shore currents to conform to the natural system. The purpose of this placement technique is to indirectly build a wider beach berm by placing sediment within the surf zone and allowing for wave action to redistribute sediment to the beach as an alternative to direct beach placement. Within a short period of time, the material placed in the surf zone is redistributed within the system without any residual impediments to egressing hatchlings or ingressing/egressing females. Nearshore placement just offshore of the beach is generally in deeper water and further offshore than surf zone placement but still within the littoral system. Generally, for a nearshore placement, the contractor is required to avoid mounding and significant bathymetric changes within the designated placement site. Though not placed immediately along the beach as described above, the purpose of placing sediment within the nearshore system is to allow the sediment to indirectly feed the beach over time. Placement of sediment within the surf zone/nearshore system may require use of a pipeline to convey the material from the dredge to the placement site. However, a pipeline floating at the surface or located along the sea floor often approaches perpendicular to the beach and would not be an obstruction to ingressing/egressing sea turtles. In fact, by contributing to dry beach habitat, over the long term these activities are likely to have a beneficial effect on loggerhead nesting and therefore positively benefit Nearshore Reproductive Habitat.

Dredged sediment that is not compatible for placement within the littoral system may also be placed offshore in a designated Ocean Dredged Material Disposal Site (ODMDS). Such sites are typically located in deeper water and further offshore. The material is typically placed via a bottom dumping scow or split hull hopper dredge throughout the ODMDS to avoid mounding and significant bathymetric changes. The elevation of the material placed in an ODMDS typically must be low enough for bottom dumping scows or hopper dredges to pass over the site and would not result in an obstruction to ingressing/egressing sea turtles.

While the offshore disposal of sediments will have no effect on Nearshore Reproductive Habitat, the disposal of sediments in the surf zone and nearshore environment may have temporary impacts and long term benefits. Overall, the activity will not adversely modify or destroy Nearshore Reproductive Habitat.

Beach Placement:

Placement of sediment on the beach associated with beach nourishment activities or beneficial use of navigation dredged material requires use of a pipeline to convey the material from the dredge to the placement site. The pipeline typically includes floating and submerged components and approaches perpendicular to the beach. Though the pipeline will be located within the nearshore reproductive habitat, a pipeline floating at the surface or located along the sea floor would not be an obstruction to ingressing/egressing sea turtles and would not affect the PCE's that support nearshore reproductive habitat.

Dredging and placement of compatible sediment on the beach in association with beach nourishment and/or navigation dredging projects will not result in barriers or dramatic altering of the slope of the beach approach for nesting females because of the relatively fast equilibration of the constructed profile. The constructed profile immediately begins to equilibrate to the more natural design profile as the waves redistribute sediment along and cross-shore to the equilibration toe of fill. The beach profile will extend into the nearshore reproductive habitat; however, the slope will quickly adjust and would not block or otherwise impede efficient passage of hatchlings or females. Additionally, in the Final Ruling for the nesting beaches Critical Habitat, USFWS states that processes that "mimic these natural processes" (e.g., beach nourishment) are an important component of the physical and biological features of these high nesting beaches. In many cases, beach nourishment projects create nesting habitat along beaches that would otherwise face persistent erosion. When coupled with coastal development, long term erosion would potentially limit the ability for sea turtles to use these beaches. Since Critical Nearshore Reproductive Habitat is tied to the locations of these high nesting beaches and beach nourishment projects can be essential to maintaining the long term nesting densities on highly erosive beaches, beach nourishment is not likely to adversely modify Critical Nearshore Habitat.

Trawling:

The use of closed and open net trawling to mitigate sea turtle entrainment risk from hopper dredges may be used in association with dredging of navigation channels and borrow areas for beach placement activities. Though trawling activities may disturb the sea floor, they are confined within the vicinity of a defined navigation channel or borrow area. Since these areas are already proposed for disturbance by the dredging itself, any seafloor disturbance from trawling will have no additional effect on the PCEs for Critical Nearshore Reproductive Habitat. Sea turtles swimming ahead of the path of a closed and open net trawler may be disturbed and/or physically relocated away from the previously occupied area. Though these animals are being disturbed and/or relocated from within the water column to avoid the risk of dredging entrainment, operational protocols are in place to avoid harm to the animals and the activity would not significantly impact ingress and egress of nesting females. Therefore, the PCEs that support nearshore reproductive habitat will not be affected.

Wintering Habitat:

The proposed activities will have no effect on Critical Wintering Habitat since this habitat is outside the range of the direct and/or indirect effects of the impact producing factors.

Breeding Habitat:

The PCEs for Critical Breeding Habitat include areas of high densities of reproductive males and females, proximity to the primary FL migratory corridor, and proximity to FL nesting grounds. In the final ruling, NMFS states that the following activities (related to the proposed action) could affect Critical Breeding Habitat: dredging and disposal of sediments, oil spills and response activities.

Dredging for navigation or beach placement:

Existing navigation channels may overlap with portions of the breeding habitat where the designated unit crosses a channel; however, no authorized channels are completely within designated breeding habitat.

For these channel portions within designated habitat, dredging would occur to excavate sediment to previously dredged and authorized depths and will not affect PCE's supporting Critical Breeding Habitat. Dredging of offshore borrow areas for beach fill may occur within the designated breeding habitat. Potential impact producing factors associated with dredging of offshore borrow areas include the removal of sediments and associated turbidity and sedimentation as well as entrainment risk of sea turtles by hopper dredges. The actual borrow areas to be dredged are relatively small compared to the overall habitat and will not significantly modify the bathymetry of the designated area and/or prevent the congregation of reproductive males and females in the vicinity of nesting habitat. Therefore, the PCEs that support the habitat will not be affected because the proposed action will not alter the high concentration of reproductive individuals in the area nor in proximity to the nesting grounds or migratory corridor. There will be no effect on Critical Breeding Habitat.

Bed Leveling:

Bed leveling activities are primarily confined to navigation channels and result in temporary benthic disturbance, burial and elevated turbidity concentrations. This activity does not result in a change from any authorized depth in any of the navigation channels and will not affect the ability for reproductive males and females to congregate within the designated habitat nor affect their proximity to FL nesting grounds. Bed leveling will not affect the PCEs supporting Critical Breeding Habitat, and therefore, will have no effect on Critical Breeding Habitat.

Ocean Disposal:

Placement of dredged material into the surf zone or nearshore environment or into a designated ODMDS may raise the elevation and change the overall bathymetry of the designated site; however, these modifications are confined and would not affect the ability for reproductive males and females to congregate within the designated habitat nor affect their proximity to FL nesting grounds, and therefore will have no effect on the PCEs supporting Critical Breeding Habitat.

Trawling:

The act of trawling can be associated with navigation dredging or dredging of offshore sand borrow areas within or in the immediate vicinity of the designated habitat. Endangered species trawling disturbs the sea floor and may disturb or physically relocate sea turtles on the bottom and/or within the water column in front of the trawler. Though sea turtles may be physically removed from the water using closed net trawlers and relocated outside of the project area, they would not be relocated outside of the designated breeding habitat and the total number of relocated animals would not affect the overall density of reproductive male and female sea turtles located offshore of the nesting grounds. Therefore, the PCEs that support the Breeding Habitat will not be affected and there will be no effect on Critical Breeding Habitat.

Beach Placement:

Beach nourishment activities and the associated impact producing factors such as turbidity, sedimentation, and beach profile adjustment and equilibration during construction of the beach berm as well as the pipelines used to transport sediment from the dredge to the beach may occur within or in the

vicinity of the designated breeding habitat. This activity would not affect the densities of reproductive male and female turtles nor their proximity to nesting grounds in FL. The impact producing factors associated with beach placement activities would have no effect on the PCE's that support the designated breeding habitat because they will not impact the high concentration of reproductive individuals in the area nor the proximity to the nesting grounds or migratory corridor.

Constricted Migratory Habitat:

The PCE's for constricted migratory habitat are: 1) Constricted continental shelf area relative to nearby continental shelf waters that concentrate migratory pathways, and 2) Passage conditions to allow for migration to and from nesting, breeding, and/or foraging areas. The primary impact to the functionality of the identified corridors as migratory routes for loggerhead sea turtles would be a loss of passage conditions that allow for free and efficient migration along the corridor. NMFS states that the primary impact to sufficient passage would be from large scale construction projects or multiple projects that require "large scale deviations in migration movement". Related to the proposed action, NMFS states that dredging or sediment disposal and noise from construction may affect Critical Migratory Habitat, but are less likely to result in an impact to the PCEs. The noise associated with the below activities occurs in an infrequent manner and is temporary and minor. Noise impacts from any of the below activities will not appreciably alter sufficient passage of sea turtles and will not be discussed further in this section.

Dredging for Navigation or Beach Placement:

Existing navigation channels may overlap with portions of the constricted migratory habitat where the designated unit crosses a channel; however, no authorized channels are completely within constricted migratory habitat. For these channel portions within designated habitat, dredging would occur to excavate sediment to previously dredged and authorized depths and will not affect PCE's supporting Constricted Migratory Habitat. Dredging of offshore borrow areas for the purpose of beach placement may occur within the designated habitat. While dredging of borrow areas may change the bathymetry of the borrow area through removal of sand resources from offshore sand shoals, the scale of these actions is small in relation to the overall size of the constricted migratory habitat off the Outer Banks of North Carolina and in Southeastern Florida and would have discountable effects on ocean currents and wave climate. Additionally, though the dredge, support vessels, and associated pipeline will be located within and transiting through the habitat, these activities would not affect the PCE's supporting the Constricted Migratory Habitat designation and impact the functionality of the corridors as migratory routes.

Bed Leveling:

Bed leveling activities are primarily confined to navigation channels and result in temporary benthic disturbance, burial and elevated turbidity concentrations. This activity does not result in a change from any authorized depth in any of the navigation channels and will not block or impede ingress or egress of nesting turtles or their hatchlings. Bed leveling will not affect the PCEs supporting Constricted Migratory Habitat, and therefore, will have no effect on the Critical Habitat.

Ocean Disposal:

Placement of dredged material within the surf zone/nearshore system and/or a designated ODMDS may raise the elevation of the seafloor and change the overall bathymetry of the placement site; however, these modifications are confined and would not impact the functionality of the corridor as migratory habitat. Therefore, dredge material placement in nearshore and offshore disposal areas will not appreciably alter any of the PCEs supporting Constricted Migratory Habitat. Specifically, the action will not alter the passage conditions of the corridor, and therefore, will have no effect on Critical Habitat.

Trawling:

The act of trawling can be associated with navigation dredging or dredging of offshore sand borrow areas within or in the immediate vicinity of the designated habitat. Endangered species trawling disturbs the sea floor and may disturb or physically relocate sea turtles on the bottom and/or within the water column in front of the trawler. Only those sea turtles located within the borrow area and within the immediate path of the trawler may be disturbed or relocated; however, the mitigation trawling activities would not affect passage conditions to allow for free and efficient migration along the corridor to and from nesting, breeding, and/or foraging areas. Though sea turtles may be physically removed from the water using closed net trawlers and relocated outside of the project area, they would not be relocated outside of the designated migratory habitat. Therefore, the PCEs that support Constricted Migratory Habitat will not be affected and there will be no effect on Critical Constricted Migratory Habitat.

Beach Placement:

Beach nourishment activities and the associated impact producing factors such as turbidity, sedimentation, and beach profile adjustment and equilibration during construction of the beach berm as well as the pipelines used to transport sediment from the dredge to the beach may occur within or in the vicinity of the designated breeding habitat in southeast Florida. This activity would not block or otherwise impede efficient passage of hatchlings or females and/or which concentrate hatchling predators and thus result in greater predation on hatchlings. Though floating and/or submerged pipelines may extend through the designated habitat, the PCEs that support the constricted migratory habitat would not be affected. Since the proposed action will not alter the passage conditions of the corridor, beach placement activities would have no effect on the PCE's that support the designated habitat.

***Sargassum* Habitat:**

The PCE's for *Sargassum* habitat consist of convergence zones, downwelling areas, margins of major currents, concentrations of *Sargassum* that support prey, fauna and flora associated with *Sargassum*, and sufficient water depth and proximity to currents to ensure offshore transport to *Sargassum* for hatchling turtles. For the majority of the proposed action area*, Sargassum* habitat is located much further offshore than any of the proposed activities and associated impact producing factors. In Southeast Florida, *Sargassum* habitat is closer to shore but still predominantly located outside of the influence of the proposed activities. Activities affecting *Sargassum* include (1) Commercial harvest; (2) Oil spills and response activities; (3) Vessel operations disposal, release, or spill of harmful waste; (4) Ocean dumping of debris or toxins; and (5) Climate change.

Dredging for Navigation or Beach Placement:

Maintenance dredging of navigation channels throughout the action area will have no effect on any of the PCEs associated with *Sargassum* habitat because it only involves the removal of sediments to return a navigation channel to its authorized depth. Dredging of offshore sediment for beach fill involves the removal of sediments in defined borrow areas. During offshore borrow area dredging operations sedimentation and turbidity may occur; however, sediment dredged for the purpose of beach placement consists of sand and does not contain debris or harmful waste that would impact the PCEs supporting *Sargassum* habitat. The action would have no effect on Critical *Sargassum* Habitat

Bed Leveling:

Maintenance dredging and associated bed leveling activities in navigation channels is located outside of the designated *Sargassum* habitat; thus, the PCEs that support *Sargassum* habitat will not be affected and the action would have no effect on Critical *Sargassum* Habitat.

Ocean Disposal:

Placement of dredged material within the surf zone, nearshore system and/or in a designated ODMDS may result in turbidity and sedimentation within the immediate vicinity of the placement site. However, sediment disposed within the surfzone/nearshore system consists of predominantly sandy material and sediment placed within a designated ODMDS is tested for contaminants prior to dumping to avoid placement of debris or toxins. Ocean disposal of sediment would not appreciably alter any of the PCEs associated with this habitat, and therefore, would have no effect on Critical *Sargassum* Habitat.

Trawling:

The use of closed and open net trawling to mitigate sea turtle entrainment risk from hopper dredges may be used in association with dredging of navigation channels and borrow areas for beach placement activities. Some *Sargassum* located within path of a closed net trawler may be removed from the water column or sea surface during each tow; however, these concentrations would be small and would likely be released back into the water following each tow. While trawling activities may have minor disturbances to the sea floor and small quantities of sargassum, the PCEs that support *Sargassum* habitat will not be affected and the action would have no effect on Critical *Sargassum* Habitat.

Beach Placement:

The placement of sand on beaches will have no effect on *Sargassum* Habitat because it is well outside of the defined boundary for this habitat type.

Subsection "Summary of Critical Habitat Effect Determination"

Proposed Activity	Impact Producing Factors	Critical Habitat Type	Effects Conclusions
Beach Placement	beach profile slope adjustment/equilibration, turbidity, sedimentation, lighting, submerged/floating pipeline, noise	*Nearshore Reproductive Habitat*	May affect, not likely to adversely modify
		Wintering Habitat	No effect
		Breeding Habitat	No effect
		Constricted Migratory Habitat	No effect
		Sargassum Habitat	No effect
Bed Leveling	benthic disturbance / Burial, turbidity	*Nearshore Reproductive Habitat*	No effect
		Wintering Habitat	No effect
		Breeding Habitat	No effect
		Constricted Migratory Habitat	No effect
		Sargassum Habitat	No effect
Ocean Disposal	turbidity, sedimentation, bathymetric change, benthic disturbance/burial	*Nearshore Reproductive Habitat*	May affect, not likely to adversely modify
		Wintering Habitat	No effect
		Breeding Habitat	No effect
		Constricted Migratory Habitat	No effect
		Sargassum Habitat	No effect
Trawling	benthic disturbance, vessel strike, disturbance and/or relocation of sea turtles from the water column	*Nearshore Reproductive Habitat*	No effect
		Wintering Habitat	No effect

		Breeding Habitat	No effect
		Constricted Migratory Habitat	No effect
		Sargassum Habitat	No effect
Dredging for navigation or beach placement	benthic disturbance, turbidity, sedimentation, lighting, bathymetric change, entrainment, vessel strike, noise	*Nearshore Reproductive Habitat*	No effect
		Wintering Habitat	No effect
		Breeding Habitat	No effect
		Constricted Migratory Habitat	No effect
		Sargassum Habitat	No effect

US Army Corps of Engineers®

BOEM
Bureau of Ocean Energy Management

Endangered Species Act – Section 7 Consultation

South Atlantic Regional Biological Assessment (SARBA)

Joint Consultation

US Army Corps of Engineers, South Atlantic Division (Lead Agency)

and

Bureau of Ocean Energy Management

Activity: Maintenance dredging and sediment placement activities in coastal waters, navigation channels, and placement and borrow areas in the South Atlantic Ocean to support USACE and BOEM missions.

Project Area: North Carolina/Virginia Border through and including Key West, Florida and the Islands of Puerto Rico and the U.S. Virgin Islands (USVI)

June 2017

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Civil Works (1990-2006) and Regulatory (1987-2008) Historical Dredging Information

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Biological Assessment and NMFS Biological Opinion for use of the sidecast dredges *Fry*, *Merritt,* and *Schweizer,* and the split hull hopper dredge *Currituck* in coastal United States waters

Appendix A2-4

(1) Dredging Operations Technical Support (DOTS) program—SAD request for technical assistance: Bed leveling following dredging operations, July 2003

(2) Biological assessments for research and compilation of baseline data for the use of bed-leveling devices at Port Canaveral, Port Everglades, Miami Harbor and Palm Beach, Florida, January 2006

Appendix A2-5

Effectiveness of relocation trawling during hopper dredging for reducing incidental take of sea turtles, Dena Dickerson, et al.

Appendix A2-6

NMFS Biological Opinion on the USACE maintenance dredging of the Ports and Intracoastal Waterway within the range of Johnson's seagrass: as adopted from the September 1998 Conference Opinion

Appendix A2-7

Dredging impacts on sea turtles in the Southeastern US: A historical review of protection, Dena Dickerson, et alia

Appendix A2-8

USACE sea turtle inspection checklist for hopper dredges: Civil Works and Regulatory projects

Appendix B

Detailed project description information provided by Wilmington District, Charleston District, Savannah District and Jacksonville District for operations & maintenance navigation projects, ocean dredged material disposal sites, coastal storm risk management (CSRM) projects (including a spreadsheet of Regulatory Program permitted CSRM projects) and borrow areas (including borrow areas on the outer continental shelf in the Bureau of Ocean Energy Management's jurisdiction).

Appendix C

Updated bed-leveling information, including:

(1) Biological Assessment, USACE Savannah District, Brunswick and Savannah Harbors, Georgia, Entrance Channel Maintenance Dredging, Field Study of Bed Levelers and Closed-Net Trawlers with Hopper Dredges, 19 September 2012

(2) Biological Opinion, National Marine Fisheries Service Southeast Regional Office, to the Savannah District analyzing the proposed use of a bed leveler and closed-net trawling within the entrance channels of Brunswick Harbor and Savannah Harbor, December 4, 2012.

(3) Biological Opinion, National Marine Fisheries Service Southeast Regional Office, to the Savannah District analyzing the proposed use of a bed leveler and closed-net trawling within the entrance channels of Brunswick Harbor and Savannah Harbor, December 23, 2013.

(4) Bed Leveler Evaluation Report, USACE Savannah District, January 2015

Appendix D

Management Protocol for Effective Implementation of Hopper Dredging Activities Operating Under the National Marine Fisheries Service (NMFS) South Atlantic Regional Biological Opinion (SARBO), USACE South Atlantic Division, December 2016 (supersedes Appendix A1).

Appendix E

North Atlantic Right Whale Conservation Plan

Appendix F

Corals Impact Assessment

Appendix G

Loggerhead Critical Habitat Analysis

Appendix H

Green Sea Turtle Distinct Population Segment Analysis

Appendix I

North Atlantic Right Whale Critical Habitat Analysis

Appendix J

Humpback Whale Distinct Population Segment Analysis

Appendix K

Atlantic Sturgeon 7(a)(2)(d) analysis

Appendix L

2001 Biological Opinion for Jacksonville District on Johnson's seagrass

1.0 BACKGROUND

The U.S. Army Corps of Engineers (USACE) and Bureau of Ocean Energy Management (BOEM) are requesting a programmatic biological opinion under Section 7 of the Endangered Species Act from the National Marine Fisheries Service (NMFS) for their specific activities within NMFS jurisdiction. Species to be assessed include: endangered smalltooth sawfish (*Pristis pectinata*); threatened North Atlantic distinct population segment (DPS) green sea turtle (*Chelonia mydas*), endangered hawksbill sea turtle (*Eretmochelys imbricata*), endangered leatherback sea turtle (*Dermochelys coriacea*), endangered Kemp's ridley sea turtle (*Lepidochelys kempii*), and threatened loggerhead sea turtle (*Caretta caretta*); threatened Johnson's seagrass (*Halophila johnsonii*); threatened corals including, elkhorn coral (*Acropora palmata*), staghorn coral (*Acropora cervicornis*), Boulder star coral (*Orbicella franksi); mountainous star coral (Oricella faceolata); Lobed star coral (Orbicella annularis); Rough cactus coral (Mycetophyllia ferox); Pillar coral (Dendrogyra cylindrus)*; endangered shortnose sturgeon (*Acipenser brevirostrum*), endangered Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), endangered Sperm whale (*Physeter microcephalus)*, and endangered North Atlantic Right Whale (*Eubalaena glacialis);* threatened Nassau grouper (*Epinephelus striatus)*, threatened scalloped hammerhead (*Sphyrna lewini)*, and proposed threatened giant manta ray (*Manta birostris*). We request a programmatic biological opinion for specific activities that the USACE and BOEM have determined may affect, and are likely to adversely affect listed species and critical habitat. We also request a programmatic concurrence for all other activities that the USACE and BOEM have determined are not likely to adversely affect designated critical habitats.

1.01 Consultation History – US Army Corps of Engineers (USACE)

This biological assessment is a result of the joint request from the USACE South Atlantic Division (SAD) and the Minerals Management Service (now known as BOEM) on April 30, 2007, to reinitiate consultation under Section 7(a)(2) of the Endangered Species Act for the continued hopper dredging of channels and borrow areas in the southeastern United States (NMFS 1997b).

Section 7(a)(2) consultation for a new South Atlantic Regional Biological Opinion has had long history and many changes that have led to the development of this newest revision in the form of a Programmatic Assessment.

Prior to 1991, each District within the SAD prepared individual project biological assessments and received biological opinions from the NMFS for each dredging event. NMFS later determined that individual consultations did not accurately assess regional implications of dredging actions and decided to develop a single Regional Biological Opinion (RBO) that would address the dredging of channels and subsequent beach nourishment activities along the Atlantic coast from North Carolina through Florida. The following list identifies the consultation history pertaining to the development of the NMFS's RBOs.

(a). National Marine Fisheries Service (NMFS). Biological Opinion dated November 25, 1991. Dredging of Channels in the Southeastern United States from North Carolina through Cape Canaveral Florida. NMFS Southeast Regional Office, St Petersburg, FL. 27 PP.

The 1991 RBO stated that continued unrestricted hopper dredging along the Southeast Region's Atlantic coast could jeopardize the continued existence of listed sea turtles. Therefore, a reasonable and prudent alternative provided in the RBO included seasonal restrictions of hopper dredging from 1 December through 31 March in channels from North Carolina through Canaveral Harbor, Florida; however, seasonal restrictions could be adjusted on a channel specific basis with appropriate supporting evidence. The implementation of seasonal restrictions on hopper dredge operations proved effective in reducing sea turtle takes throughout the South Atlantic; however, more research assessing sea turtle abundance within channels was recommended by NMFS (NMFS, 1991a). This RBO concluded that hopper dredging was unlikely to jeopardize the continued existence of NARW whales, contingent upon the institution of precautionary measures, including a NARW whale "watch." The RBO also concluded that other types of dredges, including clam shell, pipeline, split-hull hopper dredge Currituck, and sidecast dredges, were unlikely to adversely affect sea turtles. An incidental take statement of two Kemp's ridley, or five green, hawksbill or leatherback turtles mortalities, or fifty loggerhead turtle mortalities was provided. Re-initiation of consultation was triggered for any project in which five turtles were taken.

(b) National Marine Fisheries Service (NMFS). Biological Opinion dated August 25, 1995. Hopper Dredging of Channels and Beach Nourishment Activities in the Southeastern United States from North Carolina through Florida East Coast. NMFS Southeast Regional Office, St. Petersburg, FL. 25 PP.

The 1995 RBO covered beach nourishment activities, prohibited regular maintenance dredging by hopper dredge in Canaveral Harbor, eliminated a dredging window from North Carolina through Pawleys Island, SC, adjusted dredging windows for other harbors in the Southeast, and included incidental take for seven Kemp's Ridleys, seven green turtles, two hawksbills, twenty loggerhead turtles, and 5 shortnose sturgeon.

This new RBO was developed in response to a new Regional Biological Assessment (RBA) provided by the USACE, requesting that NMFS consider expansion of the dredging window based on: (1) the USACE conservative take record since 1991, (2) the willingness to continue dredging in the cooler months, during periods of reduced risk, to the maximum extent practicable, (3) the willingness to shut down when take numbers exceed anticipated numbers, and (4) the implementation of the turtle deflecting draghead on all hopper dredges to reduce take. This RBA incorporated a 1995 study performed by Dickerson, *et. al*. which evaluated sea turtle abundance in six South Atlantic U.S. channels (Canaveral Harbor, FL; Kings

Bay, FL; Brunswick Harbor, GA; Savannah Harbor, GA; Charleston Harbor, SC; and Morehead City Harbor, NC) and looked at species composition, population structure, and spatial and temporal (seasonal) distributions. This study was the first to scientifically evaluate sea turtle abundance and temporal distribution and concluded that fewer sea turtles were captured when water temperatures were at or below 16°C; thus, 16°C was recommended as a conservative threshold indicator for a reduced risk of sea turtle take during hopper dredging operations in the Atlantic. Though this study helped define water temperature as a critical factor in sea turtle occurrence within these six channels, additional studies were recommended to refine site specific factors that may influence sea turtle presence (*i.e.* immigration/emigration periods, influence of coastal dynamics on water temperature, etc.).

Recognizing the new information gathered by Dickerson *et al*. (1995) and subsequent documentation in the RBA, the 1995 NMFS BO did not include a hopper dredging window from Pawley's Island, SC through North Carolina or Titusville, FL to Key West, FL. Furthermore, the dredging windows from Pawley's Island, SC to Tybee Island, GA and from Tybee Island, GA to Titusville, FL were expanded to 1 November to 31 May and 1 December to 15 April respectively (NMFS, 1995a). However, a series of new Terms and Conditions were identified to minimize take including an emphasis on the incorporation of the new turtle deflecting draghead as a mechanism to reduce takes.

(c). National Marine Fisheries Service (NMFS). Interim Biological Opinion dated April 9, 1997. The Continued Hopper Dredging of Two Channels and Two Borrow Areas in the Southeastern United States During 1997. NMFS Southeast Regional Office, St. Petersburg, FL.

The USACE hopper dredging activities in channels and borrow areas along the southeastern coast of the United States during the spring of 1997 resulted in an unanticipated high rate of sea turtle takes and were rapidly approaching the incidental take level established in the 25 August 1995 RBO issued to the USACE. According to the 1995 RBO, re-initiation of consultation was prescribed if more than one turtle was taken in any day, or five were taken in any one channel. Additionally, re-initiation of formal consultation was required if 75 percent of the incidental take limit was reached. The interim consultation addressed the use of hopper dredges during 1997 in the Atlantic portion of the USACE South Atlantic Division, including Morehead City Harbor, Wilmington Harbor, and the Myrtle Beach and Miami borrow areas (NMFS, 1997a). For these three projects, the incidental take total for loggerhead sea turtles was increased by 15.

(d). National Marine Fisheries Service (NMFS). Biological Opinion dated September 25, 1997. The Continued Hopper Dredging of Channels and Borrow Areas in the Southeastern United States. NMFS Southeast Regional Office, St. Petersburg, FL.

This opinion was written to amend the 1995 opinion and supersede the 1997 interim opinion. It set an annual (FY) documented incidental take of seven Kemp's ridleys, seven greens, two hawksbills, thirty-five loggerheads, and 5 shortnose sturgeon, and clarified monitoring requirements for beach nourishment projects. Furthermore, the hopper dredge windows, as established in the 1995 opinion, were incorporated into the 1997 RBO for hopper dredging along the South Atlantic coast, provided the USACE continued to minimize sea turtle takes by refining the turtle deflecting dragheads, continue working in the cool water months to the maximum extent practicable, and shutting down operations when high numbers of turtle takes occur before approaching the incidental take limit for a given species (NMFS, 1997b). Prior to the release of the 1997 RBO, NMFS required the USACE to implement a SAD protocol (Appendix A2-1) to effectively manage take numbers throughout each district. This protocol expresses the USACE commitment to dredge during cool water periods in channels where sea turtle abundance is high or where substrates render the turtle deflecting draghead ineffective.

(e.). U.S. Army Corps of Engineers and US Dept. of Interior, Minerals Management Service. South Atlantic Regional Biological Assessment for dredging activities in the coastal waters, navigation channels (including designated Ocean Dredged Material Disposal Sites and sand mining areas in the South Atlantic Ocean. Submitted to National Marine Fisheries Service. September 2008.

On March 23, 2006 the USACE Jacksonville District, submitted a request to initiate consultation with NOAA Fisheries under Section 7 of the Endangered Species Act (ESA) for the use of bed leveling devices for associated cleanup activities after cutterhead, hopper, and mechanical dredging in four ports on the east coast of Florida. In a letter received on June 23, 2006, NMFS made the determination that bed leveling is part of the hopper dredging activity previously consulted on in the 1997 SARBO and as such, triggers the re-initiation criteria spelled out in 50 CFR § 402.16(c) "if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion." Furthermore, NMFS determined that 50 CFR § 402.16(d) also applies to the RBO, "If a new species is listed or critical habitat designated that may be affected by the identified action." On July 06, 2006, the USACE Jacksonville District office (SAJ) received an email from NMFS providing guidance on the procedures the USACE should follow during re-initiation in order to cover the current use of bed levelers. On December 29, 2006 NMFS sent a letter to SAJ regarding the status of ESA section 10(a)(1)(A) scientific research permits for the relocation of sea turtles related to hopper dredging activities in the southeastern United States. The letter stated NMFS's intent to phase out relocation trawling through the use of section 10(a)(1)(A) permits by letting current permits expire and recommended the USACE reinitiate consultation for dredging activities in the south Atlantic such that a new biological opinion and incidental take statement would

cover relocation trawling associated with dredging activities. Informal communication and coordination with NMFS began at this time and on July 25, 2007, a conference call was held with participants from the USACE and NMFS to discuss the scope of the new biological assessment for dredging activities in the south Atlantic along with a schedule for preparation and submission. On April 30, 2007, the USACE SAD sent a letter to NMFS formally requesting re-initiation of consultation under Section 7 of the Endangered Species Act (ESA), in regard to the 1997 SARBO.

On September 12, 2008, USACE SAD and the Department of Interior's Bureau of Ocean Energy Management (BOEM) (formerly the Bureau of Ocean Energy Management, Regulation and Enforcement, and before that the Minerals Management Service) jointly prepared the South Atlantic Regional Biological Assessment (SARBA) 2008 to provide new information and analysis for a revised and updated SARBO.

1.02 Consultation History – Bureau of Ocean Energy Management (BOEM)

Public Law 103-426 (43 U.S.C. 1337(k)(2)) was passed in October 1994, enabling the BOEM to authorize the use of Outer Continental Shelf (OCS) sand, gravel, or shell resources in approved projects. Potential borrow areas are typically identified during the feasibility phase of beach nourishment, coastal restoration, or construction projects, a process which generally occurs well in advance of formal application to the BOEM for the use of OCS sand, gravel, and shell resources. Consequently, coordination between federal agencies to facilitate joint consultation is challenging.

BOEM involvement with ESA Section 7 consultations with NMFS regarding offshore dredging activities in the South Atlantic dates to 1995 with the Duval County Shore Protection Project (FL) and Myrtle Beach Storm Risk management Project (SC). Since that time, BOEM continues to receive individual biological opinions for dredging activities in the OCS.

For the purposes of this consultation, USACE and BOEM are proceeding under the joint consultation provisions of 50 CFR 402.07 for dredging operations on the OCS and ensuing sand placement. Pursuant to 50 CFR 402.07, USACE wishes to assume the responsibility of lead agency for purposes of this regional ESA consultation.

1.03 Basis for Re-initiation

Since the submission of the 2008 SARBA, USACE and BOEM staff have continued to work with NMFS staff to respond to data needs, newly listed species, and numerous information requests. The following discussion summarizes some of the coordination since 2008.

On July 1, 2010, NMFS SERO submitted a request to SAD for additional information to revise the SARBO and raised certain areas of concern. In a letter dated August 9, 2010, SAD provided NMFS SERO with the requested information; however, the letter acknowledged that at least one

issue remained unresolved. During July 2012, SAD and NMFS SERO staff met to discuss revising and updating the SARBO. On November 6, 2013, NMFS SERO sent a second request for information letter. SAD has been coordinating with NMFS to clarify the request and provide appropriate information.

On February 7, 2014, SAD submitted a request to NMFS SERO asking for NMFS SERO the issuance of an "interim supplement" to the 1997 SARBO to address recent listings of the Atlantic sturgeon and smalltooth sawfish and to provide incidental take for Atlantic sturgeon. NMFS SERO declined the request for an "interim supplement," but clarified that while the reinitiation of consultation is ongoing, SAD should continue to conduct dredging operations under the Terms and Conditions of the 1997 SARBO and SAD's internal protocols for managing endangered species interactions with dredging. NMFS SERO recommended the preparation of an Endangered Species Act Section 7(a)(2)/7(d) jeopardy analysis. Via a letter dated April 25, 2014, SAD submitted a ESA Section 7(a)(2)/7(d) jeopardy analysis for Atlantic sturgeon, concluding that dredging actions covered by the SARBO would not jeopardize the existence of Atlantic sturgeon.

On November 10, 2015, in response to the NMFS final rule designating critical habitat for the loggerhead sea turtle, SAD submitted to NMFS SERO an analysis of the effects of SARBO-covered dredging and beach placement actions on loggerhead designated critical habitat.

NMFS SERO, USACE and BOEM biologists have been coordinating the drafting of updates/revisions to the 1997 SARBO and the 2008 SARBA. Over the years, USACE and BOEM have submitted numerous documents to address the needs of the NMFS as well as newly listed species/critical habitat/distinct population segments. These documents are incorporated by reference and include the following:

- Loggerhead Critical Habitat Analysis (Appendix G)
- North Atlantic Right Whale Critical Habitat Analysis (Appendix I)
- Green Sea Turtle Distinct Population Segment Analysis (Appendix H)
- Draft North Atlantic Right Whale Conservation Plan (Appendix E)
- Humpback Whale Distinct Population Analysis (Appendix J)
- BOEM proposed lease areas (Appendix B)
- Detailed Project Descriptions from USACE Wilmington, Charleston, Savannah, and Jacksonville Districts covering all current actions to be covered under this consultation (Appendix B)

The USACE SAD and BOEM have prepared this revision to the 2008 SARBA to specifically address NMFS 2016 request for the development of Project Design Criteria (PDC) for each of the proposed actions under the SARBA in order for them to issue a Programmatic Biological Opinion. NMFS (2011) states that "Programmatic consultations can be used to evaluate the expected effects of groups of related agency actions expected to be implemented in the future, where

specifics of individual projects such as project location are not definitively known. A programmatic consultation must identify project design criteria (PDCs) or standards that could be applicable to all future projects implemented under the consultation document. PDCs serve to prevent adverse effects to listed species, or to limit adverse effects to predictable levels that will not jeopardize the continued existence of listed species or destroy or adversely modify critical habitat, at the individual project level or in the aggregate from all projects implemented under the programmatic opinion." PDCs represent the suite of protective measures in place that the USACE and BOEM will implement for each proposed action. If projects take place in an area of known Critical Habitat, additional PDCs are stated. Some PDCs are discretionary, whereas others are binding.

Under this approach, when a new project is proposed by an action agency, NMFS (2011) states that, "Programmatic consultations allow for streamlined project-specific consultations because much of the effects analysis is completed up front in the programmatic consultation document. At the project-specific consultation stage, a proposed project is reviewed to determine if it can be implemented according to the PDCs, and to evaluate or tally the aggregate effects that will have resulted by implementing projects under the programmatic consultation to date, including the proposed project."

1.04 Purpose

The purpose of this document is to address the elements required by NMFS for them to prepare a programmatic Biological Opinion specifically by providing detailed information on the proposed action, specifics on the current projects to be assessed, PDCs relevant to the protection of threatened and endangered species, effects of the proposed actions, management of the program, and reporting of incidental take of threatened and endangered species. References to the USACE in the ensuing text should be read to also include consultation with BOEM when BOEM authority over OCS sand resources applies.

2.00 PROPOSED ACTIVITY

2.01 Action Area

The action area (defined in 50 CFR 402.02 as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action") is the U.S. territorial coastal waters, navigation channels, and borrow areas in the South Atlantic ocean including OCS sand resources under BOEM jurisdiction, from the North Carolina/Virginia border through and including Key West, Florida, and the Islands of Puerto Rico and the US Virgin Islands (USVI), including nearshore waters adjacent to coastal beaches, the Atlantic Intracoastal Waterway and the U.S. Environmental Protection Agency (EPA) designated Ocean Dredged Material Disposal Sites (ODMDS) for the navigation channels. The USACE action area includes all areas from the North Carolina/Virginia border through and including Key West, Florida, and the Islands of Puerto Rico and the US Virgin Islands (USVI) that are within the boundaries of the South Atlantic Division, except for Mobile District (Figure 1). The Jacksonville District Regulatory Division has

jurisdiction in the Florida panhandle, which overlaps with the Mobile District's civil works program. However, activities in the panhandle of Florida are covered under the Gulf Regional Biological Opinion and are not included in this assessment. The BOEM action area includes the Straits of Florida Planning Area, South Atlantic Planning Area, and portions of the Mid-Atlantic Planning Area south of the North Carolina/Virginia border (Figure 2).

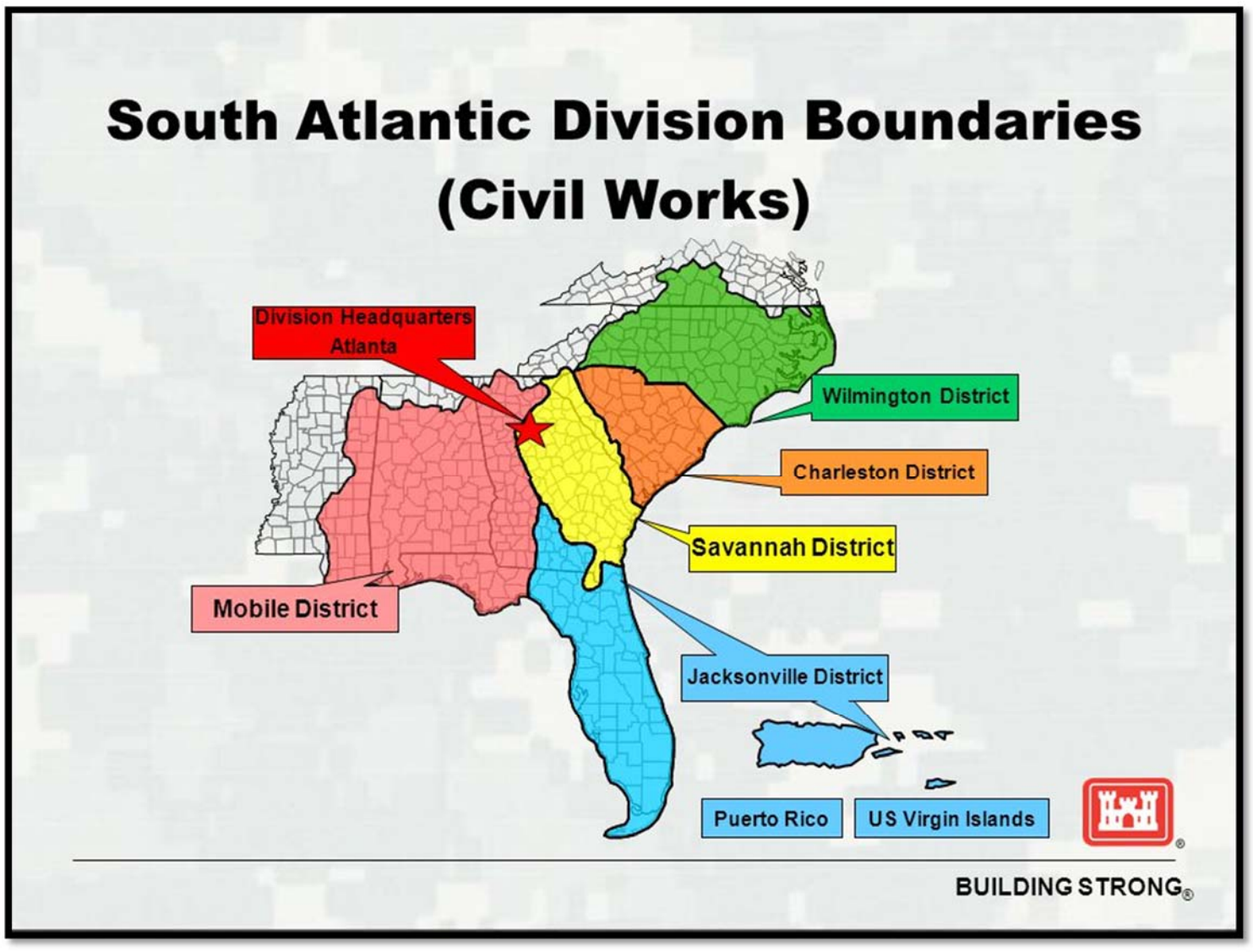


Figure 1. Map of the USACE Action Area (NC/VA border through and including the FL Keys, Puerto Rico and the US Virgin Islands)

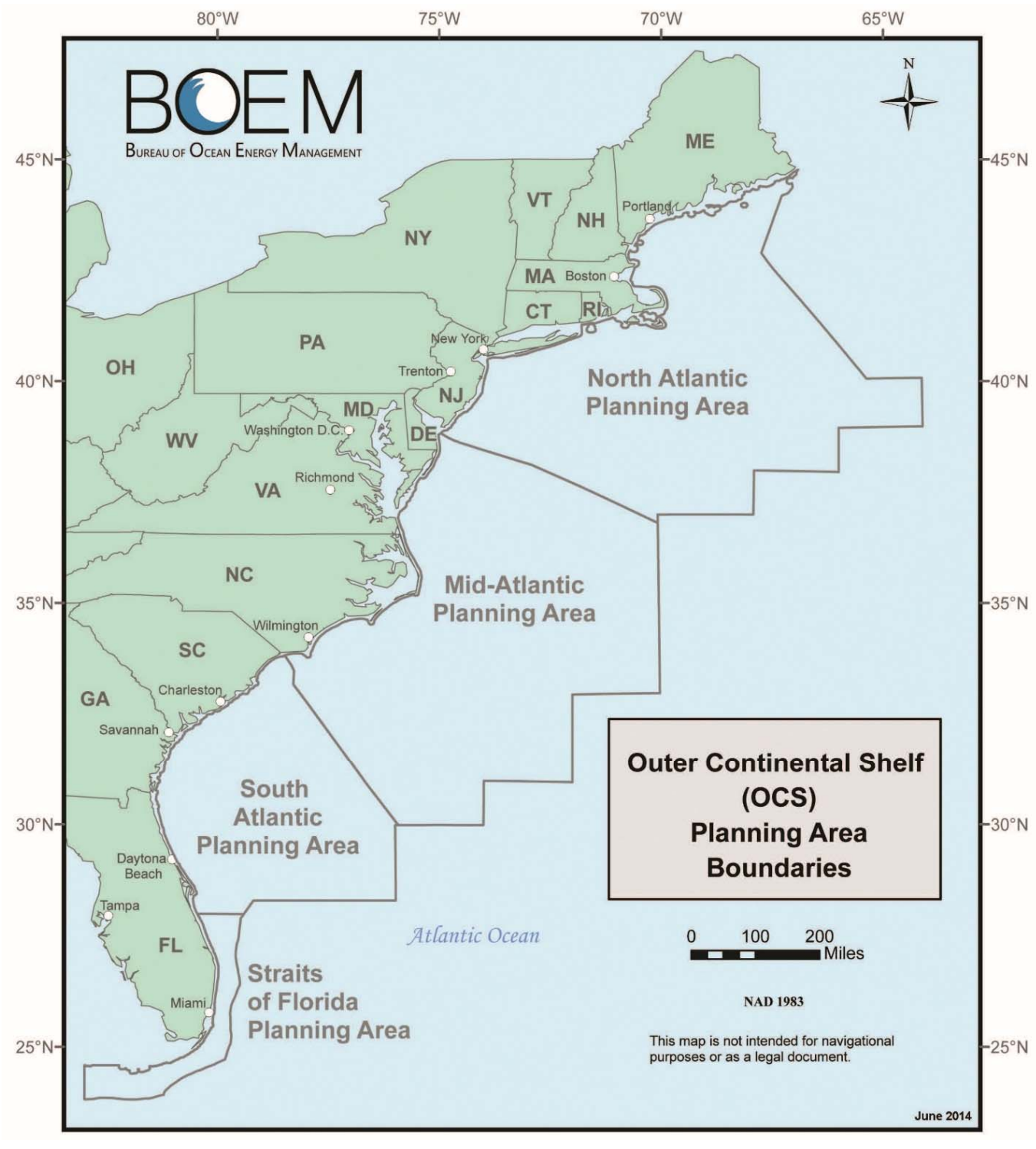


Figure 2. Map of the BOEM's Planning Area Boundaries within the South Atlantic (NC/VA border through and including the FL Keys, Puerto Rico and the US Virgin Islands)

2.02 Proposed Action (USACE & BOEM)

2.02.1 USACE Proposed Action Summary:

USACE has been responsible for the development and maintenance of navigable waterways in the US since the 1800's. The role of USACE with respect to navigation is to provide safe, reliable, and efficient waterborne transportation systems for the movement of commerce, national security needs, and recreation (Verna and Pointon 2000). For details on the USACE navigation dredging program and regarding dredged equipment and dredged material management please refer to USACE Engineering Manual (EM) 1110-2-5025 (Dredging and Dredged Material Management).

The proposed action includes the necessary components of the USACE and BOEM to accomplish various aspects each agency's missions. The following actions will be associated with a number to facilitate further discussion of the details of the actions, the PDCs associated with the action and the effects of the proposed action. The proposed action includes:

Proposed Action #1 (Navigation Dredging):

Congressionally authorized and federally-sponsored (i.e. federally-funded or partially federally-funded) or federally-permitted dredging activities for maintenance of South Atlantic coastal navigation channels (including coastal North Carolina, South Carolina, Georgia, Florida Atlantic Coast, Puerto Rico, and the US Virgin Islands) within Atlantic Coast Districts of USACE's South Atlantic Division (i.e. Wilmington, Charleston, Savannah, and Jacksonville Districts). The Atlantic Intracoastal Waterway (AIWW) and maintenance dredging of newly constructed or recently improved navigation channels is also included.

This action includes the discretionary use of sea turtle abundance trawling, relocation trawling of sea turtles, sturgeon, and sawfish, non-capture trawling, tissue sampling of sea turtles and sturgeon, insertion of Passive Integrated Transponder (PIT) tags, and attachment of satellite tags, acoustic tags, position data loggers or other similar external, relatively non-intrusive, non-permanent, scientific data gathering devices (e.g., "crittercams," remote-control cameras to monitor feeding/behavior strategies, instruments to determine time at depth, water temperature, sound reception, etc.) onto a sea turtle and/or sturgeon and/or sawfish captured pursuant to relocation trawling. The action also includes the installation of screening on dredging equipment (e.g. cutterhead, draghead, etc.) for the purpose of excluding undesirable material (e.g. munitions and explosives of concern (MEC), rock, and/or other incompatible debris) from entering the dredge, when necessary.

As needed and as funding is available, USACE periodically conducts maintenance dredging at the following Civil Works navigation projects:

- *Wilmington District Maintenance Dredging Projects*
  Atlantic Intracoastal Waterway (from VA state line to SC state line), Manteo (Shallowbag) Bay, Stumpy Point Bay, Channel to Rodanthe and Rodanthe Harbor,

Channel to Avon and Avon Harbor, Swanquarter Harbor, Rollinson Channel, including Channel from Hatteras Inlet to Hatteras, Channel to Silver Lake Harbor (including Big Foot Slough), Ocracoke Inlet, Carteret County Harbors of Refuge, Waterway Connecting Pamlico Sound and Beaufort Harbor, Channel from Back Sound to Lookout Bight, Morehead City Harbor, Beaufort Harbor and Morgan Creek, Atlantic Beach Channels, Peletier Creek, Bogue Inlet, New River Inlet, Channel to Jacksonville, New Topsail Inlet, New Topsail Inlet Connecting Channels, Wrightsville Beach Connecting Channels, Masonboro Inlet, Carolina Beach Inlet, Wilmington Harbor, Cape Fear River above Wilmington, Lockwoods Folly Inlet, Lockwoods Folly River, Shallotte River

- *Charleston District Maintenance Dredging Projects*
  Little River, Murrells Inlet, Georgetown, Jeremy Creek (turning basin inland), Town Creek (McClellanville), Charleston Harbor, Ashley River, Folly River, Atlantic Intracoastal Waterway (from NC state line to Port Royal Sound, SC), Port Royal
- *Savannah District Maintenance Dredging Projects*
  Savannah Harbor, Brunswick Harbor, Atlantic Intracoastal Waterway (from Port Royal Sound, SC to Cumberland Sound, GA)
- *Jacksonville District Maintenance Dredging Projects*
  Atlantic Intracoastal Waterway (from Fernandina Harbor, FL to Miami, FL), Okeechobee Waterway from the Atlantic Intracoastal Waterway to the St. Lucie Lock and Dam, Kings Bay Entrance Channel/Inner Channel, Jacksonville Harbor, St. Augustine Harbor, Ponce De Leon Inlet, Canaveral Harbor, Fort Pierce Harbor, St. Lucie Inlet, Palm Beach Harbor, Hillsboro Inlet, Port Everglades, Bakers Haulover Inlet, Miami Harbor, and Key West Harbor in Florida; San Juan Harbor, Arecibo Harbor, Mayagüez Harbor, Ponce Harbor, Yabucoa Harbor, Guavanes Harbor, and Fajardo Harbor in Puerto Rico; St. Thomas Harbor, St. Thomas, and Christiansted Harbor, St. Croix, in the US Virgin Islands.

See Appendix B for detailed descriptions of authorized maintenance dredging projects organized by District, including federally permitted projects conducted under the Regulatory program.

Proposed Action #2 (Transportation of Dredged Material):

Transportation of dredged material via hopper dredge, tug/scow/barge transit or pumpout, pipeline, etc. This action includes the transportation of material from the dredging of Civil Works navigation channels for (a) placement alongside or downdrift of the channel being dredged and/or (b) open water placement in an approved nearshore disposal area (typically located near barrier island passes) and/or (c) an ODMDS and/or, (d) beneficial uses of dredged material including but not limited to beach or nearshore placement. Additionally, this action includes the transportation of material dredged from offshore borrow areas

(state and federal waters) for the purpose of beach nourishment projects (see Proposed Action #4).

Proposed Action #3 (Navigation Dredged Material Placement):

After both dredging and transportation of dredged material the material is typically placed into a predetermined area for disposal or to serve some other beneficial use. This action includes the placement (or disposal) of material from the dredging of Civil Works navigation channels through (a) placement alongside or downdrift of the channel being dredged and/or (b) open water placement in an approved nearshore disposal area (typically located near barrier island passes) and/or (c) an ODMDS and/or, (d) beneficial uses of dredged material including but not limited to beach or nearshore placement.

Currently authorized US Environmental Protection Agency ODMDS sites include:

- *Wilmington District ODMDS's*
  Morehead City, North Carolina; Wilmington, North Carolina; New Wilmington, North Carolina;
- *Charleston District ODMDS's*
  Georgetown Harbor, South Carolina; Charleston, South Carolina; Port Royal, South Carolina.
- *Savannah District ODMD's*
  Savannah, Georgia; Brunswick Harbor, Georgia;
- *Jacksonville District ODMDS's*
  Fernandina Beach, Florida; Jacksonville, Florida; Canaveral Harbor, Florida; Fort Pierce Harbor, Florida; Palm Beach Harbor, Florida; Port Everglades Harbor, Florida; Miami, Florida; San Juan Harbor, Arecibo, Mayagüez, Ponce, and Yabucoa in Puerto Rico; St. Thomas Harbor, St. Thomas, and Christiansted Harbor, St. Croix, in the US Virgin Islands.

See Appendix B for detailed descriptions of Ocean Dredged Material Disposal Sites. Information concerning the management of Ocean Dredged Material Disposal Sites may be found at EPA, Region 4 and Region 2 ODMDS websites, respectively: (http://www.epa.gov/region02/water/dredge/prusvi.htm and http://www.epa.gov/region4/water/oceans/sites.html). Appendix B also contains detailed descriptions of all currently approved beneficial use projects organized by District.

Proposed Action #4 (Beach Nourishment):

Federal, federally-sponsored (funded or partially funded), or federally-permitted beach or nearshore placement of sand for Coastal Storm Risk Management (CSRM) (i.e., beach nourishment) and/or ecosystem restoration projects. Sand sources for these placement actions may include upland borrow sites, and/or dredged navigation channels, and/or

nearshore areas and/or borrow areas located in state or Federal waters (see Proposed Action #5 below). Current federal CSRM projects include:

- *Wilmington District Projects*

  Carolina Beach, Kure Beach, Ocean Isle, Wrightsville Beach

- *Charleston District Projects*

  Edisto Beach, Folly Beach, Myrtle Beach, Pawleys Island, Hunting Island

- *Savannah District Projects*

  Tybee Island

- *Jacksonville District Projects*

  Brevard County, Broward County, Dade County, Duval County, Flagler County, Indian River County, Martin County, Nassau County, Palm Beach County (Lake Worth Inlet to South Lake Worth Inlet), Palm Beach County (Martin County Line to Lake Worth Inlet & South Lake Worth Inlet to Broward County Line), St. Johns County, Volusia County, St. Lucie County.

See Appendix B for detailed descriptions of these current Coastal Storm Risk Management projects as well as other federally permitted beach nourishment projects.

Proposed Action #5 (Borrow Area Dredging):

Federal, federally-sponsored (funded or partially funded), or federally-permitted dredging activities in U.S. South Atlantic territorial waters at currently used borrow areas and virgin (previously unused) borrow areas. These borrow areas may be located in state and/or Federal waters, and may cross the boundary between the two jurisdictions. When located in state waters, USACE will authorize the sand removal activity. When located in Federal waters, BOEM will authorize the sand removal activity. This action includes the discretionary use of relocation trawling, abundance trawling, non-capture trawling, tissue sampling, tagging and scientific data collection, and MEC screening as summarized in Proposed Action #1. See Appendix B for descriptions of state and federal borrow areas.

Proposed Action #6 (G&G Surveys):

Federal or Federally-sponsored exploratory surveying and sampling techniques to determine a site's sediment characteristics and suitability for use in beach nourishment projects as well as characterizing material from navigation channels.

Proposed Action #7 (Emergency Dredging):

Emergency dredging activities following an unforeseen event for the purpose of maintaining existing navigation channels, to nourish an eroded beach, or to address a national security concern. The emergency may result from a natural disaster such as a flood event, storm or hurricane or from a navigation related catastrophe (e.g. a vessel collision with a bridge).

USACE Civil Works is authorized to conduct emergency response actions under the Flood Control and Coastal Emergency Act (Public Law 84-99) or the Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288). For the Regulatory Program, emergency permit actions are authorized through Clean Water Act Section 404 and Rivers and Harbors Act Section 10 implementing regulations at 33 CFR Section 325.2(e)(4), which defines an "*emergency*" as "*a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures*."

Proposed Action #8 (Bed Leveling):

Federal, Federally-sponsored, or Federally-permitted bed-leveling activities. Bed-leveling is a mechanical dredging technique for channels, turning basins, dredged material disposal areas (i.e. ODMDS sites or approved nearshore disposal sites), and borrow areas using plows, I-beams, or other bed-leveling mechanical dredging devices employed during or after dredging activities or by themselves to level high spots in a channel bottom or to redistribute sediments in a dredged material disposal area or borrow area. See Appendices A-4 and C for additional information regarding the use of bed-levelling dredging devices.

Proposed Action #9 (Minor Channel Modifications):

Dredging and disposal activities for modifications to existing navigation channels that are within the discretionary authority of USACE (i.e. additional Congressional authorization is not required). Consistent with USACE Engineering Regulations and the budget process, certain navigation channel modifications are funded as maintenance activities. These modifications include channel realignments, turn or bend modifications, advanced maintenance opportunities, and overdepth dredging.

This does **NOT** include navigation channel improvements beyond the scope of maintenance dredging or maintenance modifications of channels and turning basins to depths or widths not previously authorized throughout the project area. Maintenance dredging is defined as maintaining channels at specified depths and widths, including overdepth and advanced maintenance dredging. Channel improvements involve dredging to increase channel dimensions (length, depth or width) beyond dimensions previously authorized or permitted. Channel improvements require a Civil Works Planning study seeking additional Congressional authorization to expand existing channel dimensions or to construct a new channel. Channel improvements are not within the scope of the proposed action and will be consulted on individually by the appropriate USACE District.

2.02.2 BOEM Proposed Action Summary

The Outer Continental Shelf Lands Act (OCSLA) of 1953 defines the OCS as submerged lands lying seaward of state coastal waters within U. S. jurisdiction, i.e. waters that are more than 3 nautical miles from the coast line. (See 43 U.S.C. 1301, definition of "lands beneath navigable

waters," and 43 USC Section 1331, definition of "outer Continental Shelf"). USACE regulatory authority, under Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), extends three nautical miles from the coast line and coincides with state coastal waters (33 CFR 329.12—Geographic and jurisdictional limits of oceanic and tidal waters). Section 10 authority does not extend to the OCS except for structures affecting navigable waters of the United States including "artificial islands, installations, and other devices on the seabed" [33 CFR 322.3(b)—Activities requiring permits; Outer continental shelf]. Thus, the use of OCS submerged lands, including the extraction of sand, is primarily under the jurisdiction of BOEM. BOEM's proposed action is to issue a negotiated agreement pursuant to its authority under the OCSLA for dredging of OCS sand resources, currently leased or proposed to be leased for shore protection, beach restoration, or coastal wetlands restoration projects by Federal, State or local government agencies, or use in construction projects authorized by or funded in whole or in part by the Federal Government. This action coincides directly with Proposed Action #'s 4-7 and indirectly with Proposed Actions #2-3 and #'s 5-7, as described above.

2.03 USACE and BOEM Projects

2.03.1 USACE Projects

As a component of the USACE Civil Works navigation dredging, coastal storm risk management, and ecosystem restoration missions a myriad of associated dredging projects have been authorized. Furthermore, as a component of the USACE Regulatory program, dredging and shore protection projects have been permitted throughout the Southeast coast in accordance with Section 10 of the Rivers and Harbors act of and Section 404 of the Clean Water Act. See Appendix B for detailed descriptions of Civil Works Navigation and coastal storm risk management projects involving the use of dredging. Appendix B also contains a spreadsheet for Regulatory actions requiring dredging as a component of a coastal storm risk management project. The Regulatory spreadsheet was developed and data populated for each District using the best available information. These lists and/or descriptions of Regulatory and Civil Works dredging projects represent, to the maximum extent practicable, Civil Works authorized or Regulatory permitted USACE dredging actions throughout the South Atlantic at present. The lists and project descriptions are not exact; rather they are estimations based on the best available information at this time. Projects that are not listed or described in Appendix B, but are authorized or permitted after the development of this assessment and fall within the categories of actions defined in the description of the proposed action in Section 2.02 will be covered by this assessment, if applicable PDCs can be implemented.

2.03.2 BOEM Projects

BOEM is the Bureau within the Department of the Interior (DOI) responsible for overseeing sand and gravel, oil and gas, alternative energy, and other mineral development on the OCS. As steward for these energy and non-energy resources, BOEM must ensure that the development of these resources is done in a safe and environmentally sound manner and that any potential adverse impacts to the marine, coastal, and human environments are avoided or minimized.

Since BOEM authorizes the use of OCS sand, gravel, and shell resources, BOEM must comply with the requirements specified in a wide range of environmental statutes, including but not limited to the OCSLA, National Environmental Policy Act (NEPA), and Endangered Species Act (ESA). Under Public Law 103-426, if OCS sand resources are to be used for shore protection, beach restoration, or coastal wetlands restoration projects by Federal, State or local government agencies, or use in construction projects authorized by or funded in whole or in part by the Federal Government, BOEM may enter into a negotiated agreement that addresses potential use of OCS sand and gravel resources. Prior to negotiating that agreement, BOEM conducts an environmental review to evaluate potential environmental effects resulting from the proposed marine mineral exploration and development activities. The NEPA evaluation may be conducted jointly with another agency, in which case BOEM is either the lead or a cooperating agency. BOEM may also be required to initiate formal ESA and EFH consultations with the USFWS and NMFS, or participate jointly in the consultation requirements with another agency. For the purpose of this ESA consultation, BOEM is serving as a joint consulting agency with the USACE serving as the lead agency.

Any mitigation measures, terms, conditions, and/or recommendations identified during the consultation process are incorporated within the BOEM negotiated agreement. Depending on project timing and the level of stakeholder communication, this process has historically resulted in overlapping consultations for the full federal action, the authorization, dredging, transport, and placement of OCS sand resources. Previous regional consultations (1991, 1995, and 1997) by the USACE for dredging activities in the South Atlantic region have not contemplated or addressed the use of OCS sand for Civil Works or Regulatory permitted shore protection or coastal wetlands restoration projects, or the BOEM role in authorizing access to said resources. However, as the demand for sand for CSRM increases and the quantity of sand within three miles becomes more limited, OCS sand and gravel has become an increasingly attractive resource and alternative to upland or state water sand borrow areas. Since 1995, the BOEM has conveyed over 140 million cubic yards of OCS sand for 42 projects nationwide, and these projects resulted in flood risk reduction for, and/or environmental restoration of 303 miles of the Nation's coastline. A majority of these projects have occurred in the South Atlantic.

Table 1 identifies projects that have used or have proposed use of OCS sand borrow areas as well as potential OCS sand resource areas available for future use that BOEM has identified through its marine mineral resource evaluation initiatives. OCS marine mineral resource evaluations have historically been completed by BOEM through cooperative agreements, environmental studies, and other research projects through state agencies and universities on the South Atlantic coast. BOEM received $16.3 million for Hurricane Sandy response under the Disaster Relief Appropriations Act of 2013 which included funds for cooperative agreements with NC, SC, GA, and FL to update their offshore sand resource maps and data bases. The funds also supported additional research to gather and analyze geophysical information and sediment core samples for each state. The new data identifies and assesses new potential sand resources which might be needed in the future.

Table 1. OCS sand resources which have ongoing executed leases, proposed leases, or have been identified for potential future lease by BOEM*

Ongoing Executed Leases							
State	**USACE District**	**Project**	**Cubic Yards**	**Borrow Area**	**Lease Start**	**Lease Expire**	**Lease Number**
SC	Charleston	SC State Ports Authority	6000000	Charleston ODMDS	3/23/2010	6/16/2018	OCS-A-0477
FL	Jacksonville	Patrick Air Force Base (Amendment)	350000	Canaveral Shoals Borrow Area II	1/15/2015	1/15/2017	OCS-A-0488
		Collier County	500000	T1	4/14/2015	4/14/2018	OCS-G-35160
		Longboat Key (Amendment)	466500	F2 Borrow Area (BA-F2)	10/10/2014	10/10/2016	OCS-G-34669
NOTE: The cubic yardage reported for "Ongoing Executed Leases" represents the sediment volume requested for an individual construction event, not the volume required to support the life of the project. Subsequent lease requests may be made for similar volumes to support future nourishment efforts.							
Proposed Leases (Pre-Lease / Resource Evaluation in Progress / Feasibility Study)							
NC	Wilmington	Dare County, NC (Kitty Hawk)	2245000	A and C			
		Dare County, NC (Kill Devil Hills)	1096000				
		Dare County, NC (Duck)	1358000				
		Bogue Banks (Regulatory, NC)	3270000	Morehead City, NC; Offshore Dredged Material Disposal Site (ODMDS)			
		Bogue Banks (Civil Works, NC)	18000000	U and Q2			
		Surf City and North Topsail Beach, NC	20000000	A, C, D, E, F, G, H, J, L, N, O, S, and T			
		West Onslow and New River Inlet (Topsail Beach)	10000000	A, C, D, E, and F			
SC	Charleston	Myrtle Beach, SC	1700000	Surfside Borrow Area			
		Folly Beach, SC	TBD	Offshore Folly Beach			
FL	Jacksonville	Duval County, FL	1394000	Shoal S			
		Brevard County Shore Protection Project (North and South Reach)	TBD	Canaveral Shoals Borrow Area II			
		Brevard County (Mid-Reach), FL	900000	Canaveral Shoals Borrow Area II			
		Miami/Dade County, FL	5200000	Offshore SE Florida (M4-R105 and SL10-T41)			
		Flagler County, FL	2030000	2A and 2B			
		St Lucie County, FL	1300000	St. Lucie Shoals (SL4-R98)			
NOTE: The cubic yardage for "Proposed Leases" is the estimated volume of OCS material for the life of the project (i.e. 50 year planning life), with the exception of Dare County, NC , Myrtle Beach, SC, and Duval County, FL projects which are proposed leases for individual construction events. NMFS SERO PRD is currently preparing an idividual Biological Opinion for Dare County, NC; however, future construction events would be included under the SARBO.							
Potential Sand Resource Areas (Identified Sand Resources For Future Use)							
NC, SC, GA, FL	Wilmington, Charleston, Savannah, Jacksonville	Atlantic Sand Assessment Project (ASAP) and other Marine Mineral resoure evaluation studies in the South Atlantic Region	Up to 10 MCY	http://www.seasketch.org/#projecthomepage/5272840f6ec5f42d210016e4/about; http://www.boem.gov/Marine-Mineral-Resource-Evaluation/#South Carolina	NA		
NC	Wilmington	MMS Sand Resource Area		Target 1-4			
FL	Jacksonville	MMS Sand Resource Area		A1, A2, B1, B2, C1, C2, D1, D2			
				No Name North1			
NOTE: BOEM's Marine Minerals Program has conducted multiple marine mineral resource evaluation studies offshore of NC, SC, GA, and FL. These studies have identified "potential sand resource areas" that could be considered and refined for future borrow areas. Though specific borrow areas limits and volumes have not been defined, use of up to 10 MCY from these "potential sand resource areas" for future lease requests throughout the South Atlantic Region is anticipated over the next 5-10 years.							

3.00 SPECIES AND CRITICAL HABITAT

Lists of Federally Threatened and Endangered (T&E) species for the proposed action and geographical area were developed in consultation with NMFS (Southeast Regional Office, St. Petersburg, FL) during the initial scoping meeting held in St. Petersburg, FL on 16 May, 2007 and have been changed over time to reflect new species and critical habitat listings. This list includes T&E species that could be present in the area based upon their geographic range (Tables 2, 3, and 4). However, the actual occurrence of a species in the area would depend upon the availability of suitable habitat, the season of the year relative to a species' temperature tolerance and migratory habits, and other factors.

Table 2. Listed Species Likely to Occur in or near the Action Area

Common Name	Scientific Name	Status
Turtles		
Green sea turtle	*Chelonia mydas*[1]	T
Kemp's ridley sea turtle	*Lepidochelys kempii*	E
Leatherback sea turtle	*Dermochelys coriacea*	E
Loggerhead sea turtle	*Caretta caretta*[2]	T
Hawksbill sea turtle	*Eretmochelys imbricata*	E
Olive ridley sea turtle	*Lepidochelys olivacea*	T
Fish		
Smalltooth sawfish	*Pristis pectinata*[3]	E
Shortnose sturgeon	*Acipenser brevirostrum*	E
Atlantic sturgeon	*Acipenser oxyrinchus*[4]	E/T
Nassau grouper	*Epinephelus striatus*	T*
Scalloped hammerhead shark [5]	*Sphyrna lewini*	T*
Giant manta ray	*Manta birostris*	T*
Invertebrates and Marine Plants		
Elkhorn coral	*Acropora palmata*	T
Staghorn coral	*Acropora cervicornis*	T
Boulder star coral	*Orbicella franksi*	T
Mountainous star coral	*Orbicella faveolata*	T

[1] North and South Atlantic distinct population segment (DPS)
[2] Northwest Atlantic Ocean (NWA) DPS
[3] The U.S. DPS
[4] Activities occurring within river and in-shore habitats in the action area may affect Atlantic sturgeon from the South Atlantic DPS; however, Atlantic sturgeon from all DPS may be affected in off-shore waters within the action area. The New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs are listed as endangered; the Gulf of Maine DPS is listed as threatened.
[5] Central and Southwest Atlantic DPS
*-Proposed

Common Name	Scientific Name	Status
Lobed star coral	*Orbicella annularis*	T
Rough cactus coral	*Mycetophyllia ferox*	T
Pillar coral	*Dendrogyra cylindrus*	T
Johnson's seagrass	*Halophila johnsonii*	T
Marine Mammals		
North Atlantic right whale	*Eubalaena glacialis*	E
Sei whale	*Balaenoptera borealis*	E
Blue whale	*Balaenoptera musculus*	E
Fin whale	*Balaenoptera physalus*	E
Sperm whale	*Physeter macrocephalus*	E
Humpback whale (West Indies DPS)	*Megaptera novaeangliae*	Not at Risk
E = endangered; T = threatened		

Table 3. Designated Critical Habitat in or near the Action Area

Species	Unit
Loggerhead sea turtle	Unit LOGG-N-01 through LOGG-N-36 for Nearshore Reproductive Habitat, Breeding Habitat, and/or Migratory Habitat and Unit; LOGG-S-01 or LOGG-S-02 for *Sargassum*
Green sea turtle	Culebra Island, Puerto Rico.
Hawksbill sea turtle	Mona and Monito Islands, Puerto Rico.
Leatherback sea turtle	U.S.V.I, Puerto Rico
North Atlantic right whale:	Southeast U.S. Calving Area - Unit 2
Atlantic sturgeon	South Atlantic Unit 7[6]
Staghorn and elkhorn coral	Florida Area, Puerto Rico, St. John/St. Thomas, U.S.V.I, St. Croix, U.S.V.I.
Johnson's seagrass	All Units A-J

Table 4. Proposed Designated Critical Habitat in or near the Action Area

Species	Unit
Green sea turtle	Will be consistent with the 2016 listing of 11 distinct population segments[7]

[6] The South Atlantic Unit 7 (St. Marys Unit) includes the St. Marys River in (1) Camden and Charlton Counties in Georgia and (2) Baker and Nassau Counties in Florida.
[7] Not yet proposed

The blue, finback, and sei whales are not discussed in detail in this assessment as they are unlikely to be within the vicinity of the coastal action area since they are typically offshore species, residing in deep water, and the activities discussed by the USACE and BOEM are coastal in nature. Additional information on blue, fin and sei whales can be found in Blaylock *et al*. 1995; Waring *et al*. (1997, 1998, 1999, 2000, 2001, 2002, 2003, 2006, and 2007). Due to the rarity of sightings of these three whale species in the action area, the USACE and BOEM believe that any effects to them by the proposed dredging operations are discountable. Discountable effects under Section 7 of the ESA are those "extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur."

This Section incorporates by reference the following documents:

- 2008 SARBA (Appendix A1)
- Loggerhead Critical Habitat Analysis (Appendix G)
- North Atlantic Right Whale Critical Habitat Analysis (Appendix I)
- Green Sea turtle Distinct Population Segment Analysis (Appendix H)
- North Atlantic Right Whale Conservation Plan (Appendix E)
- Detailed Project Descriptions from SAW, SAC, SAS, and SAJ covering all current actions (Appendix B)
- BOEM Proposed Lease Areas (Appendix B)
- Atlantic Sturgeon 7(a)(2)(d) analysis (Appendix K)
- Humpback Whale DPS writeup (Appendix J)
- Coral impact analysis (Appendix F)
- 2001 Johnson's Seagrass Biological Opinion issued to the USACE Jacksonville District (Appendix L)

Due to the incorporation of the aforementioned documents and formal discussions with NMFS, USACE and BOEM will not restate previous species information here that has already been submitted during the ongoing Section 7(a)(2) consultation.

4.0 DETAILED DESCRIPTION OF PROPOSED ACTIONS AND PROJECT DESIGN CRITERIA

The purpose of this section is to: 1) describe the USACE and BOEM management of the proposed actions related to ESA listed species, 2) further describe the proposed actions, and 3) identify Project Design Criteria (PDCs) that may be implemented with each action. All of the

below actions, either individually or in combination, are essential to the successful execution of the USACE and BOEM missions. PDCs represent the suite of design criteria that the USACE and BOEM may choose to implement to protect T&E species, minimize impact to T&E species, handle incidentally taken T&E species, monitor projects for T&E species purposes, and collaborate internally and among partners to educate each other and utilize new technologies, where applicable. Only measures pertinent to T&E species will be discussed in these sections. PDCs will be labeled by Proposed Action number and then consecutive letters. For example, the fifth PDC for Proposed Action 3 would be PDC # 3e.

Management of Dredging Activities:

Management of the NMFS incidental take statement for T&E species is a top priority of the USACE and BOEM when implementing the actions described in this document. USACE and BOEM will use the following procedures to manage dredging activities on a yearly basis within their respective authorities.

MGMT – 1. USACE South Atlantic Division (SAD) and BOEM will each be responsible for the management of the NMFS allocated incidental take numbers relative to their respective dredging activities during a federal fiscal year (FY).

MGMT - 2 USACE and BOEM will each develop and utilize an internal management protocol for anticipated yearly hopper dredging operations to help manage incidental take. The protocol, which is a living document and can be updated yearly, will ensure a consistent approach across the Districts to minimize and manage take. USACE and BOEM will adapt the Management Protocol based on previous year's circumstances, recent trends, and discussions with dredging and T&E species experts. The protocol may address the following information, including but not limited to:

i. Anticipated projects to be dredged that year;

ii. Protocol for reporting of takes and for managing take across the region;

iii. Flexibility in implementing dredging windows to manage projects across the region;

iv. Timing of projects and risk management; and

v. Deviation from implementing specific PDCs if certain conditions are met.

MGMT – 3. USACE and BOEM will manage hopper dredge entrainment risk through species specific analyses and preparation of risk assessment reports prior to initiation of a project and/or after the take of a species. The USACE and BOEM Management Protocols will recommend procedures for utilizing risk assessments to effectively manage lethal and non-lethal take throughout the region. USACE District level risk assessments requesting flexibility in implementing dredging windows should be prepared prior to the dredging fiscal year to allow SAD the opportunity to evaluate the risk assessment and assess annual dredging priorities on a regional basis.

MGMT – 4. USACE (lead) and BOEM shall continue to use the sea turtle community of practice (CoP) consisting of NMFS staff, USACE SAD staff, BOEM staff, Engineering Research and Development Center (ERDC) experts, and a representative from the Civil Works and Regulatory programs at each SAD district who have a comprehensive background on sea turtle and hopper dredge interactions and represent their District with respect to these issues. The goal of this CoP is to effectively implement the both the USACE and BOEM missions, as they relate to the use of hopper dredges, while adhering to the environmental laws and regulations for the protection of sea turtle species.

Operations and Dredging Endangered Species Support System (ODESS) / Annual Reporting:

No annual reporting will be required for actions that have a no effect or may affect, not likely to adversely affect determination. For projects that are likely to affect listed species or modify critical habitat, the Operations and Dredging Endangered Species Support System (ODESS) can be used to pull reports. Additionally, due to the volume of projects that obtain Regulatory permits, projects under a threshold of 50,000 cubic yards or five surface acres of dredging will not require any annual reporting, unless the action has a "likely to adversely affect" determination. ODESS is a data collection and decision making tool that is designed to measure impacts of hopper dredging activities to threatened and endangered species and to assist other agencies in the evaluation of these data. USACE developed ODESS to provide a platform to centralize and archive data regarding threatened and endangered species from dredging activities for long-term continuity and evaluation of these data. The tool can be used to monitor takes across the region. The website is a dynamic tool that is continually being populated and updated. ODESS will be the primary reporting mechanism for reporting of takes associated with dredging projects.

MGMT - 5. USACE and BOEM will utilize the ODESS system to share information (including lethal and non-lethal takes) with NMFS about projects dredged during the FY.

MGMT - 6. Annual reporting regarding management of NMFS incidental take statement will take place within the ODESS system. The ODESS system will report each project under the SARBO proposed action that is maintained in a given FY.

4.01 Proposed Action #1 (Navigation Maintenance Dredging)

Navigation dredging is essential for the safe and efficient commercial, recreational, and military waterborne transportation. NOAA defines dredging as, "…the removal of sediments and debris from the bottom of lakes, rivers, harbors, and other water bodies. It is a routine necessity in waterways around the world because sedimentation—the natural process of sand and silt washing downstream—gradually fills channels and harbors (http://oceanservice.noaa.gov/facts/dredging.html)". Navigation dredging comprises the maintenance dredging of congressionally authorized and federally-sponsored (i.e. federally-

funded or partially federally-funded) or federally-permitted navigation channels (including coastal North Carolina, South Carolina, Georgia, Florida Atlantic Coast, Puerto Rico, and the US Virgin Islands) within Atlantic Coast Districts of USACE's South Atlantic Division (i.e. Wilmington, Charleston, Savannah, and Jacksonville Districts). The AIWW and maintenance dredging of newly constructed or recently improved navigation channels is also included. Maintenance dredging includes the periodic removal of naturally deposited materials such as sand, silt, clay, and sometimes naturally occurring or man-made debris within authorized channels, turning basins, and anchorage areas, to the authorized depth, including allowances for advanced maintenance, and overdepth dredging.

- Advance maintenance is dredging to a specified depth beyond the authorized channel dimensions in critical and fast shoaling areas to avoid frequent re-dredging, in order to ensure the reliability and least overall cost of operating and maintaining the project authorized dimensions.
- Allowable overdepth is in excess of the required construction depth and allows payment for material dredged below the required construction depth to account for inaccuracies in the dredging process.

The specific channels that are authorized are highlighted in Section 2 and detailed in Appendix B. New operations and maintenance (O&M) projects will be allowed if applicable PDCs can be met. USACE will notify NMFS of any new Federal O&M action not previously covered. The information will consist of location of channel, potential equipment to be used, type of material expected, volume of material, and anticipated frequency of dredging.

A variety of equipment can be used to accomplish this mission. Common equipment includes hydraulic cutterhead dredges, hydraulic hopper dredges, mechanical dredges, splithull dredges (a type of small hopper dredge), and side casting dredges. These equipment types will be discussed individually below. Dredging equipment (e.g. cutterhead, draghead, etc.) may be outfitted with munitions and explosives of concern (MEC) screening for the purpose of excluding undesirable material at the dredge site (e.g. MEC, rock, and/or other incompatible debris) from entering the dredge and/or being placed on the beach in approved placement areas or beneficial use sites. Screening configurations may vary depending on the type of dredge, the material to be excluded, and other project specific factors. Based on past dredging contracts, screening has primarily been implemented on hopper dredges working in offshore borrow areas (borrow area dredging is discussed as Proposed Action #4). Specifications have routinely included longitudinal bars with openings/spacings of 1.25 - 1.5 inches by 6 inches on the dragheads. The dimensions of the screen bars are designed and constructed in a manner to exclude undesirable material while maximizing the total open area of the suction head through which sand can be dredged and maximize the hydraulic transport efficiency of the draghead.

Once dredged material is removed from a navigation channel it is necessary to place it in a predetermined location. These locations include upland dredged material management areas (also called containment areas, confined disposal areas, upland disposal areas, etc), ODMDS's, open water placement sites, alongside and downdrift of a channel, nearshore ocean, marsh

creation, thin layer placement, and other beneficial uses. More information on placement areas will be discussed in Proposed Action #3.

The sub-sections following the below General Navigation Dredging PDCs will discuss dredge types associated with dredging of navigation channels covered in this assessment as well as any additional PDCs applicable to those dredge types.

Project Design Criteria Applicable to all USACE Navigation Maintenance Dredging

1a. All contractors must submit to USACE/BOEM an Environmental Protection Plan (EPP) that documents compliance with the ESA and measures to minimize take of listed species.

1b. For dredges and ancillary vessels operating at night and within 3nm of nesting beaches, lighting will be limited to the minimal lighting necessary to comply with USCG and OSHA requirements (most up-to-date version of EM 385-1-1). Appropriate lighting is necessary to provide a safe working environment during nighttime activities on deck (i.e. general maintenance work deck, endangered species observers, etc.).

1c. USACE will implement the conservation measures described in the USACE/NMFS North Atlantic Right Whale Conservation Plan submitted as part of this Biological Assessment (Appendix F).

1d. Any collision with and/or injury to any T&E species shall be reported to the National Marine Fisheries Service's Protected Resources Division.

If Munitions and Explosives (MEC) Screening is used:

1e. Since site conditions can change over time and it is not possible to predict every occurrence where MEC screening may be used in the future, NMFS will be notified when MEC screens will be used on a project.

1f. Endangered Species Observers (ESO's) will be required to inspect the MEC screens after every load to verify that no T&E species are impinged on the screening. If screening is used on a beach nourishment job, screening should be monitored and USACE should be notified upon any potential turtle entrainments.

In Loggerhead Critical Habitat:

For dredging projects located within Loggerhead Critical Habitat, no additional PDCs are warranted.

In Atlantic Sturgeon Critical Habitat:

For dredging projects located within Atlantic sturgeon proposed Critical Habitat, no additional PDCs are warranted.

In North Atlantic Right Whale Critical Habitat:

For dredging projects located in areas within North Atlantic Right Whale critical habitat, no new PDCs are warranted. As stated in PDC # 1c, USACE will implement the conservation measures described in the USACE/NMFS North Atlantic Right Whale Conservation Plan found in Appendix F. While BOEM will not be contributing funds (since project funds are already contributed through USACE), they will observe the other aspects of the conservation plan.

In Coral Critical Habitat:

For dredging projects located in areas where threatened and endangered corals may be present, the following protected species construction conditions will be adhered to consistent with the corals analysis, submitted along with this Biological Assessment (Appendix G).

1g. For sand mining projects that take place near hardground habitats, surveys will be required to identify, delineate, and avoid valued habitat. If the project is located in a site where listed corals may be present, these surveys should be leveraged to provide additional data concerning the presence or absence of listed corals near the sand mining borrow area.

1h. All navigation maintenance dredging operations will remain in-channel or ensure all designated locations for anchoring be limited to areas devoid of hardgrounds.

1i. Monitor turbidity associated with dredging operations.

1j. Prior to the commencement of project construction, if required by state or territory permit, a pre-construction conference shall be held to review any specific conditions and monitoring requirements of the project with the project's contractors and appropriate state, territory and/or federal personnel. In order to ensure that appropriate representatives are available, the invitees shall be contacted prior to the intended meeting date. The following items shall be provided at the meeting:

i. A written summary of the construction schedule, the specific type of dredge equipment and construction methods to be used and the (final) anticipated volume of material to be dredged from each borrow area;

ii. A plan view of all staging and beach access areas, overlaid on a recent aerial photograph;

iii. The names, credentials and contact information for the individuals who will conduct the turbidity monitoring and biological monitoring (as applicable);

iv. A copy of the contractor's Environmental Protection Plan, or equivalent, which provides project-specific details of the Best Management Practices (BMPs) that will be implemented to prevent erosion, turbidity and the release of hazardous substances at the dredge, pump-out and pipeline locations and staging areas.

In Areas where Smalltooth Sawfish may be present:

For dredging projects located in areas where smalltooth sawfish may be present, the following protected species construction conditions will be adhered to (provided by NMFS Southeast Regional Office on 6 March, 2006 and discussed in the 2008 SARBA):

1k. Though no incidental take of smalltooth sawfish have been documented by any dredging method, the USACE will inform Endangered Species Observers (ESO) on board hopper dredging projects of the potential for smalltooth sawfish to be present in certain project areas as well as report any sightings to the appropriate individuals. Where sawfish may be present, the USACE will require observers to inspect for potential smalltooth sawfish take as a component of endangered species coverage of inflow and overflow screening on hopper dredges. Incidental takes will be recorded in ODESS if a take should occur.

1l. All personnel associated with the project shall be instructed of the potential presence of smalltooth sawfish and the need to avoid collisions with them. All construction personnel are responsible for observing water-related activities for the presence of smalltooth sawfish.

1m. Siltation barriers shall be made of material in which smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block 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.

1n. All vessels associated with this action 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.

1o. If a 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 smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a 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 (e.g., 20 minutes have passed since the animal was last seen).

1p. Any collision with and/or injury to a smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312).

In Johnson's Seagrass Critical Habitat:

Federal channels do not contain Johnson's seagrass Critical Habitat. Additionally, this action is previously covered in a 2001 Biological Opinion issued to the USACE Jacksonville District (Appendix L).

4.01.1 Hydraulic Dredging

Hydraulic dredging is characterized by the use of a centrifugal pump to dredge sediment and the transportation of the dredged material slurry and water to identified discharge areas. The ratio of water to sediment within the slurry mixture is controlled to maximize efficiency. Too little water and the dredge will bog down; too much and the dredge won't be efficient in its work and it will take longer to dredge the shoals. The main types of hydraulic dredges are cutterhead pipeline and hopper dredges.

4.01.1.1 Pipeline Dredges - Cutterhead Suction Dredges

Pipeline dredges are designed to handle a wide range of materials including clay, hardpan, silts, sands, gravel, and some types of rock formations without blasting. They are used for new work and maintenance in projects where suitable placement/disposal areas are available and operate in an almost continuous dredging cycle resulting in maximum production, economy, and efficiency. A cutterhead is a mechanical device that has rotating blades or teeth to break up or loosen the bottom material so that it can be sucked through the dredge pipeline (Figure 3). Pipeline dredges are rarely self-propelled, and typically must be transported to and from the dredge site where they are secured in place by special anchor pilings, called spuds. Pipeline dredge size is based on the inside diameter of the discharge pipe which commonly ranges from 6- to 36-inches. Pipeline dredges are capable of dredging in shallow or deep water and have accurate bottom and side slope cutting capability. They require an extensive array of support equipment including pipeline (floating, shore, and submerged), boats (crew, work, survey), barges, and pipe handling equipment. Most pipeline dredges have a cutterhead on the suction end. Limitations of pipeline dredges include relative lack of mobility, long mobilization and demobilization, inability to work in high wave action and currents, and they are impractical in high traffic areas.

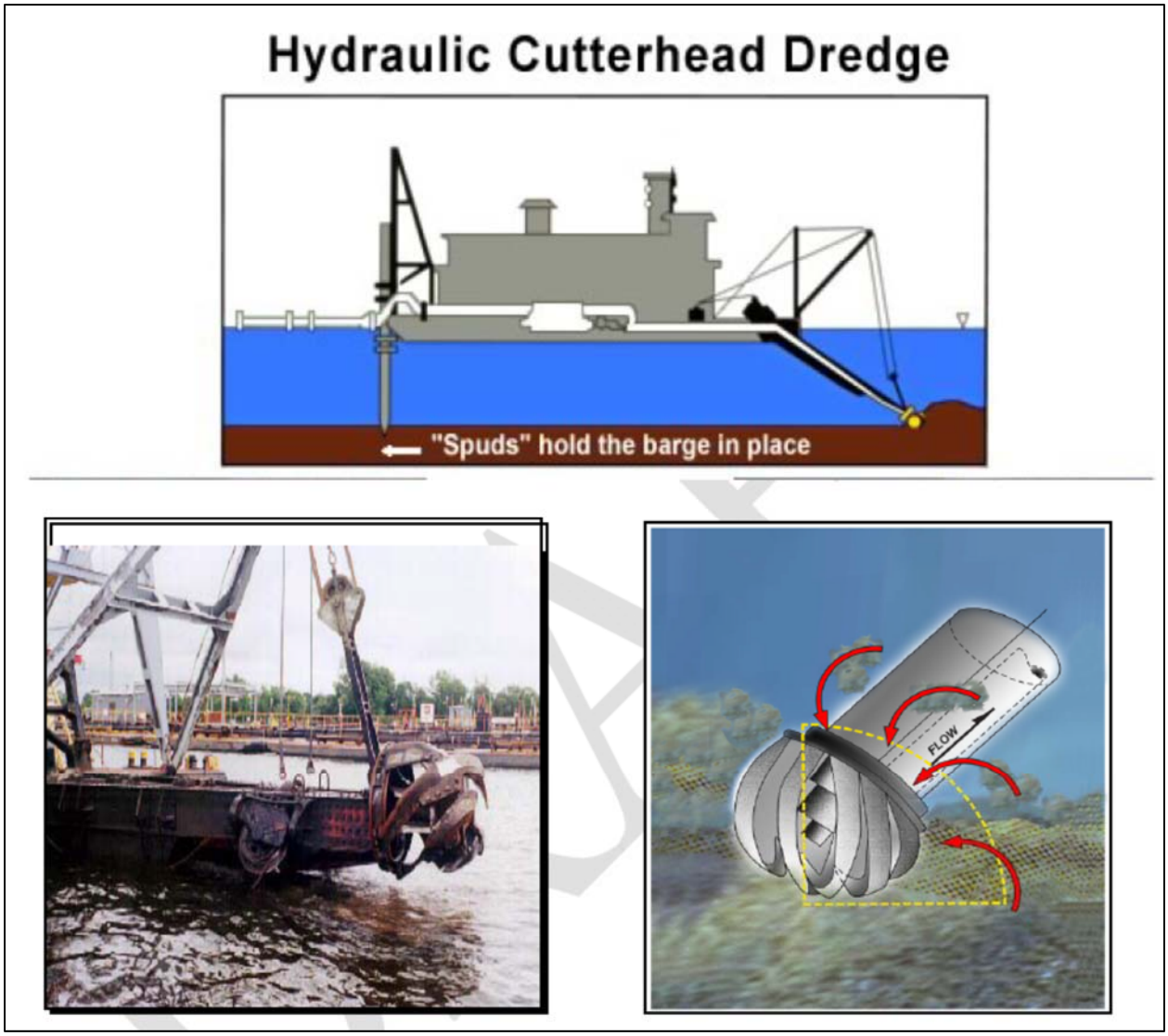


Figure 3. Cutterhead pipeline dredge schematic and representative close-up photographs.

During the dredging operation a cutterhead suction dredge is held in position by two spuds at the stern of the dredge, only one of which can be on the bottom while the dredge swings. Some cutterheads use a system of anchors and winches to hold themselves in place and/or advance forward. There are two swing anchors some distance from either side of the dredge, which are connected by wire rope to the swing winches. The dredge swings to port and starboard alternately, passing the cutter through the bottom material until the proper depth is achieved. The dredge advances by "walking" itself forward on the spuds. This is accomplished by swinging the dredge to the port, using the port spud and appropriate distance, then the starboard spud is dropped and the port spud raised. The dredge is then swung an equal distance to the starboard and the port spud is dropped and the starboard spud raised.

Cutterhead pipeline dredges work best in large areas with deep shoals, where the cutterhead is buried in the bottom. A cutterhead removes dredged material through an intake pipe and then

pushes it out the discharge pipeline directly to the placement/disposal site. Most, but not all, pipeline dredging operations involve upland placement/disposal of the dredged material. Therefore, the discharge end of the pipeline is connected to shore pipe. When effective pumping distances to the placement/disposal site become too long, a booster pump is added to the pipeline to increase the efficiency of the dredging operation. Though not common, cutterhead pipeline dredges may be used on offshore dredging projects where the placement distance exceeds the capabilities of booster pumps. Specifically, the cutterhead pipeline dredge is used in combination with a spider barge/scow operation and transported by tugs to a hydraulic off-loader located just offshore of the placement site (e.g. Caminada Headland Project, Gulf of Mexico). These operations will be discussed more in Proposed Action #2.

Project Design Criteria for Hydraulic Cutterhead Dredging

There are no additional PDCs required for the protection of T&E species specific to hydraulic cutterhead dredging as these dredges are not commonly involved in the taking of threatened and endangered species. All of the pertinent general navigation PDCs apply (see above).

4.01.1.2 Hopper Dredges

The hopper dredge, or trailing suction dredge, is a self-propelled ocean-going vessel with a section of the hull compartmented into one or more hoppers. Fitted with powerful pumps, the dredges suck sediment from the channel bottom through long intake pipes, called dragarms, and store it in the hoppers. Normal hopper dredge configuration has two dragarms, one on each side of the vessel. A dragarm is a pipe suspended over the side of the vessel with a suction opening called a draghead for contact with the bottom (Figures 4 and 5). Depending on the hopper dredge, a slurry of water and sediment is generated from the plowing of the draghead "teeth," the use of high pressure water jets, and the suction velocity of the pumps. The dredged slurry is distributed within the vessels hopper allowing for solids to settle out and the water portion of the slurry to be discharged from the vessel during operations through its overflow system. When the hopper attains a full load, dredging stops and the ship travels to either an in-water disposal site, where the dredged material is discharged through the bottom of the ship by splitting the hull, or opening doors in the bottom of the hull, or hooks up to an in-water pipeline, where the dredged material is transported to a shore placement site (e.g., beach nourishment).

Hopper dredges are well suited to dredging heavy sands. They can work in relatively rough seas but safety, effectiveness, and costs are a concern. Because they are mobile, they can be used in high-traffic areas. They are often used at ocean entrances and offshore, but cannot be used in confined or shallow areas due to their size and draft.

Hopper dredges can move quickly to disposal sites under their own power (maximum speed unloaded ≤ 17 knots; maximum loaded ≤ 16 knots), but since the dredging stops during the transit to and from the disposal area, the operation loses efficiency if the haul distance is too far. Based on the review of hopper dredge speed data provided by the USACE Dredging Quality Management (DQM) program, the average speed for hopper dredges while dredging is between

1-3 knots, with most dredges never exceeding 4 knots (Jay Rosatti, ERDC, personal communication).

Hopper dredges also have several limitations. Considering their normal operating conditions, hopper dredges cannot dredge continuously. The precision of hopper dredging is less than other types of dredges; therefore, they have difficulty dredging steep side banks and cannot effectively dredge around structures.

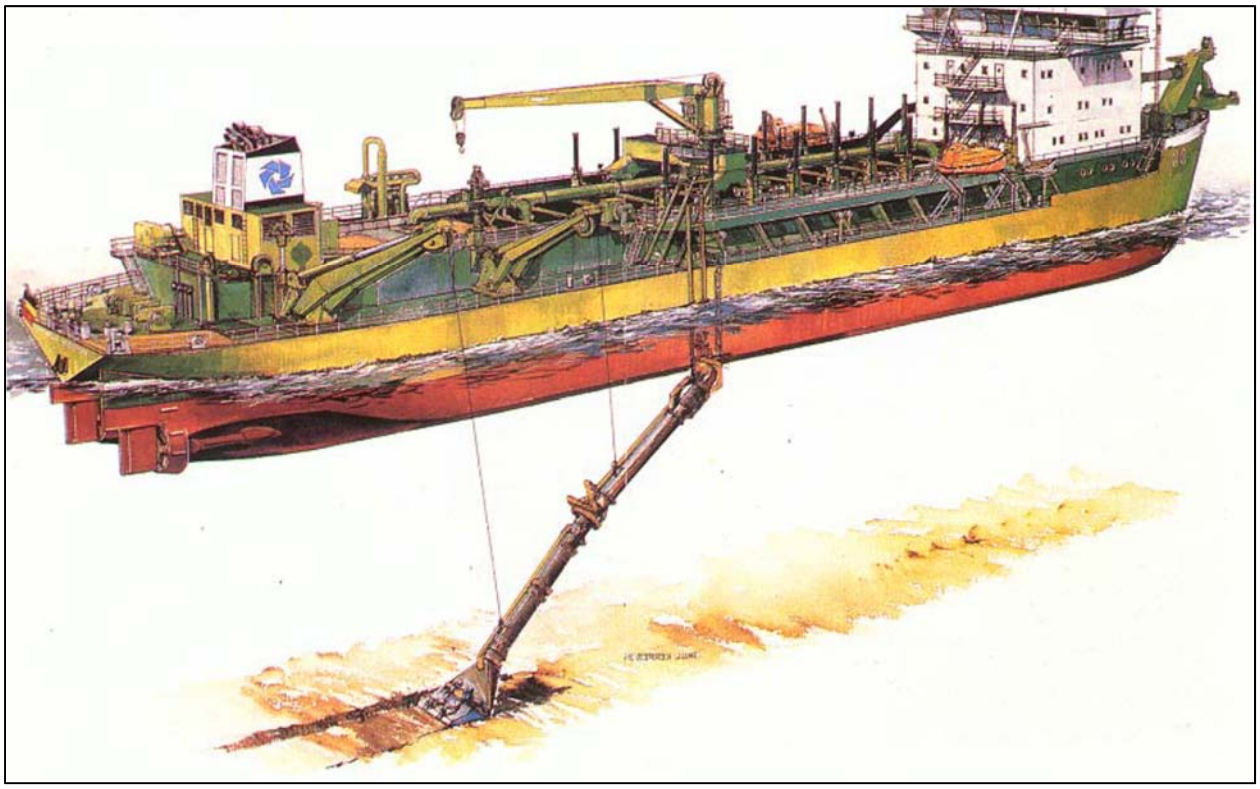


Figure 4. Hopper dredge illustration.

Draghead Deflectors:

In order to minimize the risk of incidental takes of sea turtles, sea turtle deflectors are added to the dragheads may be used on hopper-dredging projects where the potential for sea turtle interactions exist (discussed as a PDC below) and the dredging environment does not reduce the efficacy of the deflector and increase the risk for sea turtle interaction. The leading edge of the deflector is designed to have a plowing effect of at least 6-inch depth when the drag head is being operated. Appropriate instrumentation is required on board the vessel to ensure that the critical "approach angle" is attained in order to satisfy the 6-inch plowing depth requirement (USACE 1993).

New technologies are continually being developed by industry and studied by ERDC and others. For example, the slotted draghead deflector, which is not currently approved for use by NMFS, provides an opportunity to have greater dredging efficiency while still being protective of threatened and endangered species. In addition, the use of "tickler chains" either individually or in combination with the draghead deflector may further reduce entrainment risk, while increasing dredging efficiency. This new technology could allow for even greater dredging efficiency by enabling deflectors to be removed entirely while still minimizing risk of incidental take through the use of the "tickler chains." New dredging technologies which minimize entrainment risk while improving dredging efficiencies are critically important to optimize total risk reduction with improved project performance and reduction of total dredge operation time. The PDCs below will outline the process by which new technologies can be approved.

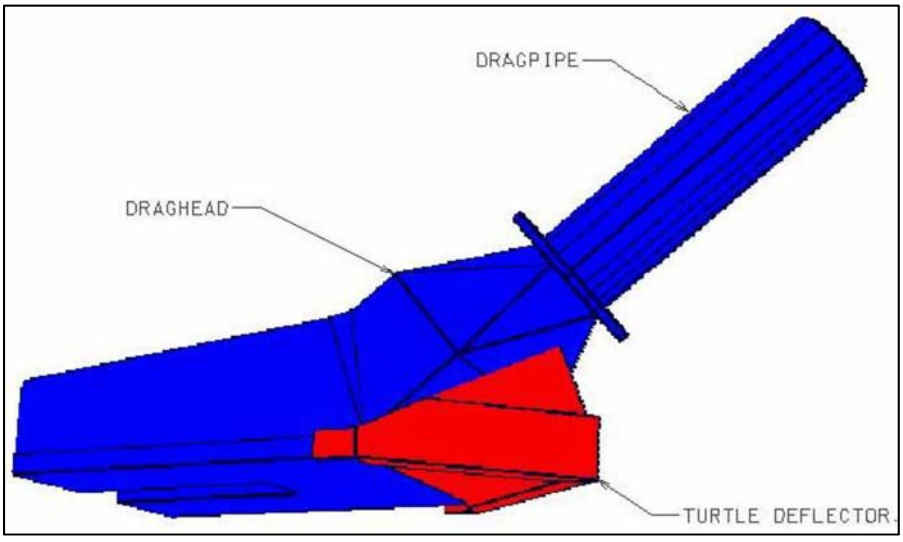


Figure 5. Illustration of a hopper dredge draghead with installed sea turtle deflector.

Trawling Practices:

Trawling has been used as a component of some hopper dredging activities to assess relative abundance of sea turtles in a known high-density borrow site or channel prior to dredging. Additionally, during times when the sea turtle entrainment rate for a specific hopper dredging

activity is expected to be high, modified shrimp trawling gear and techniques may be used to capture and relocate threatened and endangered sea turtles from hopper dredging sites. Trawling will be discussed as a PDC below. For more information on trawling practices and history of USACE trawling, please see Section 2.08 and Section 4 of the 2008 SARBA.

Project Design Criteria for Hopper Dredging

1.2a. During all hopper dredging operations, ESOs approved by NMFS[8] shall be aboard to monitor for the presence of listed species (primarily sea turtles, sturgeon, whales, and smalltooth sawfish). ESO coverage shall be 100% (i.e., 2 observers 24hr/day) and shall be conducted year round. During transit to and from the disposal area or pump-out location, the presence of listed species will be monitored for, especially the NARW, during the period November 1 through April 30 (corresponds to NARW Conservation Plan). During dredging operations, while dragheads are submerged, the observer shall continuously monitor the inflow and/or overflow screening for turtles and/or turtle parts and sturgeon and/or sturgeon parts. Upon completion of each load cycle, dragheads should be monitored as the draghead is lifted from the sea surface and is placed on the saddle in order to assure that sea turtles/sturgeon that may be impinged within draghead are not lost and un-accounted for. To the maximum extent practicable, observers shall physically inspect dragheads and inflow and overflow screening/boxes for listed species take.

1.2b. To the maximum extent practicable, dredging pumps shall be disengaged by the operator when the dragheads are not firmly on the bottom, to prevent impingement or entrainment of sea turtles/sturgeon within the water column. This precaution is especially important during the cleanup phase of dredging operations when the draghead frequently comes off the bottom and can suck in turtles/sturgeon resting or foraging in the shallow depressions between the high spots the draghead is trimming off.

1.2c. To the maximum extent practicable, pumping water through the drag heads is not allowed while maneuvering or during travel to/from the disposal or pumpout area.

1.2d. Where applicable, all waterport configurations are required to be screened before they are utilized on the dredging project.

1.2e. Except for special circumstances, a state-of-the-art solid-faced deflector that is attached to the draghead with chains and an adjustable leading chain at the apex of the deflector must be used on all hopper dredges at all times. Exceptions include:

[8] A list of endangered species observer-biologists (ESOs) that have been NMFS-approved to monitor threatened/endangered species takes by hopper dredges in Greater Atlantic and Southeast regions, can be obtained by contacting NMFS Greater Atlantic Regional Fisheries Office (formerly, Northeast Region). The main contact is Mr. William Barnhill; he can be reached at William.Barnhill@noaa.gov or (978) 282-8460. https://www.greateratlantic.fisheries.noaa.gov/protected/esaobserver/

i. Through coordination with SAD, may request use of an alternative, experimental draghead from NMFS prior to initiation of work. USACE will provide NMFS with experimental draghead specifications and a contingency plan to revert to a solid-faced deflector if sea turtle or sturgeon incidental take were to become excessive.

ii. Through coordination with USACE SAD and BOEM, Districts may request the use other experimental techniques, including but not limited to tickler chains. USACE and/or BOEM will provide NMFS with the specifications and a contingency plan if sea turtle or sturgeon incidental take were to become excessive.

iii. Consistent with MGMT-2, deviations from implementing specific draghead deflector PDCs may be granted, in coordination with USACE and/or BOEM, if local conditions or dredging history indicate that the probability of sea turtle or sturgeon incidental take is low. However, the District, through coordination with SAD, would require the Contractor to halt dredging and install a solid-faced draghead deflector if incidental take were to become excessive.

1.2f. As a component of the commitment to managing dredging activities described in MGMT 1-4, the USACE and BOEM shall continue to coordinate with and engage the dredging industry in the development of innovative solutions to improve dredging efficiencies and reduce entrainment risk. USACE and BOEM will provide NMFS with the specifications of any new technology and a contingency plan if sea turtle or sturgeon incidental take were to become excessive based upon coordination with SAD and management of the yearly incidental take limit.

1.2g. The Contractor shall develop a written operational plan to minimize T&E species takes and submit it as part of the Environmental Protection Plan for approval by USACE and/or BOEM prior to project commencement.

1.2h. To assure contractor compliance with all threatened and endangered species avoidance and minimization measures during hopper dredge operations, trained personnel will perform detailed quality assurance inspections on each hopper dredge prior to the start of a dredging project.

1.2i. USACE's DQM data collection system will be used to monitor dredging operations and dredged material placement in the ODMDS or other disposal sites (nearshore disposal sites, beach pumpout, etc.). Collected data includes but is not limited to variables such as draghead elevation, slurry density, slurry velocity, etc.

1.2j. If a sea turtle or sturgeon incidental take occurs, DQM data may be used to generate graphs for use in developing risk assessments that assess operational status of the dragheads during any given load cycle. Depending upon the results of the risk assessment, corrective actions may be taken to reduce the risk of further incidental take.

1.2k. All hopper dredges are required to have 100% inflow screening of dredged material and 100% overflow screening is recommended. If conditions prevent 100% inflow screening, inflow screening may be reduced gradually, as further detailed in the following, but 100% overflow screening is then required.

The hopper's inflow screens shall not exceed 4-in by 4-in screening/openings. If it is determined, in coordination with onboard ESOs and the draghead operator and in coordination with appropriate USACE or BOEM staff, that the screening is clogging and reducing production substantially, the screens may be modified sequentially. Mesh size may be increased to 8-in by 8-in; if that fails to solve the clogging problem, then 16-in by 16-in openings may be used. Clogging should be greatly reduced or eliminated with these options; however, further clogging may compel removal of the screening altogether, in which case effective 100% overflow monitoring and screening is mandatory. USACE and/or BOEM shall notify NMFS when inflow screening is going to be reduced or eliminated, what attempts were made to reduce the clogging problem, and provide details of how effective overflow screening will be achieved. Screening should be reinstated when clogging is no longer occurring.

1.2l. USACE should consider using dredging windows to minimize the risk of sea turtle incidental take by hopper dredges. As stated in the 1997 SARBO for navigation dredging, from the Virginia/North Carolina Border south to Pawley's Island, South Carolina, USACE may conduct hopper dredging throughout the year, i.e. a window did not apply. From Pawley's Island, South Carolina, south to Tybee Island, Georgia, USACE should conduct hopper dredging from 1 November through 31 May. From Tybee, Island, Georgia, south to Titusville, Florida, USACE should conduct hopper dredging from 1 December through 15 April. From Titusville, Florida, south to Key West, Florida, USACE should conduct hopper dredging throughout the year, i.e. a window did not apply. (Note: Across the region, borrow area dredging does not have a dredging window.) Subject to SAD's approval, a District may propose dredging outside of these historic windows for a given location if the District prepares a risk assessment in accordance with MGMT-3 and determines that the risk of dredging outside of the historic window is warranted.

1.2m. USACE and/or BOEM may utilize sea turtle or sturgeon relocation trawling and/or non-capture trawling in association with hopper dredging activities when used as an avoidance and minimization measure to reduce the risk of potential incidental take of sea turtles. Trawlers have up to 48 hours to mobilize in the event they become required by USACE and/or BOEM. In either of these situations, the following conditions apply:

i. Protected Species Handling During Trawling: Handling of sea turtles and sturgeon captured during abundance/relocation trawling shall be conducted by NMFS-approved protected species observers[8]. Sea turtles and sturgeon captured pursuant to relocation trawling shall be handled in a manner designed to ensure their safety and viability, and shall be released over the side of the

vessel, away from the propeller, and only after ensuring that the vessel's propeller is in the neutral, or disengaged, position (i.e., not rotating).

ii. Captured Turtle Holding Conditions: Captured turtles shall be kept moist, and shaded whenever possible, until they are released. They may be held for up to 24 hours if opportunistic, ancillary, "piggy-back" research (e.g., opportunistic satellite tagging) is proposed.

iii. Weight and Size Measurements and PIT Tagging: Turtles may be measured (standard carapace measurements including body depth), tagged (PIT or Inconel), and weighed prior to release when safely possible. Any external tags shall be noted and data recorded into the observer's log. Only NMFS-approved observers or observer candidates in training under the direct supervision of a NMFS-approved observer[8] shall conduct the tagging/measuring/weighing/tissue sampling operations. PIT tagging may only be conducted by observers with PIT-tagging training or experience. USACE and BOEM will contact NMFS annually for recent updates on PIT tagging and tissue sampling protocols.

iv. Take and Release Time During Trawling: Turtles shall be kept no longer than 12 hours prior to release (except as noted in ii. above) and shall be released not less than 3 nautical miles (nm) from the trawl site.

v. If a smalltooth sawfish is captured, USACE and/or BOEM will adhere to the most current NMFS Sawfish Safe Release Guidelines. These handling criteria will assist in minimizing time on deck and potential injury to the animals while they are being removed from the nets. If necessary, ESOs will be trained in implementing appropriate tagging and tissue sampling procedures in order to support additional data needs as outlined in the Final Recovery Plan for recovery of smalltooth sawfish. In addition, USACE and/or BOEM will coordinate with the Florida Fish and Wildlife Conservation Commission – Fish and Wildlife Research Institute (FWRI) staff that are working on sawfish recovery issues.

vi. If a shortnose or Atlantic sturgeon is captured, USACE and/or BOEM will adhere to the most current NMFS approved safe handling protocol.

vii. In the event there is an equipment malfunction (or other scenario where the tag cannot be applied in a reasonable timeframe) then the safety of the animal becomes more important and may be released without tagging.

1.2n. ESOs may perform tissue sampling of lethally and non-lethally taken sea turtles and sturgeon as a component of trawling and dredging operations when funding is available. The most up-to-date NMFS handling procedures will be utilized.

1.2o. USACE and/or BOEM will have the discretionary authority to insert internal Passive Integrated Transponder (PIT) tags and attach external tags to sea turtles, sturgeon, and

sawfish captured pursuant to relocation/abundance trawling efforts when funding is available. The most up-to-date NMFS handling procedures will be utilized.

1.2p. USACE and/or BOEM will have the discretionary authority to attach satellite tags, acoustic tags, position data loggers or other similar external, relatively non-intrusive, non-permanent, scientific data gathering devices (e.g., "crittercams," remote-control cameras to monitor feeding/behavior strategies, instruments to determine time at depth, water temperature, sound reception, etc.) onto a sea turtle and/or sturgeon and/or sawfish captured pursuant to relocation/abundance trawling when funding is available. The most up-to-date NMFS handling procedures will be utilized.

In Critical Habitat for Any Species:

No additional PDCs are required beyond the General Navigation Dredging PDCs.

4.01.1.3 Side-Cast and Special Purpose Split-Hull Hopper Dredges

Side-casting and special purpose split-hull hopper dredges are shallow-draft seagoing vessels, especially designed to remove material from the bar channels of small coastal inlets. Special purpose split-hull hopper dredges are designed to work in the shallow-draft ocean bar channels along the coast. These special purpose split-hull hopper dredges are capable of working in waters as shallow as 5 feet and similar to the side-cast dredge, they pick up the bottom material through two dragarms and pump it into a hopper within the ship. The split hull configuration allows for the ship's hull to split beneath the hopper and allow the material to discharge in shallow water as the materials dump between the hulls, instead of underneath. For side-casting dredges, the hull design is similar to that of a hopper dredge; however, side-casting dredges do not usually have hopper bins. Instead of collecting the material in hoppers onboard the vessel, the side-casting dredge pumps the dredged material directly overboard through an elevated discharge boom. The side-casting dredge picks up the bottom material through two dragarms and pumps it through a discharge pipe supported by a discharge boom. During the dredging process, the vessel travels along the entire length of the shoaled area casting material away from and beyond the channel. Dredged material is also carried away from the channel section by littoral and tidal currents. Due to the potential sedimentation and turbidity impacts of side-cast dredging on Johnson's seagrass and corals, side-casting dredges will not be used south of the range of these species (i.e., south of Sebastian Inlet, Florida). The USACE Wilmington District's sidecast dredge MERRITT, and split hull hopper dredges CURRITUCK and MURDEN, do not create an entrainment risk, no project design criteria are not necessary (operating windows, deflectors, screening, observers, reporting requirements, etc.). Their small size and operating characteristics including small draghead sizes [2-ft by 2-ft, to 2-ft by 3-ft], small draghead openings [5-in by 5-in to 5-in by 8-in], small suction intake pipe diameters [10-14 in], and limited draghead suction [350- 400 hp]) have been previously determined by NMFS to not adversely affect listed species (March 9, 1999, ESA consultation with USACE Wilmington District, incorporated herein by reference). If SAD verifies that there is a lack of risk of entrainment of

other dredges that have similar operating characteristics and are the same or lesser sized, then PDC will not be necessary.

Figure 6. Side-casting dredge MERRITT.

Project Design Criteria for Side Casting and Split Hull Dredging

The general dredging PDCs will be followed for this action.

In Loggerhead Critical Habitat:

1.3a. Side casting will not be performed in a manner that creates an impediment to loggerhead migration to and from nesting, breeding, and/or foraging areas.

In North Atlantic Right Whale Critical Habitat

1.3b. Side casting will not cause appreciable mounding of dredged material that could inhibit migration pathways for the animal.

In Johnson's Seagrass Critical Habitat:

1.3c. Due to the potential sedimentation and turbidity impacts of side-cast dredging on Johnson's seagrass, side-casting dredges will not be used in the range of these species (i.e., south of Sebastian Inlet, Florida).

In Coral Critical Habitat:

1.3d. Due to the potential sedimentation and turbidity impacts of side-cast dredging on corals, side-casting dredges will not be used in the range of this species (i.e., south of Sebastian Inlet, Florida).

4.01.2 Mechanical Dredging

Mechanical dredges are characterized by the use of some form of bucket to excavate and raise the bottom material (Figure 4). They remove material by scooping it from the bottom and then

placing it onto a waiting barge or scow, or directly into a placement/disposal area. Mechanical dredges work best in consolidated, or hard-packed, materials and can be used to clear rocks and debris. Dredging buckets have difficulty retaining loose, fine materials, which can be washed from the bucket as it is raised. Special buckets have been designed for controlling the flow of water and material from buckets and are used when dredging contaminated sediments. Mechanical dredges are rugged and can work in tightly confined areas. They are mounted on a large barge and are towed to the dredging site and secured in place by anchors or spuds. They are often used in harbors, around docks and piers, and in relatively protected channels, but are not suited for areas of high traffic or rough seas. These dredges can generate relatively large amounts of turbidity as the bucket traverses the water column.

4.01.2.1 Clamshell Dredges

Clamshell (aka bucket) dredges, named for the scooping buckets they employ, are the most common types of mechanical dredge (Figure 7). A clamshell dredge begins the digging operation by dropping the bucket in an open position from a point above the sediment. The bucket falls through the water and penetrates into the bottom material. The sides of the bucket are then closed and material is sheared from the bottom and contained in the bucket compartment. The bucket is raised above the water surface, swung to a point over the barge, and then released into the barge by opening the sides of the bucket. Usually two or more disposal barges, called dump scows, are used in conjunction with the mechanical dredge. While one barge is being filled, another is being towed to the dumpsite by a tug and emptied. If a diked disposal area is used, the material must be unloaded using mechanical or hydraulic equipment. Using numerous barges, work can proceed continuously, only interrupted by changing dump scows or moving the dredge. This makes mechanical dredges particularly well suited for dredging projects where the disposal site is many miles away.

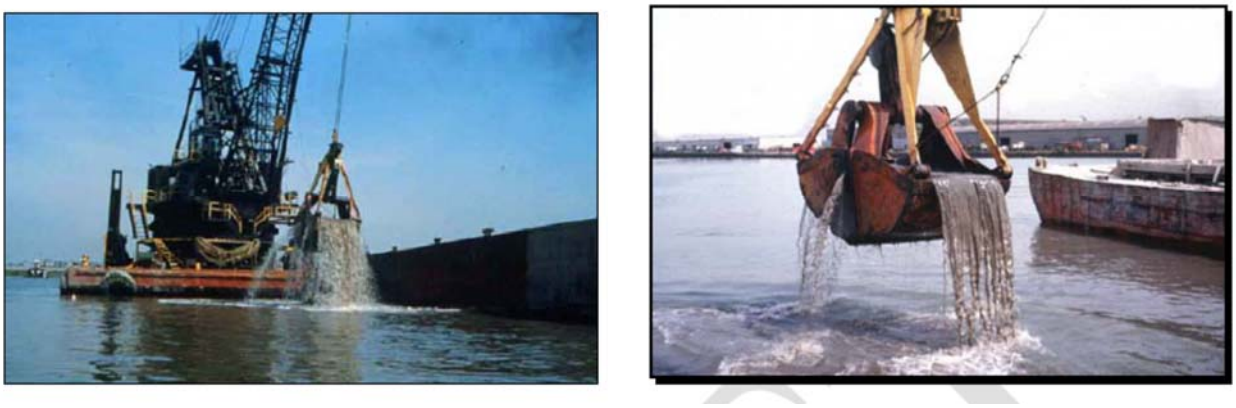


Figure 7. Mechanical dredge (clamshell bucket and barge).

4.01.2.2 Backhoe Dredges

Backhoe dredges operate by scooping material from the bottom and placing in a waiting barge or into a disposal area. The backhoe dredge uses a bucket that is structurally connected to the dredge by the rigid member configuration as shown in Figure 5. To increase digging power, the

dredge barge is moored on powered spuds that transfer the weight of the forward section of the dredge to the bottom to provide reaction forces to the digging-induced forces. The maximum bucket size that can be used for a specific project depends on the rated capacity of the excavator, sediment characteristics, and water depth. Bucket sizes generally range from 6 to 25 yd^3 (0.6-19 m^3). Larger backhoes can excavate to a maximum depth of approximately 80 ft (24 m). The density of sediment excavated can almost equal its in situ density but, like other conventional mechanical dredges, it may generate a relatively large amount of sediment resuspension at the dredge site.

Figure 8. Backhoe Dredge NEW YORK (Courtesy of Great Lakes Dredge and Dock Company, Oak Brook, IL)

4.01.2.3 Agitation Dredging

Agitation dredging is a process that intentionally discharges dredged material into the water column under the assumption that a major portion of the sediments will be transported and permanently deposited outside the channel prism by tidal, river, or littoral currents. Agitation dredging is typically used only when there are currents in the surrounding water to carry the sediments from the channel, and when the risk to environmental resources is low. Favorable conditions may exist at a particular project only at certain times of the day, such as at ebb tides, or only at such periods when the stream-flow is high. To use agitation dredging effectively requires extensive studies of the project conditions and definitive environmental assessments of the effects. Agitation dredging is not typically performed in slack water or when prevailing currents permit redeposit of substantial quantities of the dredged material in the project area or in any other area where future excavation may be required.

Project Design Criteria for Mechanical Dredging

Mechanical dredging will not necessitate any new PDCs beyond the applicable General Navigation PDCs.

4.02 Proposed Action #2 (Dredging Material Transportation)

Common Transportation Methods:

Hopper Dredges, Tugs, Scows and Barges:

Depending on the dredging and disposal site conditions for an individual project, as a component of hydraulic and mechanical dredging operations, accompanying equipment such as tugs and barges (e.g., hopper, scow, spider, etc.) may be used in association with dredging activity in order to transport the dredged material to a pre-determined placement site. Methods of transporting dredged material to placement sites include self-propelled transport via hopper dredges or towing of loaded barges to placement sites via tugboats. Tugboats are a component of all dredging operations and may be used to move immobile equipment into place as well as towing loaded barges to the placement sites. Hopper dredges or bucket and barge operations are often used when placement areas are beyond the pumping distance of pipeline dredges considering that hopper dredges and barges can transport material over long distances to the placement sites. Depending on a myriad of factors such as the type of dredged material, cubic yardage to be dredged, barge capacity, overflow capability, distance of the placement site, weather, etc., there may be several hopper dredges or barges that consistently rotate from the dredge site to the placement site to achieve maximum efficiency and productivity. The number of hopper loads or barges towed, the transport interval, and the speed to the placement site will vary for each project depending on these factors.

Hydraulic Cutterhead Pipeline:

Dredged material placed in placement areas by hydraulic dredges or pumped into placement areas by pump-out facilities travels through a pipeline and enters the placement area as a slurry (mixture of dredged solids and dredging site water) (ER1110-2-5025).

Project Design Criteria (Dredged Material Transportation)

For the dredging of materials that will be transported and subsequently placed, the General Dredged Material Transportation PDCs will be adhered to.

2a. The Districts will use USACE's DQM data collection system to monitor dredging operations and dredged material placement in the ODMDS or other disposal sites (nearshore disposal sites, beach pumpout, etc.). Collected data includes but is not limited to variables such as draghead elevation, slurry density, slurry velocity, etc.

In Right Whale Critical Habitat:

For transportation and placement of dredged material located in areas that intersect with any Right Whale critical habitat, no additional PDCs are warranted. USACE will implement the

conservation measures described in the USACE/NMFS North Atlantic Right Whale Conservation Plan found in Appendix F.

In Loggerhead Critical Habitat:

No additional PDCs for loggerhead critical habitat are required.

In Coral Critical Habitat:

2b. To avoid damage to hardbottom habitat), cables used to tow pipeline, barges or other equipment shall be pushed into position, or if necessary, pulled using a floating cable or polypropylene (floating) lines.

2c. Where practicable during transit, all project-related vessels and equipment shall maintain a minimum clearance of 10 feet over hardbottom habitats.

In Johnson's Seagrass Critical Habitat:

Federal channels do not contain Johnson's seagrass critical habitat. Additionally, this action is previously covered in the 2001 Biological Opinion issued to the Jacksonville District.

2d. Where practicable during transit, all project-related vessels and equipment shall maintain a minimum clearance of 10 feet over listed seagrass communities.

4.03 Proposed Action #3 (Navigation Dredged Material Placement Options)

After both dredging and transportation of dredged material the material is typically placed into a predetermined area for disposal or to serve some other beneficial use.

4.03.1 Traditional Placement Methods

Confined Disposal Facilities:

Some of the material dredged during navigation dredging projects is transported to containment areas. These areas can be called Confined Disposal Facilities (CDFs), Dredged Material Management Areas (DMMAs), upland disposal areas, etc. These terms can be used interchangeably. Upland or confined placement is placement of dredged material within diked nearshore or upland CDFs via hydraulic or mechanical means. A CDF is an engineered structure for containment of dredged material. They may be constructed as upland sites, nearshore sites with one or more sides in water (sometimes called intertidal sites), or island containment areas. CDFs vary considerably in size, dike type, and method of filling. Although the volumes vary from year to year, on the order of 35% of the total volume of material dredged to maintain Federal projects in the United States is placed in CDFs. The confinement or retention dikes or structures in a CDF enclose the placement area above any adjacent water surface, isolating the dredged material from adjacent waters during placement. These facilities are designed to retain as much of the fine-grained sediments as is practicable. This is typically managed through the use of

weirs. The return flow of water (effluent) from a CDF is specifically defined as a discharge to waters of the United States under Section 404 of the Clean Water Act (CWA).

Ocean Dredged Material Disposal Sites:

The EPA has the authority to promulgate ocean dumping criteria, designate recommended ocean disposal sites, and issue permits for dumping materials (except for dredged material) into ocean waters. Under Sections 102 and 103 of the Marine Protection Research and Sanctuaries Act (MPRSA), as amended (33 U.S.C. 1412), also known as the *Ocean Dumping Act,* the EPA and the USACE have the responsibility for ensuring that ocean dredged material disposal activities will not unreasonably degrade or endanger human health, welfare, amenities, or the marine environment. MPRSA Section 102 authorizes EPA to designate sites and times at which dumping may occur and to establish criteria for reviewing and evaluating permit applications. In those cases where site designation by the USEPA under Section 102 of the MPRSA is required, the NEPA process applies and leads to the EPA issuing a rulemaking in the Federal Register establishing the site. Since disposal in ODMDS sites and the establishment of these sites is coordinated on or consulted on during these designations, no new consultation for ocean disposal is needed here.

4.03.2 Placement for Beneficial Uses

Beneficial use of dredged material is a powerful tool for harmonizing environmental values and navigation projects. It is defined by USACE as "utilizing dredged sediment as resource materials in productive ways which provide environmental, economic, or social benefit (https://budm.el.erdc.dren.mil/intro.cfm?Topic=Intro)". Some common beneficial uses are nearshore placement, placement alongside and down drift of a navigation channel, and placement on a beach or other sandy habitat. Other beneficial uses include marsh creation, land creation, thin layer placement, fish and wildlife habitat enhancements, fisheries improvements, wetland restoration, etc. To read more about beneficial uses see the website above or https://www.epa.gov/sites/production/files/2015-08/documents/identifying_planning_and_financing_beneficial_use_projects.pdf

Existing beneficial use projects that are mentioned in Appendix B are covered under this evaluation. Any new beneficial use projects, not discussed in Appendix B, will be coordinated with SAD and included as part of the proposed action. To be included in the programmatic consultation, a project must be consistent with the description of Proposed Action #3 and able to implement all pertinent PDCS. Information that will be sent to NMFS during the project NEPA process includes:

i. Project description
ii. Location (reach of channel and placement area(s))
iii. Construction methods
iv. Assurance of compliance with applicable PDCs

Discussion of any specific impact pathways to T&E species and/or critical habitat concerns. The below brief descriptions describe some of the more common beneficial uses that are part of this proposed action.

Nearshore Placement Sites:

An increasingly utilized method is to place sediment in the nearshore zone in the form of a berm or mound. The goals of this method are to place sediments as a feeder berm which supplies sediment to the beach profile and shoreline through the dissipation of wave energy by breaking over the nearshore berm. The placement may also be designed to alter wave direction and modify the rate or direction of local sediment transport. Generally the placement is aligned roughly parallel to the beach, but the optimum alignment at a specific site will be determined by the direction of the most destructive wave climate. Because the placement is generally a submerged formation, most or all of the formation usually can be created by the bottom discharge of dredged material from hoppers, however scows and pumpout barges can be utilized. Berms may gradually erode and be dispersed, but the dispersed material will probably benefit the local coastal regime, either through beach feeding or by increasing foreshore levels. Currently approved nearshore placement sites are indicated in Appendix B.

Beach Placement:

Material from navigation channels can be used beneficially to enhance beach habitat and/or provide storm risk management benefits to coastal structures. In beach placement, dredged material is used to supply sediment to beaches that are subject to erosion. Shore erosion is a major problem along many ocean and estuary beaches and this practice allows for navigation channels to be maintained while keeping otherwise disposed of sediments in the littoral system where they provide benefits to humans and fish and wildlife resources. The methods are similar to those described below in Proposed Action #3, Beach Nourishment. The difference here is that Proposed Action #2 is for the general placement and transportation of dredged material, while Proposed Action #3 is for specifically authorized CSRM, Ecosystem Restoration Projects, or USACE permitted project. Any beach placement from navigation channels are described in Appendix B.

Alongside and/or Downdrift of Channels:

A commonly used beneficial use is treating sediment as a resource and attempting to keep the sediment within the littoral system where possible. This is usually performed with a side caster dredge and/or split hull hopper dredge in shallow draft navigation channels and inlets. Hopper dredges and cutterhead pipeline dredges can also perform this beneficial use. Material is pumped or placed downdrift of a navigation channel in a small mound where it is allowed to be transported by waves and currents. This approach provides environmental benefits by keeping sediment in the littoral system. The material placement is a habitat improvement due to the creation of bottom relief which establishes fish habitat, or placed at elevations suitable for the establishment of seagrass beds, oyster habitat, or other valuable ecosystem function.

Project Design Criteria (Navigation Dredged Material Placement)

For the dredging of materials that will be placed for use in these projects, the General Navigation Dredging PDCs will be adhered to.

3a. The Districts will use USACE's DQM data collection system to monitor dredging operations and dredged material placement in the ODMDS or other disposal sites (nearshore disposal sites, beach pumpout, etc.). Collected data includes but is not limited to variables such as draghead elevation, slurry density, slurry velocity, etc.

3b. All dredged material must be placed in an approved upland disposal site, EPA-designated ODMDS, USACE Dredged Material Management Area, or USACE approved beneficial use sites.

In Right Whale Critical Habitat:

For transportation and placement of dredged material located in areas that intersect with any Right Whale critical habitat, no additional PDCs are warranted. USACE will implement the conservation measures described in the USACE/NMFS North Atlantic Right Whale Conservation Plan found in Appendix F.

In Loggerhead Critical Habitat:

This action is subject to the PDCs for loggerhead critical habitat in Proposed Action #4.

In Coral Critical Habitat:

3c. Placement will not occur on areas in SE Florida possessing the PCEs for designated coral critical habitat.

3d. To avoid damage to designated coral critical habitat, cables used to tow pipeline, barges or other equipment shall be pushed into position, or if necessary, pulled using a floating cable or polypropylene (floating) lines.

3e. Additional BMP's shall include, but not be limited to, the construction of a shore-parallel dike in beach areas where sand is hydraulically pumped onto the beach to allow settling of sand prior to discharge of the return water back into the ocean. Examples of BMPs that may be included (where appropriate to the project) can be found in the Florida Department of Environmental Protection's (DEP) "Best Management Practices (BMPs) for Construction, Dredge and Fill and Other Activities Adjacent to Coral Reefs" (2008).

In Johnson's Seagrass Critical Habitat:

3f. Placement will not occur on Johnson's seagrass critical habitat, except in circumstances where habitat restoration is the purpose.

4.04 Proposed Action #4 (Beach Nourishment)

This proposed action describes Federal, federally-sponsored (funded or partially funded), or federally-permitted beach nourishment of sand for CSRM, ecosystem restoration projects, or other USACE and/or BOEM authority. USACE participation in the restoration, protection, and

placement of sediment on beaches is authorized under various statutes, including the Regulatory authority to permit beach nourishments under Section 10 of the RHA and Section 404 of the CWA. USACE coastal storm risk management projects reduce coastal erosion damages resulting from hurricanes and coastal storms, mostly through long-term beach nourishment projects, which currently involve intermittent placement of sand on shorelines for up to 50 years of federal participation under each Congressional authorization. Additionally, these projects provide for the continued use of these beaches for sea turtle and shorebird nesting that otherwise would be lost or compromised due to coastal erosion. Sand sources for these placement actions may include upland borrow sites, dredged navigation channels, nearshore areas, and/or borrow areas located in state waters or OCS waters under BOEM's jurisdiction. Beach nourishment projects vary in size, scope, and purpose. For a list of CSRM projects and other beach nourishment projects, please see Appendix B. While not all projects are designed in the same manner, the following discussion provides a general description of the physical process of sand placement during beach nourishment construction projects in the South Atlantic region.

Beach nourishment is the introduction of sediment along a shoreline to supplement the natural littoral (longshore) drift. Sediment compatibility analyses are a significant consideration in the design of beach nourishment projects to assure that dredged sediments are consistent with the native beach characteristics. Considering the variability in native beach sediment characteristics among projects, compatibility analyses are extensively coordinated with environmental resource agencies to assure compliance with federal, state, and/or local requirements. Sand is pumped to the beach by pipeline either directly from the dredge (e.g. cutterhead suction dredge) or from an offshore pumpout station (e.g. hopper dredge) and shaped using earth-moving equipment. The beach building process typically involves the use of bulldozers and other heavy equipment to distribute the sediment as it falls out of suspension at the outflow end of the pipeline. The sediment slurry is often diffused as it is released from the terminal pipe in order to reduce the flow velocity onto the beach and minimize the risk of creating scour holes. Dikes are typically constructed on one or two sides of the effluent area to allow for extended settlement time of suspended solids in order to reduce turbidity levels in the near shore environment. It is unnecessary and impractical to artificially grade beach slopes below the mean low water elevation since they will be shaped by wave action to the natural slope. As such, the initial constructed profile extends seaward of the final adjusted design profile by a variable distance to support anticipated sand movement during and immediately after construction. Once sand distribution along the foreshore occurs, the adjusted profile should resemble the design profile of the project.

Construction times for projects vary based on length of project, type of dredge, number of dredges, etc. Generally, construction related impacts are temporary and minor since they are only occurring in one location as the operation moves along the beach. Renourishment cycles typically are 3 to 10 years, although this varies from project to project, and are modeled based on pre-established criteria for when the project is no longer achieving its intended purpose of reducing storm damages.

USACE and/or BOEM will ensure that any new beach nourishment project is consistent with the description of Proposed Action #3 and meets pertinent PDCs for inclusion in this Biological Opinion. Information that will be sent to NMFS during the project NEPA process includes:

i. Project description

ii. Location (reach of channel and placement area(s))

iii. Construction methods

iv. Assurance of compliance with applicable PDCs

v. Discussion of any specific impact pathways to T&E species and/or critical habitat concerns.

Below are a list of PDCs that may apply to beach projects covered under this Biological Opinion.

Project Design Criteria (Beach Nourishment)

Offshore Pump-Out PDCs

4a. Pipeline routes will be designed to minimize impediments to nesting/emerging sea turtles and avoid impacts to benthic resources.

i. To the maximum extent practicable, all pipelines must be placed close to perpendicular to the beach when approaching the shoreline within 100 m unless otherwise needed to change to avoid a hardbottom area or other resource.

ii. To the maximum extent practicable for beach nourishment projects, pipelines shall not be placed on listed corals. Prior to pipeline deployment within coral habitats, a survey shall be conducted to relocate any listed colonies from the approved pipeline corridor. Pipelines are typically floated into place within an approved corridor, and after deployment a survey is conducted to triage any corals that may have been impacted by the pipe deployment. As the pipelines are made of heavy steel, they cannot be moved once deployed. A post-removal survey shall also be conducted and restoration of impacted areas conducted, as applicable. Pipelines typically cannot be floated in these areas due to human safety and navigational safety and must be submerged on the bottom.

4b. During sea turtle nesting and emergence season, all lighting aboard dredges and associated tugs and barges operating within 3 nmi of sea turtle nesting beaches shall be limited to the minimal lighting necessary to comply with USCG and OSHA requirements (most up-to-date version of EM 385-1-1). All non-essential lighting on the dredge and pumpout barge shall be minimized through reduction, shielding, lowering, and/or use of low pressure sodium lights to the extent practicable to reduce potential disorientation effects on female sea turtles approaching the nesting beaches and sea turtle hatchlings making their way seaward from their natal beaches.

Beach Nourishment PDCs

4c. The contractor shall minimize turbidity in nearshore waters by using methods that promote settlement before water returns to the water body (i.e., shore parallel dikes). Turbidity control measures shall be used to the maximum extent practicable throughout construction to control erosion and siltation to ensure there are no violations of state or federal water quality standards. Turbidity control measures shall be monitored to (1) ensure listed species are unable to become entangled, (2) shall be removed promptly upon project completion, (3) and shall not block entry to or exit from designated critical habitat.

4d. Construction of new erosion control structures (e.g., groins, seawalls, revetments) or any other structure that could obstruct sea turtle access to beaches is not authorized under this Opinion and shall be consulted upon separately.

4e. Sediment quality will be compatible with native sediments. Consideration should be given to state and federal requirements

4f. Appropriate lighting is necessary to provide a safe working environment during nighttime activities. Lighting associated with beach nourishment construction activities shall be minimized through reduction, shielding, lowering, and/or use of low pressure sodium lights to the extent practicable without compromising safety to reduce potential disorientation effects on female sea turtles approaching the nesting beaches and sea turtle hatchlings making their way seaward from their natal beaches.

4g. Projects shall not place material seaward of the originally authorized, permitted and constructed project footprint or placement boundary (fill/design template). Sand placement will be monitored for compliance with the design template during post-construction surveys.

In Coral Critical Habitat:

4h. Anchor points for offshore pump out stations that are typically used in association with hopper dredging will avoid nearshore hardbottom habitat to the maximum extent practicable.

4i. Hardbottom habitat within the project footprint will be identified using geophysical survey methods, hardbottom edge surveys, and/or use of previously generated hardbottom maps. Data will be provided to NMFS as part of the project NEPA coordination.

4j. If placement will occur in an area of known hardbottom habitat, a survey of the area to identify any listed corals will be performed. NMFS has developed an approved survey protocol for staghorn and elkhorn corals and this method shall be used. NMFS has not developed a similar survey protocol for the five newly listed corals species. As such, survey methods will be at USACE and/or BOEM discretion, until NMFS publishes a survey method.

4k. Any healthy listed corals free of disease, boring sponge, bleaching, etc (including the 5 newly listed corals, for which there is no identified critical habitat) found within the direct project footprint will be relocated per NMFS Acropora relocation protocol (the only current relocation protocol available) until such time as a protocol is developed for the five newly listed species.

4l. The location of relocated listed corals will be coordinated with NMFS.

4m. To the maximum extent practicable, pipelines will be placed in previously coordinated and permitted pipeline corridors. Where that cannot occur, placement of the pipeline will minimize impacts to hardbottom habitats.

i. A 25-foot-wide corridor shall be identified that will be expected to cause the least impact to corals or hardbottom habitats. The pipeline shall be placed within the 25-foot corridor to the maximum extent practicable. If it is not possible to keep the pipeline within the 25-foot corridor, an explanation will be provided to NMFS within 7 calendar days of pipeline placement.

ii. To the maximum extent practicable, the pipeline within the approved offshore pipeline corridor shall be fixed with collars or placed upon lifters that are sufficient to elevate the pipeline a minimum of 24 inches (60 centimeters) above the bottom at the collar/lifter. The collars or lifters shall be spaced a maximum of 50 feet (15 meters) apart. To the maximum extent practicable, collars or lifters shall be strategically located along the pipeline for maximum elevation over unavoidable listed coral colonies. Pipeline and collars/lifters shall be of sufficient density and configuration to rest securely and immobile without anchoring. In order to facilitate the salvage of any listed coral that is broken or damaged by the pipeline, a survey shall be conducted within 24 hours of placement to triage any broken listed corals, sponges, etc. A similar pipeline removal survey shall be conducted within 24 hours after pipeline removal.

iii. Use of the offshore pipeline and pump-out equipment shall cease if a significant leak, damage, or other unexpected condition (e.g., pipeline movement) is observed. Pumping of dredged material from the offshore pipeline and pump-out location shall not resume until the cause of the leak, damage or unexpected condition is assessed and a remedy to the condition is implemented. The issue that led to the shut-down and any remedial action shall be reported to NMFS within one business day to facilitate natural resource damage assessments, if applicable.

iv. Hardbottom/coral critical habitat along the nearest edge of reef east and west of the operational box, and within at least 25 feet (approximately 7.5 meters) of the operational box and the pipeline will be inspected twice a week through in-water surveys, unless precluded by unsuitable dive conditions. Divers shall record the location, nature, and extent of any leaks or irregular conditions (e.g., anchor cable drag, pipeline movement or sudden shoal formation), along with any resulting listed

coral damage, and findings provided to the agencies within one business day. Damaged listed coral will be restored or relocated by qualified scientists within seven (7) days of such notification, pending suitable dive conditions.

4n. Additional BMPs shall include, but not be limited to, the construction of a shore-parallel dike in beach areas where hydraulically dredged material is discharged onto the beach to allow settling of sand prior to discharge of the return water back into the ocean. Examples of BMPs that may be included (where appropriate to the project) can be found in the Florida DEP's "Best Management Practices (BMPs) for Construction, Dredge and Fill and Other Activities Adjacent to Coral Reefs" (2008).

4o. Turbidity shall be monitored during placement activities as an indicator of water quality.

4p. For sand mining project, sedimentation may be monitored on the hardbottoms adjacent to borrow sites.

In Johnson's Seagrass Critical Habitat:

Johnson's Seagrass critical habitat is not expected to be in the project footprint since these projects are outside of its typical range.

In Loggerhead Sea Turtle Critical Habitat:

4r. Since beach compatible sediment will be used, beach nourishment, including subtidal habitat, will not significantly alter the beach profile or slope, nor create excessive long term turbidity or sedimentation concerns.

4s. Pipelines and lighting shall follow PDC 4a and 4b.

In North Atlantic Right Whale Critical Habitat:

For beach nourishment projects located adjacent to North Atlantic Right Whale critical habitat, no additional PDCs are warranted.

If Munitions and Explosives (MEC) Screening is used:

4t. Since site conditions can change over time and it is not possible to predict every occurrence where MEC screening may be used in the future, NMFS will be notified when MEC screens will be used on a project.

4u. ESOs will be required to inspect the MEC screens after every load to verify that no T&E species are impinged on the screening. If screening is used on a beach nourishment job, screening should be monitored and USACE should be notified upon any potential turtle entrainments.

4.05 Proposed Action #5 (Borrow Area Dredging)

The sand to nourish a beach typically comes from an offshore borrow area located in state or OCS waters, but as described above, can sometimes come from navigation channels or upland sources. These areas are chosen based on a compatibility analysis of sediment quality (See cross-over with Proposed Action #3). Cost and removal methods can also be considerations.

Finding an affordable borrow source with sufficient quantities of high-quality beach fill can be challenging. Grain size, color, composition, and texture of the material should match the native sand as closely as practical to ensure proper project performance (See Proposed Action #3). Borrow areas are identified at the onset of a new project, yet due to changed conditions, sediment transport, increased need for material and other factors, borrow area locations are subject to change over time. Borrow area dredging equipment types and methodologies are to the same as those described under navigation dredging and will not be restated here. PDCs identified within Proposed Action #1 which are relevant to dredging in the OCS will include BOEM. USACE and/or BOEM will ensure that any new borrow area dredging is consistent with the description of Proposed Action #5 and meets pertinent PDCs for inclusion in this Biological Opinion. Information that will be sent to NMFS during the project NEPA process includes:

i. Project description

ii. Location

iii. Assurance of compliance with applicable PDCs

iv. Discussion of any specific impact pathways to T&E species and/or critical habitat concerns.

Project Design Criteria for Borrow Area Dredging

PDCs will be the same as those mentioned in Proposed Action #1 depending on the type of equipment used. Proactive planning in the borrow site location, design, and use plans is critical for minimizing impacts to sea turtles from hopper dredging activities. Based on: (1) the understanding of incidental sea turtle take risk associated with hopper dredging activities, as well as (2) the capabilities of a hopper dredge to implement measures to reduce incidental take risk under certain dredging conditions, a best management practice design criteria is recommended. Additional PDCs are as follows.

5a. USACE and BOEM may consider the following borrow area design criteria to minimize sea turtle and sturgeon entrainment risk by hopper dredge:

i. When the borrow site is too shallow the dredge could run aground before it is full of sand. This causes the dredge to have to light load which reduces the dredge's productivity and increases the duration of the project and thereby risk of sea turtle and/or sturgeon entrainment.

ii. Seek borrow sites that minimize the number of turns the dredge has to make to get a load of sand. Turns are not productive and are a greater risk to turtles.

5b. For sand mining projects that take place near hardground habitats, USACE and/or BOEM are already required, during coordination efforts with Federal, State/Commonwealth/Territory and local resource agency partners, to conduct resource mapping efforts for resources surrounding each borrow area.

In Loggerhead Critical Habitat:

For dredging projects located in areas where loggerhead critical habitat is present, the PDCs stated for Proposed Action #1 in loggerhead critical habitat will apply.

In Right Whale Critical Habitat:

No additional PDCs are necessary for dredging projects located in areas that intersect with North Atlantic Right Whale critical habitat. USACE will implement the conservation measures described in the USACE/NMFS North Atlantic Right Whale Conservation Plan submitted as part of this document (Appendix F). While BOEM will not be contributing funds (since project funds are already contributed through USACE), they will observe the other aspects of the conservation plan

In Coral Critical Habitat:

For dredging projects located in areas where threatened corals may be present, the following PDCs will apply:

5c. The resource mapping from 4b will provide data concerning the presence or absence of listed corals near the sand mining borrow area, using NMFS approved protocol if established for all corals.

5d. No designated critical habitat will be dredged, and a 400 ft buffer will be maintained around all critical habitat.

5e. Sedimentation monitoring may occur to document the effects from sedimentation on surrounding listed coral critical habitat.

5f. Monitor turbidity associated with dredging operations.

In Johnson's Seagrass Critical Habitat:

No additional PDCs are required as it is unlikely that Johnson's seagrass would be present in an offshore sand borrow area.

4.06 Proposed Action # 6 (Geophysical and Geotechnical Investigations)

4.06.1 Geophysical Investigations

Geophysical and geotechnical investigations are performed to evaluate those geologic, geotechnical, and soil conditions that affect the safety, cost effectiveness, design, and execution of a proposed coastal storm risk management project or navigation maintenance dredging project. There are different methods used for coastal storm risk management projects and maintenance dredging projects. The purpose of conducting a geotechnical and geophysical investigation for a coastal storm risk management project is to locate offshore sand borrow sources, which are of sufficient size, quality, and proximity to the shoreline to make construction economically feasible and environmentally acceptable. Additional purposes include ensuring that borrow areas do not contain, or adequately avoid, submerged shipwrecks, other historic/prehistoric resources, and hardbottom habitat. Navigational dredging projects require

geotechnical and geophysical investigations that are tailored to evaluate subsurface conditions for both maintenance dredging and beneficial use of dredge material; or evaluation of new work material for a harbor deepening/expansion.

Geophysical survey methodologies employed for the purpose of evaluating borrow area and channel sediment characteristics typically use a high-resolution, low-energy sound and receiver system towed behind a vessel. The type of equipment typically consists of sub-bottom profiler sonar, side-scan sonar, magnetometers, and single and multi-beam bathymetry sonar.

BOEM currently has a regional Biological Opinion for G&G activities in the southeast (19 July 2013) and will not be covered under Geophysical and Geotechnical Investigations (Proposed Action #5). USACE marine geophysical investigations typically employ the use of:

- Sub-bottom profiling sonar
- Single beam and multi-beam bathymetry sonar
- Side-scan sonar
- Magnetometer remote sensing

Sub-bottom Profiling Sonar

Sub-bottom profiling systems used by USACE and BOEM typically consist of either Chirp or Boomer systems. A high-resolution chirp or boomer subbottom profiler is typically used to delineate near-surface geologic strata and features. These systems use a transducer to emit a frequency-modulated sound pulse towards the seafloor and to receive the return of the pulse once it is reflected from the seafloor or from the contacts between sedimentary layers near the seafloor (acoustic impedance). The physical properties of the different geologic strata (composition, density, texture) cause minute velocity changes in the reflected acoustic signal (called acoustic impedance). Receivers at the surface listen for the reflected acoustic sound wave which returns as a series of echoes (as a result of bouncing off the geologic strata). The two-way travel time for the sound wave is measured, and using known soundwave propagation velocities through the water column, the subsurface stratigraphy and relative depth can be plotted.

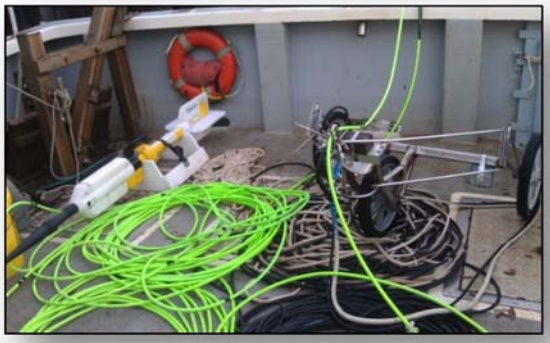
The difference between chirp and boomer is in the frequency of sound used, with chirp systems being generally higher frequency. Chirp systems are generally single-channel systems that operate around a central frequency that is swept electronically across a range of frequencies to provide improved resolution. The most probable system consists of towfish with internal transducer that imparts an acoustic signal with frequencies potentially ranging from 500 hertz (Hz) up to 24 kilohertz (kHz) approximately every 0.5 to 1 seconds. For optimal data quality, the chirp system is typically towed at water depths where the towfish remains within approximately 10 feet (30 m) above the seafloor. Additionally, the system would be operated at noise levels

limited to 220 dB re 1 µPa or less (rms SPL). A boomer is a seismic reflection profiler that operates between 0.7 and 2 kHz that generate high quality sub-bottom penetration resolution.

Hydrographic Surveys (multi-beam and single-beam sonar)

Hydrographic surveys comprising both single and multibeam bathymetry data are collected by measuring sound pulses reflected off the seafloor with a towed transducer. Single-beam systems transmit a high frequency acoustic pulse in a beam directly downward. Energy is reflected off the sea floor and received by the transceiver. Mulitbeam bathymetry transmits and receives acoustic pulses by sending a sound pulse through the water column until it reaches the seafloor, upon which it is reflected back to the receiver. Multibeam is used to gather information about water depths and seafloor topography and covers a wider area of the seafloor with each survey. The information is also used to detect acoustical backscatter which is used to characterize the seabed to aid in archaeological, benthic and sediment composition investigations.

Side-Scan Sonar



A side scan sonar survey provides a higher level of detail during the reconnaissance phase of an investigation. Side-scan sonar generates an image of seabed morphology, submerged objects, and other features. The sonar towfish is typically towed behind a boat at a constant altitude. Changes in backscatter intensity general result from changes in sediment composition and texture, presence of hardbottom/ledges, archaeological resources / shipwrecks, debris, etc. It may be used to infer zones of coarse and fine grained materials; however, physical sampling is required in order to properly characterize the material.

Magnetometer Remote Sensing

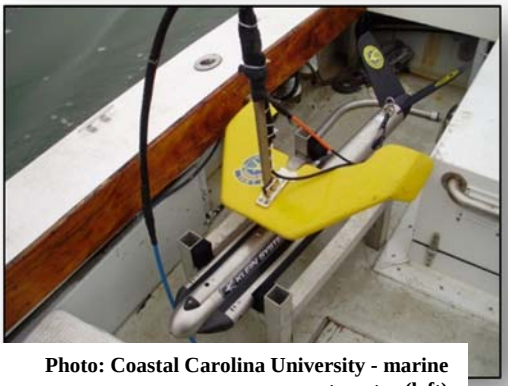


Photo: Coastal Carolina University - marine magnetometer (left)

The marine magnetometer is a passive remote sensing device (i.e., nothing is emitted) that identifies materials with ferrous or ferric components or other objects having a distinct magnetic signature. This method is commonly used in underwater archaeological investigations to identify any potential historic resources. It has also been used in navigational projects to identify submerged wrecks, debris, pipelines and utilities, and in some instances, unexploded ordinance (UXO).

4.06.2 Geotechnical Surveys/Sediment Characterization

Geotechnical surveys (coring and sediment sampling) are most frequently performed concurrent with, or after geophysical surveying. The methods chosen are dependent upon the type of project and the engineering and environmental design and investigation requirements. For coastal storm risk management projects, these surveys are typically conducted to identify and characterize the sediment volume, quality, and geological characteristics of a prospective borrow area. For established navigational projects requiring regular maintenance dredging, a geotechnical investigation may be conducted to locate and evaluate the volume and quality of sediments in a shoal for a variety of reasons. In the case of a harbor deepening or expansion, an extensive geotechnical investigation is conducted to delineate the subsurface soils and rock within the proposed dredging prism, determine the best method of removing the materials, and determine the storage capacity and/or develop engineering recommendations for existing disposal areas. The following techniques are the most commonly used methods for USACE geotechnical investigations and sediment characterization methods related to navigation dredging and coastal storm risk management projects:

- Geological borings
    - Vibracoring
    - Standard penetrometer testing (SPT)
    - Wash/jet probing
- Surficial grab sampling

Nearly all geotechnical sampling occurs from either stationary vessels less than approximately 20 m (65 ft) in length or from work barges towed into place. Some operational platforms require anchoring for brief periods with small anchors. Sometimes jack-up barges and spudded work barges are used. Surveys typically last only a few days and disturb a minimal area of seabed during individual sampling events (e.g., collection of a core or grab sample). Although vibracoring is the most likely technique used, other sampling methods such as piston or box coring and jet probes are also used as part of geotechnical surveys. Geological sampling disturbs the seafloor; however, due to the small size of the cores and platforms, the area of seabed to be disturbed during individual sampling events is minor.

Geologic Borings

Geological borings are collected to describe the basic geologic materials including surface and subsurface sediments for engineering analyses on dredging material for navigation or beach nourishment projects. Many different types of borings can be performed including auger borings, drive borings, standard penetration test borings, washprobes, cone penetration tests, vibracoring, and rock core boring. The following sections provide information on two of the most commonly used techniques for navigation projects and borrow site surveys.

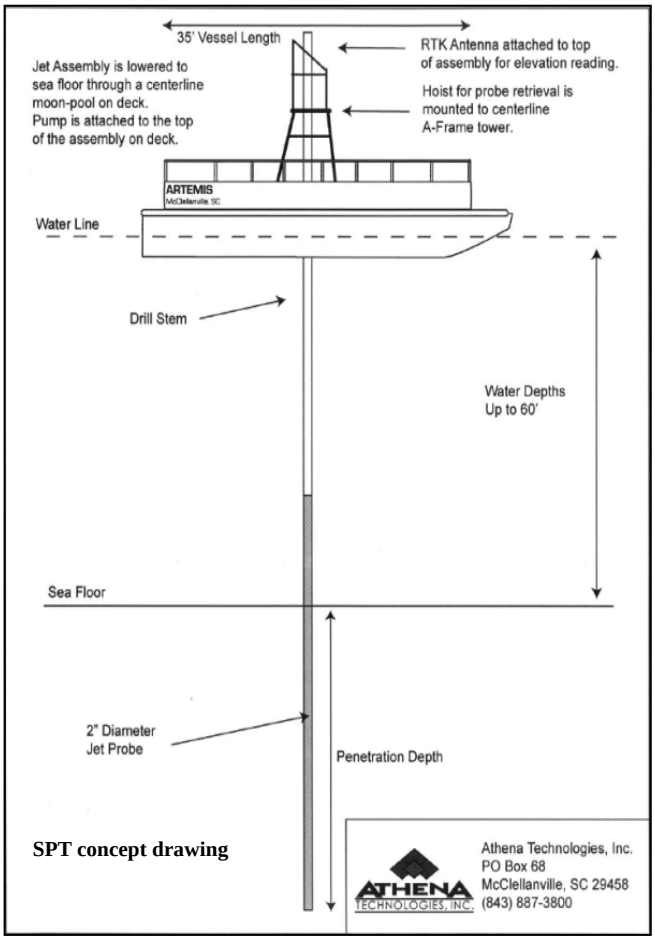
Vibracoring

A 3- or 4-inch (7.6- 10.1-centimeter (cm)) diameter aluminum core barrel mounted on a platform or support assembly would be used to penetrate sediments in the upper 20 feet (6 m)

of the seafloor. A sediment sample of 5 to 20 feet (1.5 to 6 m) would be acquired to determine sediment characteristics and sand resource thickness. To penetrate seafloor sediments, the core barrel is vibrated by a pneumatic or electric vibrahead, which results in local liquefaction of sediment along the core barrel surface, facilitating penetration into the sediment. Depending on local conditions, a typical vibracore survey can obtain 15 to 25 cores approximately 20 feet (6 m) deep in an area measuring 1 square mile per day.

Standard Penetrometer Tests

The Standard Penetration Test (SPT) is described in ASTM D1586-08a as a test procedure by which a splitspoon sampler is driven, using a known energy, to obtain a representative soil sample for identification purposes, and to measure the resistance of the soil to penetration (compactness). The driving energy is imparted to the sampler (and length of drill rod) from the blows of a 140-lb hammer free-falling 30-inches. The test provides an indication of the relative density of granular soils, such as sand and gravel. The test method is used extensively to quantify soil properties for geotechnical engineering design.



SPT concept drawing

Wash/Jet Probing

For this technique, wash probes or jet probes are advanced into the seafloor using a 1.5-inch hollow steel probe, 2-inch steel drill stems, and a 3-inch flexible hose connected to a water pump aboard the work vessel. The probe, pipe and hose are connected via reducers and cam-lock pipe fittings. The operator lowers the wash/jet probe to the seafloor. Once the probe strikes the seafloor, the water pump is turned on, resulting in a blast of water emerging from the tip of the probe. The probe is advanced under its own weight until refusal is encountered. Upon refusal, the penetration depth is recorded and the probe is retrieved using a mechanical winch system. Wash probing is most commonly used in navigation projects to rapidly ascertain the presence of rock or stiff/dense material within a proposed dredge prism.

Grab Sampling

Grab samplers collect samples of the topmost layers of the seabed and benthic biota by bringing two steel clamshells together and cutting a bite from the soil. The grab sampler consists of two steel clamshells on a single or double pivot brought together either by a powerful spring or powered hydraulic rams operated from the support vessel. The grab is lowered to the seabed and activated either automatically or by remote control and the sample is raised to the vessel for examination. Typically three to four grabs can be obtained per hour, but is dependent on specific equipment, sample depth, sediment type and distance between samples.

Project Design Criteria for G&G Activities

6a. USACE will implement the conservation measures in the USACE/NMFS North Atlantic Right Whale Conservation Plan submitted as part of this Biological Assessment (Appendix F).

In Loggerhead and Coral Critical Habitat:

6b. USACE will perform side scan sonar surveys to roughly determine presence/absence of hardbottom areas. USACE will not perform coring work in areas of suspected/known hardbottom.

4.07 Proposed Action #7 (Emergency Dredging)

Emergency dredging activities following an unforeseen event for the purpose of maintaining existing navigation channels or to place sand on an eroded beach. The emergency may result from a natural disaster such as a flood event, storm or hurricane or from a catastrophe (e.g. a vessel collision with a bridge) or for a national security concern. USACE Civil Works is authorized to conduct emergency response actions under the Flood Control and Coastal Emergency Act (Public Law 84-99) or the Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288). For the Regulatory Program, emergency permit actions are authorized through Clean Water Act Section 404 and Rivers and Harbors Act Section 10 implementing regulations at 33 CFR Section 325.2(e)(4), which defines an "*emergency*" as "*a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures*."

Project Design Criteria for Emergency Dredging

USACE and BOEM will abide by the PDCs applicable to the particular type of dredging equipment used and placement area employed.

7a. USACE and BOEM will notify NMFS prior to the emergency action taking place or as soon as practicable afterwards.

4.08 Proposed Action #8 (Bed-Leveling)

A "bed-leveler" is considered to be any type of dragged device used to smooth sediment bottom irregularities left by a dredge (Figure 9). It is also referred to as a "mechanical leveling device or drag bar". In various parts of the United States this process is known as "barring" or "knockdown" (Hales et al. 2005). In certain cases, bed-levelers are used to redistribute sediments to maintain navigable depths rather than removing them by dredging with conventional methods. Dredge types using bed-levelers include clamshell (excavator), bucket, hydraulic cutterhead, and hopper dredges. Use of a dragbar often reduces the cleanup dredging required with hopper dredging, and thus reduces the potential for sea turtle or sturgeon take.

Figure 9. Example bed leveler
(photograph courtesy Bean Dredging Company and Weeks Marine Incorporated)

Use of bed-levelers is not a new dredging technique and can be documented as far back as 1565 (Van de Graaf 1987). Typically, a bed-leveler consists of a large customized plow, I-beam, or old spud that is slowly dragged across the sediment to smooth out peaks and trenches during the final cleanup phase of the dredging activity. Another variant is for the hopper dredge to dig trenches along the channel below the project depth, and then a plow/I-beam bed-leveling device suspended from a barge is dragged along the bottom of the channel by a tugboat to knock material from high spots into deeper trenches dug along the channel bottom in order to achieve final project depth and an even grade (Figure 10). Additionally, bed leveling is also permitted through the Regulatory program, often as a form of agitation dredging. However, the specific number of bed leveling permits or specific permit conditions under which the permits

were provided have not been evaluated holistically. Bed-leveling has also been used by cutterhead dredge contractors for reducing heights of disposal mounds. According to hopper dredge, bucket dredge, and clamshell dredge contractors, bed-leveling is the preferred and least expensive method for achieving the final grade as compared to re-dredging. A barge and workboat performing bed-leveling by trailing where a hopper dredge has been excavating is a relatively inconspicuous activity; accordingly, the utilization of bed-levelers by contractors in U.S. waters has previously received benign neglect (Hales 2003).

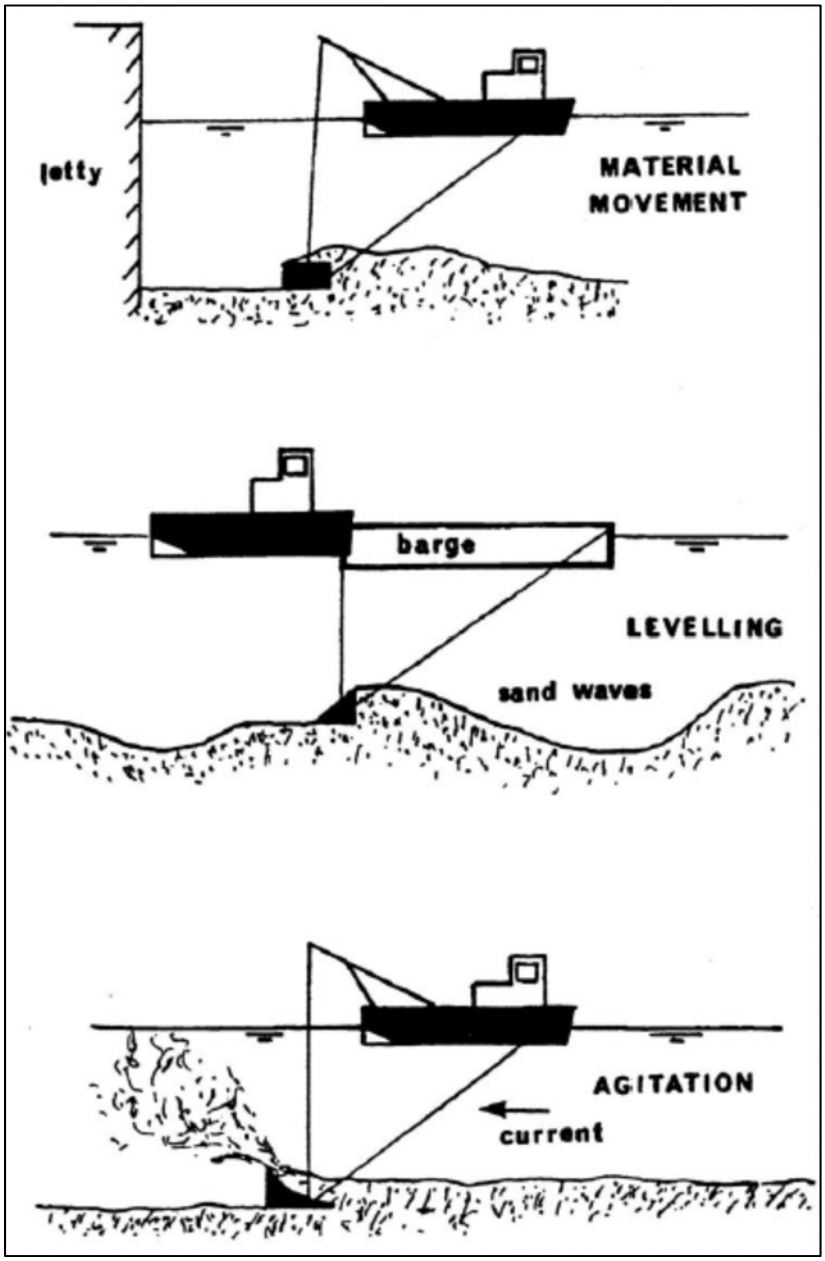


Figure 10. Drag-beam devices used for material movement, bed leveling, and agitation dredging (Mohammed 1994).

Project Design Criteria for Bed-Leveling

8a. USACE and BOEM will notify NMFS and the Sea Turtle Stranding and Salvage Network (STSSN) state representative of location and start and stop dates of any bed leveling activities.

8b. Bed levelers shall be constructed of a smooth steel blade with no teeth and a bottom length angling forward approximately 45° forward of the blade face, or other similar design that shall produce a sand wave in front of the leading face of the beam to disturb sea turtles off the sea floor bottom.

8c. All support structures are to be welded to the back of the blade with no primary or secondary attachment points extending beyond the width of the blade face which could serve as impingement or "pinch" points for passing sea turtles.

8d. The bed-leveler shall be slowly lowered to the sea bottom and the depth of the bed leveler adjusted constantly to meet required depth and to compensate for tidal fluctuations.

8e. The bed-leveler shall be towed/pushed along the bottom no faster than approximately 1-2 knots.

8f. The contractor shall submit drawings to USACE and/or BOEM of the bed leveler and record when and where the bed leveler was used in the channel.

8g. USACE and BOEM shall monitor strandings in conjunction with the appropriate state STSSN and the appropriate state natural resources department during all bed leveling activities. The determination of take of a stranded turtle by bed leveling activities will be made by the USACE and BOEM with input from the appropriate state natural resources department.

4.9 Proposed Action #9 (Modifications to Existing, Authorized Navigation Channels)

The USACE authority to make modifications to the existing authorized project is limited by Section 5 of the Rivers and Harbors Act of 1915 and ER 1165-2-119 (below). This limited authority is executed under the O&M program. These modifications are primarily used to improve the safety and efficiencies of existing ship traffic. Navigation improvements requiring new or amended Congressional authorization for construction are not covered by this biological assessment and would require an individual consultation with NMFS.

ER 1165-2-119 states:

Modification Under Existing Authority, Navigation Projects. The Chief of Engineers has but limited discretion with respect to modification of completed navigation projects without new authorization. The River and Harbor Act of 1915 provides (Section 5) an authority to increase channel dimensions, beyond those specified in project authorization documents, at entrances, bends, sidings and turning places as necessary

to allow the free movement of vessels. Exercise of this authority is confined to original project development. Where not otherwise precluded by project authorization, the location of a completed channel may be altered during the course of the periodic maintenance program if the maintenance can thereby be more economically accomplished and related aids to navigation are readily adjustable to suit the restored channel dimensions at the shifted location.

The USACE authority to perform advanced maintenance is governed by ER 1130-2-520. In most cases this work is outside of the authorized dimensions in order to "capture" the material before it ends up in our channel.

ER 1130-2-520 States:

Advance maintenance dredging, to a specified depth and/or width, may be performed in critical and/or fast-shoaling areas to avoid frequent redredging and ensure the least overall cost of maintaining the project. MSC commanders are authorized to approve advance maintenance dredging for new work dredging and maintenance dredging of the project. Written justification is required. As a minimum, the justification for advance maintenance should describe historical shoaling rates, frequency of dredging, and cost analysis. Advance maintenance involving the removal of rock is not authorized under the Operation and Maintenance, General appropriation. Advance maintenance shall not be used to provide navigation channel dimensions for vessels that exceed the design limitations of the project. Before using advance maintenance, the integrity of structures adjacent to the channel and the possibility that the material in the advance maintenance portion of the channel is significantly different from maintenance material should be reviewed.

Project Design Criteria for Modifications to Existing, Authorized Navigation Channels

9a. USACE will notify NMFS of a modification to a channel by sending a brief notification that documents the project covered under SARBO, the change being made, the reason for the change, and an anticipated date of construction of the change.

In Critical Habitat for any species:

9b. USACE will send NMFS an assessment of the design changes and an additional effects analysis on the essential features that may be influenced by the design changes.

5.0 Effects of the Proposed Actions

This section will identify the potential effects of the proposed action and will be presented based on the proposed action numbers. To refine the discussion of effects this section will focus on the potential impact producing factors (IPFs) associated with each action and how they relate to each species evaluated in the consultation. Proposed Action numbers relate back to the numbers identified in Section 2 of this report. Not all actions produce the same effects;

therefore Table 5 summarizes each individual action and lists all the various IPFs that could occur for all actions. For each action an "X" is listed in the appropriate cell if that IPF could occur for that action. This table will be used to narrow the scope of the effects determination made at the end of each individual proposed action. Each action will address potential species related affects as they would relate to the appropriate IPF. Where applicable, this section will reference documentation identified in the Appendices of this report.

Table 5. Relationship of proposed actions to applicable impact producing factors

Proposed Activity			Impact Producing Factors										
												Temporary Obstructions	
Number in Project Desription	Description	Specific Action	Entrainment	Beach Profile Slope Adjustment/Equilibration	Turbidity	Sedimentation	Benthic Disturbance / Burial	Bathymetric Change	Hydraulic/Hydrologic Changes	Noise	Vessel Strike	Submerged/Floating Pipeline	Lighting
1	Navigation Dredging	Mechanical Dredging			X	X	X			X	X		X
		Hydraulic Cutterhead			X	X	X			X	X		X
		Hydraulic Hopper	X		X	X	X			X	X		X
		Split Hull Hopper / Sidecasting			X	X	X			X	X		X
2	Transportation	Hopper			X	X	X			X	X		X
		Pipeline			X	X	X			X		X	
		Tug and Scow/Barge			X	X	X			X	X		X
3	Placement	Upland Disposal Area			X	X	X						X
		Ocean Disposal			X	X	X	X	X				X
		Beach Placement		X									X
		Nearshore Placement (beneficial use)			X	X	X	X	X				X
		alongside channel (beneficial use)			X	X	X	X	X				X
		Other Beneficial Uses			X	X	X	X	X				X
4	Beach Placement			X	X	X	X	X	X	X		X	X
5	Borrow Area Dredging		X		X	X	X	X	X	X	X		X
6	Geophyisical and Geotechnical Surveys						X			X	X		
7	Emergency Dredging*		*X*	*X*	*X*	*X*	*X*	*X*	*X*	X	*X*	*X*	*X*
8	Bed Leveling		X		X	X	X			X	X		X
9	Modifications to Navigation Channels						X	X	X				

** Dependent upon the emergency action taken, but could encompass any of the other proposed actions.*

5.01 Proposed Action #1 (USACE Maintenance Navigation Dredging)

Dredging of sediment associated with maintenance dredging has the potential to adversely affect the species considered in this report. Potential effects include actions of the dredging equipment (i.e., cutting, suction, sediment removal, and hydraulic pumping of water and sediment) causing entrainment of species; physical contact with dredging equipment and vessels (i.e., vessel strike); turbidity generated at the dredge site; sedimentation on nearby resources; increased marine noise; and temporary lighting on the dredge (Table 6). Potential impacts vary depending on the type of equipment used, the nature and location of sediment discharged, the time period in relation to life cycles of organisms that could be affected, and the nature of the interaction of a particular species with the dredging activities. This section will be organized based upon the outline and IPF's marked in Table 6. If an IPF is thoroughly discussed in another document it will be mentioned here as being specifically incorporated.

Relocation and abundance trawling for sea turtles as a component of hopper dredging operations has been known to non-lethally take sea turtles and sturgeon. The impacts of this are thoroughly discussed in the 2008 SARBA (Appendix A) and will not be restated here.

Table 6. Species Specific IPFs for Proposed Action 1

Navigation Dredging		Impact Producing Factors										
Specific Action	Species/Habitat	Entrainment	Beach Profile Slope Adjustment/ Equilibration	Turbidity	Sedimentation	Benthic Disturbance / Burial	Bathymetric Change	Hydraulic/Hydrologic Changes	Noise	Vessel Strike	Temporary Obstructions	
											Submerged/Floating Pipeline	Lighting
Hydraulic Hopper	Sea Turtles	X		X	X	X			X	X		X
	Fish Species	X		X	X	X			X			
	Corals			X	X	X						
	Johnson's Seagrass			X	X	X						
	Whales								X	X		
Hydraulic Cutterhead	Sea Turtles			X	X	X			X	X		X
	Fish Species			X	X	X			X			
	Corals			X	X	X						
	Johnson's Seagrass			X	X	X						
	Whales								X	X		
Mechanical	Sea Turtles			X	X	X			X	X		X
	Fish Species			X	X	X			X			
	Corals			X	X	X						
	Johnson's Seagrass			X	X	X						
	Whales								X	X		
Sidecaster / Split-Hull Hopper	Sea Turtles			X	X	X			X	X		X
	Fish Species			X	X	X			X			
	Corals			X	X	X						
	Johnson's Seagrass			X	X	X						
	Whales								X	X		

5.01.1 Sea Turtles

USACE has determined that the proposed action of continued maintenance dredging of navigation channels may affect, and is likely to adversely affect (MALAA) sea turtles. This determination is made specifically for entrainment from hopper dredging activities for the loggerhead, green, kemp's ridley, olive ridley and hawksbill sea turtles. Cutterhead and mechanical dredging may affect, but is not likely to adversely affect (MANLAA) the loggerhead, green, kemp's ridley, olive ridley, and hawksbill sea turtles. Navigation dredging will have no effect on leatherback sea turtles.

5.01.1.1 Entrainment

Entrainment of bottom dwelling animals is a possibility for hopper dredges performing maintenance dredging in support of USACE navigation mission. The effects of sea turtle entrainment by hopper dredges have been well documented by the USACE over the last few decades. The effects of hopper dredging resulting from entrainment have been thoroughly described in past consultation documents including the 2008 SARBA (Appendix A1, Section 4.02.1.1 – pages 122-129). Appendix B lists all of the current projects in South Atlantic Division that involve maintenance dredging. Information on the history of takes of listed species can be found on the ODESS website (http://dqm.usace.army.mil/odess/#/home). The potential impact of hopper dredging on sea turtles will be minimized by the USACE and BOEM implementation of the PDCs outlined in Section 4.01 of this report.

The potential impacts of hydraulic cutterhead dredging on sea turtles was considered by NMFS in its 1991, 1995, and 1997 South Atlantic Regional Biological Opinions (SARBO), as well as the 2003 (revised in 2005 and 2007) Gulf of Mexico Regional Biological Opinion (GRBO), for Corps hopper dredging activities. Under each biological opinion the NMFS determined that cutterhead pipeline dredging may affect but is not likely to adversely affect sea turtles. The impacts of mechanical dredging operations on sea turtles were previously assessed by the NMFS (NMFS, 1991a; NMFS, 1995a; NMFS 1997b; NMFS, 2003c) in the various versions of the SARBO and the 2003 (revised in 2005 and 2007) GRBO. The 1991 SARBO states that "clamshell dredges are the least likely to adversely affect sea turtles because they are stationary and impact very small areas at a given time. Any sea turtle injured or killed by a clamshell dredge would have to be directly beneath the bucket. The chances of such an occurrence are extremely low…" (NMFS, 1991a). NMFS also determined, "Of the three major dredge types, only the hopper dredge has been implicated in the mortality of endangered and threatened sea turtles." This determination was repeated in the 1995 and 1997 SARBO's (NMFS, 1995a and 1997). No new information is available that suggests increased risk of sea turtle take by clamshell dredges since the 1991, 1995, and 1997 SARBO's were received.

5.01.1.2 Turbidity and Sedimentation

From a turbidity and/or sedimentation standpoint, a hopper dredge has the highest likelihood of adverse effect due to the overflow of water being returned from the hopper to the surrounding environment. With this overflow, "fines" (usually clays or silts which are light enough not to have settled out in the hopper) are returned to the water during dredging operations. The clamshell or bucket dredge ranks second since the material may or may not be enclosed in a bucket, and if it is not enclosed, material may escape that bucket into the surrounding environment. Turbidity could be generated when the full bucket travels through the water column to the surface and is emptied into an adjacent barge. The dredging method with the lowest level of associated sedimentation or turbidity is the cutterhead dredge. This dredge has suction that removes the sediment and transports it to the surface, where it is either pumped onto the receiving beach, or placed in a scow for transport to either a beach or disposal site. Cutter/spider barge/scow operations would likely have turbidity and sedimentation associated

with overflow of the scow during loading, and as with hopper dredges, the fines would be the material most likely to be returned via the overflow.

Due to disturbances of the bottom sediments and losses of dredged material that occur with dredging operations, some minor level of sedimentation is expected outside of navigation channels. This effect relates to the turbidity generated from a dredging operation. Any sedimentation from dredging would be minor and the effects to sea turtles and their foraging or migration to natal beaches would be discountable.

The effects of turbidity and sedimentation on sea turtles from navigation dredging would be insignificant. Turbidity within the open water system would be quickly dissipated due to currents, wind and wave action. Since dredging does not take place in any one area for an extended period of time, there are numerous areas of nearby, alternate, and similar habitat for any project within the proposed action. Sedimentation outside of the channel would be minor and have no effect on sea turtle behavior, life history, or habitat.

5.01.1.3 Benthic Disturbance/Burial

Pelagic and benthic juvenile loggerheads are omnivorous and forage on crabs, mollusks, jellyfish, and vegetation at or near the surface (Dodd, 1988). Sub-adult and adults are primarily coastal dwellers and typically prey on benthic invertebrates such as mollusks and decapod crustaceans in hard bottom habitats. The main food sources are blue crabs (*Callinectes sapidus*), horseshoe crabs (*Limulus polyphemus*), other crabs, cannonball jellyfish (*Stomolophus meleagris*), and miscellaneous jellyfish. Other sea turtle species could be similarly impacted. The proposed project will displace benthic food supply, but these effects are expected to be temporary in nature. Though initial loss of benthic resources are likely, quick recovery, between 6-months (McCauley et al., 1977; Van Dolah et al., 1979; Van Dolah et al., 1984; and Clarke and Miller-Way, 1992) to two years (Bonsdorff, 1980; Ray, 1997) is expected. The maintenance of existing navigation channels will have no effect on turtles through benthic disturbance/burial of habitat as these channels are periodically maintained to mitigate for shoaling and provide for safe and efficient transportation. Also there are numerous areas nearby with similar habitat.

5.01.1.4 Noise

Sound produced from various dredges is thoroughly discussed in the 2008 SARBA. Effects to listed species as a result of noise created by construction activities can physically injure animals in the affected areas or change animal behavior in the affected areas. Injurious effects can occur in 2 ways. First, effects can result from a single noise event exceeding the threshold for direct physical injury to animals, and these constitute an immediate adverse effect on these animals. Second, effects can result from prolonged exposure to noise levels that exceed the daily cumulative exposure threshold for the animals, and these can constitute adverse effects if animals are exposed to the noise levels for sufficient periods. Behavioral effects can be adverse if such effects prevent animals from migrating, feeding, resting, or reproducing, for example. Sea turtles may be affected by related noise from this action but it will be intermittent and will not occur in any one area for any appreciable period of time. Due to the mobility of sea turtles

and because these projects occur in open water environments, they would likely move away from the source. Therefore, the effects from sound for this action will be insignificant on sea turtles.

5.01.1.5 Vessel Strike

Interactions with vessels and/or relocation trawlers may elicit startle or avoidance responses, and the effects of the proposed action may result in temporary changes in behavior of sea turtles (minutes to hours) over small areas, but are not expected to change the distribution of any sea turtles in the action area. Given the relatively slow speed of dredge vessels, the ability for sea turtles to move out of the way, and the anticipated avoidance behavior by sea turtles at the sea surface or in the water column, the chance of vessel strike is discountable.

5.01.1.6 Lighting

Lighting aboard dredges is only applicable to sea turtles and their ability to locate natal beaches for nesting, or the potential to interfere with hatchling movement to the sea. Dredge plants and associated tugs and barges are required to meet Corps, U.S. Coast Guard, and OSHA lighting standards for safety. Ample lighting on a hopper dredge is specifically required for the observers on board to provide safe access at night to the inflow boxes and screens. During the dredging process, if the dredge is within the vicinity of the nearshore area, lighting from the dredge or other associated vessels may impact sensitive nesting female and hatchling sea turtles. Additional lighting impacts may occur in the placement/disposal areas, floating pipeline (near the dredge and disposal area), and associated heavy equipment working on the site. By utilizing the PDCs for lighting mentioned above, the lighting impacts to sea turtles will be insignificant.

5.01.1.7 Effect Determination for Sea Turtles

While USACE and BOEM will follow the PDCs, for hopper dredges it is anticipated that incidental take will occur and Proposed Action #1 may affect, and is likely to adversely affect, the sea turtle species described herein, except for the Leatherback. Other dredging methods may affect, but are not likely to adversely affect the sea turtle species described herein, except for the Leatherback. Due to the Leatherback not being a bottom dwelling species, it is expected that dredging methods in Proposed Action #1 will not affect the Leatherback. Capture trawling, tissue sampling and tagging within Proposed Action #1 may affect, but are not likely to adversely affect listed sea turtle species.

5.01.1.8 Effects on Critical Habitat

Critical habitat exists for the leatherback, hawksbill, green, and loggerhead sea turtles. Descriptions of the critical habitat can be found in Appendix A1 (2008 SARBA, Section 3.01, pp 43-44, 54-55, and 58-59) and within Appendix G (Loggerhead Critical Habitat Analysis). Based on a review of existing critical habitat designation for leatherback, hawksbill, and green sea turtle species, as well as a review of previous and ongoing dredging project locations, no projects have been documented in or in the vicinity of any existing designated critical habitat. While critical

habitat does exist for loggerhead sea turtles in the action area, the maintenance dredging of navigation channels will have no effect on any Loggerhead critical habitat because none of the primary constituent elements will be affected. Appendix G provides a detailed analysis of the action on the various habitat types. USACE and BOEM conclude that this proposed action will have no effect on designated critical habitat for leatherback, hawksbill, green, and loggerhead sea turtle species.

5.01.2 Fish Species – Atlantic Sturgeon, Shortnose Sturgeon, Smalltooth Sawfish, Nassau Grouper, Giant Manta Ray, Scalloped Hammerhead

5.01.2.1 Entrainment

Sturgeon sp:

Though incidental take of sturgeon has been documented for hydraulic and mechanical dredging, only hydraulic hopper dredge operations are known to take sturgeon, are capable of effectively screening for incidental take, and have included ESOs to monitor and report incidental take since 1995. The potential for significant numbers of adult and juvenile fish being hit by a cutterhead is fairly low, and mechanical dredging has not been associated with any sturgeon take. Based on the current understanding of the different dredging operations relative to sturgeon behavior, clamshell and hydraulic cutterhead dredges are still considered by NMFS as alternative dredge types to reduce potential entrainment impacts to sturgeon (NMFS, 1998). A discussion of effects of dredging on both Atlantic and shortnose sturgeon can be found in the 2008 SARBA (Appendix A1, Section 4.05, pp159-166).

The eggs and larval sturgeons are not as mobile and, therefore, are more likely to be impacted either by being entrained by the dredge or being smothered/physically damaged by the materials in the dredge plume. Though most dredging activities will be limited to areas downstream of known spawning grounds, there is a potential for sturgeon eggs or larvae to be impacted by cutterhead dredging.

Similar to sea turtles, sturgeon entrainment is known to occur by the use of hopper dredging throughout the southeast. The effects of hopper dredging resulting from entrainment have been thoroughly described in past consultation documents. The use of the turtle deflectors on the draghead reduces the potential for take of benthic oriented species (i.e., sea turtles and sturgeon) by creating a sand wave in front of the draghead and pushing animals out of the way that were otherwise at risk of entrainment. By the implementation of the PDCs discussed in Section 4.01, USACE and BOEM will minimize the risk of entrainment to sturgeon sp. Appendix B lists all of the current projects in South Atlantic Division that involve maintenance dredging.

Smalltooth Sawfish:

Based on the current South Atlantic distribution, hopper dredge impacts to smalltooth sawfish are not likely from the North Carolina/Virginian border through southeast Florida. However,

considering that the smalltooth sawfish are most common within the boundaries of the Everglades National Park and the Florida Keys, the risk of hopper dredging impacts off the extreme southern portion of the state through Key West is higher. Based on current smalltooth sawfish encounter data throughout the Florida Keys, it is not likely that sawfish will be in the immediate vicinity of dredging operations. Take of a smalltooth sawfish by a hopper dredge is unlikely considering the smalltooth sawfish's affinity for shallow, estuarine systems. USACE has no record of hopper dredge entrainment of a smalltooth sawfish.

Nassau Grouper:

The Nassau grouper's distribution includes Florida and the Caribbean Sea. Adult Nassau grouper are generally associated with high-relief coral reefs in clear waters to depths of 130 meters. Juvenile Nassau grouper are associated with macroalgae (primarily *Laurencia* species), seagrass beds, and artificial and natural reef structure. As juveniles grow, they move progressively to deeper areas on offshore reefs. Maintenance dredging and other actions covered by this biological assessment generally occur in navigation channels or other areas outside of Nassau grouper habitat. The primary threat to Nassau grouper is commercial fishing, especially during spawning aggregations.

USACE has no record of hopper dredge entrainment of a Nassau grouper. Considering the adult size, mobility and habitat use, entrainment of a Nassau grouper by a hopper dredge is extremely unlikely to occur. This species could be entrained during relocation or abundance trawling efforts.

Scalloped Hammerhead Shark:

The distribution of scalloped hammerhead sharks is worldwide in coastal, warm, temperate and tropical seas in the Atlantic, Pacific, and Indian Oceans. The scalloped hammerhead shark is a coastal, pelagic species found in ocean waters and in waters over the continental shelf. This shark has been observed in estuarine habitats and offshore to depths of 1000 meters. Adults are usually solitary or occur in pairs. The primary threats to scalloped hammerhead sharks are targeted fisheries, shark fin trade and fishery bycatch.

There are no aggregation sites for the scalloped hammerhead shark in the action area. USACE has no record of hopper dredge entrainment of any of the scalloped hammerhead shark DPSs. Considering the adult size, mobility and primarily pelagic habitat use of this species, entrainment of a scalloped hammerhead shark by a hopper dredge is extremely unlikely to occur. This species could be entrained during relocation or abundance trawling efforts.

Giant Manta Ray:

On January 12, 2017, NMFS published a proposed rule in the Federal Register to list the giant manta ray as a threatened species under the Endangered Species Act. The distribution of the giant manta ray is worldwide in tropical and temperate ocean waters. On the U.S. Atlantic Coast, the giant manta ray has been documented as far north as New Jersey. The giant manta ray is commonly encountered on shallow reefs or sighted feeding offshore at the surface. The

giant manta ray is occasionally observed in sandy bottom areas and seagrass beds. Regional sub-populations appear to be small and generally contain less than 1,000 adult individuals. The primary threats to *Manta* species are targeted fishing and fishery bycatch.

There are no aggregation sites for the giant manta ray in the action area. USACE has no record of hopper dredge entrainment of a *Manta* species. Considering the rarity, adult size and mobility of the giant manta ray, entrainment by a hopper dredge is extremely unlikely to occur. This species could be entrained during relocation or abundance trawling efforts.

5.01.2.2 Turbidity and Sedimentation

Extensive studies have been done on the behavioral responses of fish to increased turbidity. These studies measured reactions such as cough reflexes, swimming activity, gill flaring, and territoriality that may lead to physiological stress and mortality; however, specific studies on sturgeon responses are limited. The effects of suspended sediment on fish should be viewed as a function of concentration and exposure duration (Wilber and Clarke, 2001). The behavioral responses of adult salmonids for suspended sediment dosages under dredging-related conditions include altered swimming behavior, with fish either attracted to or avoiding plumes of turbid water (Newcombe and Jensen, 1996).

Turbidity impacts to fish species as a result of proposed navigation dredging activities are expected to be temporary, with suspended particles settling out within a short time frame. These sediment disturbance impacts are expected to be minimal in nature and are not expected to have a measurable effect on water quality beyond the frequent natural increases in sediment load. For these reasons turbidity and sedimentation adjacent to channels will have insignificant effects on listed fish species.

5.01.2.3 Benthic Disturbance/Burial

Short term impacts could occur to benthic foraging and refuge habitat. Dredging activities can impact benthic assemblages either directly or indirectly and may vary in nature, intensity, and duration depending on the project, site location, and time interval between maintenance operations. Assuming that channel shoaling is a result of transport of sediment from littoral drift or other nearby areas, the composition of maintenance material dredged from the channel is expected to be the same as that remaining upon completion of dredging. At individual dredged channels and ports throughout the South Atlantic, it is not known how extensively the channels and turning basins are used by sturgeon as feeding areas. Channels maintained at frequent dredging intervals are not expected to be used extensively for feeding or other activities. More detailed discussion on benthic disturbance can be found within Appendix A1 (pp 164-166).

No new areas will be dredged under this Proposed Action. Therefore, no impacts to any of the listed fish species foraging habitat from alterations to hydrodynamic regime or additional loss of physical habitat (i.e., changes in benthic substrate) are expected.

5.01.2.4 Noise

Noise was previously discussed in Section 5.01.1.4. Fish species may be affected by related noise from this action but it will be intermittent and will not occur in any one area for any appreciable period of time. Due to the mobility of these species and because these projects generally occur in open water environments, they would likely move away from the source of noise. Fish species may be adversely affected by being temporarily unable to use the sites for foraging or shelter due to avoidance of construction activities and related noise. These effects will be insignificant because they are located in open water and will not consume the entire width of a channel at any time. Because of this, construction will not restrict movement of species in the area, and there is ample, alternate similar habitat adjacent to the project sites.

5.01.2.5 Effect Determination for Fish Species

While USACE and BOEM will follow the PDCs, it is anticipated that incidental take of sturgeon species will occur with the use of hopper dredges (from entrainment) and relocation trawling. Thus, the use of hopper dredging for Proposed Action #1 may affect, and is likely to adversely affect, the Atlantic and shortnose sturgeon; and the use of Cutterhead and Mechanical dredging may affect, but are not likely to adversely affect sturgeon. Hopper dredges may affect but are not likely to adversely affect smalltooth sawfish when dredging in the vicinity of the Florida Keys. The other species discussed here, Nassau Grouper, Scalloped Hammerhead Shark and Giant Manta Ray, are not expected to be affected by dredging activities in Proposed Action #1. Capture trawling may effect, but is not likely to adversely affect all listed fish species and tissue sampling and tagging may effect, but is not likely to adversely affect sturgeon.

5.01.2.6 Effects on Atlantic Sturgeon Critical Habitat

Navigation maintenance dredging will have insignificant effects on Atlantic sturgeon critical habitat. Essential features of Atlantic sturgeon critical habitat include: (1) suitable hardbottom substrate in low salinity waters; (2) transitional salinity zones from 0.5-30ppt; (3) soft substrate downstream of spawning sites; (4) waters of appropriate depth and absent barriers to passage; and (5) appropriate bottom water temperature and dissolved oxygen (DO) conditions. Maintenance dredging of navigation channels does not change substrate conditions because it is only removing shoaling material and returning a channel to its authorized depth. As such, it does not alter salinity regimes within a water body. Similarly, maintenance dredging has no long-term effect on any water quality parameters. The depths of a channel would simply be returned to a previously maintained depth.

Since spawning occurs upstream of most dredging projects, impacts to eggs and larvae are not expected. However, spawning migration pathways would likely occur within the vicinity of proposed dredging activities considering that some anadromous fish immigrate to their upstream spawning grounds via dredged or natural channel corridors. Considering that (1) dredging activities that occur within seasonal or spawning migration areas will be localized at any one time and would not span the length and width of the entire channel; and (2) when migrating, sturgeon have been documented to stay in the upper to middle portion of the water

column, it is likely that dredging activities will not preclude passage through migratory pathways or significantly reduce adequate areas for migration.

While there may be short-term minor effects to water quality and access, these effects will be insignificant; therefore, navigation dredging may affect, but is not likely to adversely modify Atlantic sturgeon critical habitat.

5.01.3 Listed Corals

Appendix F of this document presents a detailed corals analysis based upon the proposed actions of this Biological Assessment. The below text and the corals discussion in subsequent sections will summarize the findings of that analysis.

5.01.3.1 Turbidity

Indirect effects due to turbidity to a listed corals adjacent to the channels would be temporary and insignificant. The creation and resuspension of sediments during construction may result in sediment transport and deposition onto the hardbottom and coral reefs, rendering the area temporarily unsuitable and unavailable for coral recruitment and growth. Corals that have settled on the edge and in the vicinity of maintained channels are adapted to sediments associated with vessel passage in the channel, as well as any outflows from the channels. As such they are less likely to be adversely affected by temporary sedimentation associated with O&M dredging of navigation channels. Sediment accumulation on dead coral skeletons and exposed hard substrate reduces the amount of available substrate suitable for coral larvae settlement and fragment reattachment. Even small increases in sedimentation can reduce coral recruitment and survivorship (Babcock and Smith 2000), and sediments coupled with turf algae further impede recruitment of coral larvae of some species. Therefore, if sediments are present and deposited on the areas adjacent to construction, habitat may be unavailable for coral larval and fragment recruitment and growth. The effects of sedimentation on listed corals is discussed further below.

5.01.3.2 Sedimentation

From a turbidity and/or sedimentation standpoint, a hopper dredge has the highest likelihood of adverse effect due to the overflow of water being returned from the hopper to the surrounding environment. With this overflow, “fines” (usually clays or silts which are light enough not to have settled out in the hopper) are returned to the water during dredging operations. The clamshell or bucket dredge ranks second since the material may or may not be enclosed in a bucket, and if it is not enclosed, material may escape that bucket into the surrounding environment. The dredging method with the lowest level of associated sedimentation or turbidity is the cutterhead dredge. This dredge has suction that removes the sediment and transports it to the surface, where it is either pumped onto the receiving beach or placed in a scow for transport to either a beach or disposal site.

A review of four dredging projects (described in Appendix F) found that impacts associated with storms can have sedimentation rates in excess of 400 times those seen with a dredging project.

Even if sedimentation causes an indirect impact to listed corals from the dredging operation, coral reefs and hardbottom habitat are dynamic systems and sediments are often removed from the substrate by currents, tides, or storm events, especially those on exposed coasts like the Florida Reef Tract. Based on monitoring of nearby beach nourishment projects, it is likely that the impacts of sedimentation will be temporary, with the majority of the area returning to suitable conditions after approximately 18 months (Prekel et al. 2008). Previous monitoring from dredge events at Key West and Port Everglades show no permanent impacts from sedimentation. Overall, the effects of sedimentation from maintenance dredging on listed corals are likely to be insignificant.

5.01.3.3 Benthic Disturbance/Burial

Minimal direct impacts (breakage or removal) of the listed coral species are anticipated from dredging activities associated with O&M of a federal navigation channel and no direct effects are anticipated for sand mining activities. The listed coral species are not known to colonize on unconsolidated sediments, which is what is being removed from the navigation channels.

5.01.3.4 Effect Determination for Listed Corals

Following the PDCs listed above, maintenance dredging of navigation channels may affect, but is not likely to adversely affect listed corals, as corals are not anticipated to be in the navigation channels and the material being removed from the channels is not expected to cause any more sedimentation on surrounding corals than that which happened when the material arrived.

5.01.3.5 Effects on Coral Critical Habitat

The activity may impact critical habitat by physically altering or removing benthic habitat suitable for colonization. Indirect effects to critical habitat may occur from sedimentation and turbidity of dredging navigational channels. This increase sedimentation may cause loss of substrate for fragment reattachment or larval settlement. NMFS has previously stated that hard substrate along the bottom and walls of existing channels does not provide the essential features for listed coral critical habitat for settlement and recruitment. As discussed in the final rule designating critical habitat, NMFS determined that existing federally-authorized channels do not provide the essential feature. This is based on the disturbed nature of the substrate within channels and channel walls (i.e., it has been dredged from its natural conditions). Further, sediment movement, suspension, and deposition levels are high within existing channels due to vessel movements in the channels and tidal currents. Hard substrate found within these channels and along their walls are ephemeral in nature and are frequently covered by sand or disturbed by vessel passage and O&M dredging, thus not meeting the definition of the essential feature. Therefore, the impacts to the hardbottom that occurs in channel bottoms and channel walls are not considered impacts to listed coral critical habitat.

For indirect effects to critical habitat, the Corps estimated the amount of critical habitat adjacent to navigational channels to be approximately 200 acres. Based on the calculations in Appendix F, the indirect impacts to coral critical habitat are estimated to be approximately 0.0068% of the total area designated as critical habitat being impacts. Given the large area of

unaffected critical habitat remaining, the magnitude of the effect would not reach the level of adverse modification of critical habitat.

5.01.4 Johnson's Seagrass

NMFS has previously determined that Johnson's seagrass is likely to be adversely affected by maintenance dredging in areas adjacent to the channels, harbors, and private or commercial dredging projects. For a full description of these effects, see Appendix L (NMFS (2001)).

5.01.4.1 Turbidity, Sedimentation, and Benthic Disturbance

Routine O&M dredging associated with the movement of sediments in and around inlets may affect seagrasses by direct removal, light limitation due to turbidity, and burial from sedimentation. Since the effects of this action on Johnson's seagrass are previously covered under the 2001 Biological Opinion to Jacksonville District (Appendix L), they will not be discussed further in this document. By continuing to operate under that Biological Opinion and pertinent PDCs of this SARBA, USACE and BOEM will minimize impacts on the species.

5.01.4.2 Effects on Johnson's Seagrass Critical Habitat

In the 2001 Biological Opinion to USACE Jacksonville (Appendix L), NMFS determined that navigation dredging is not likely to destroy or adversely modify Johnson's seagrass critical habitat.

5.01.5 Whales

5.01.5.1 Noise

In order to better assess potential species impacts (i.e., disturbance of communication among marine mammals) associated with dredge-specific noise from navigation maintenance or deepening operations, Clarke et al. (2002) and Reine et al. (2015 and 2016) performed underwater field investigations to characterize sounds emitted by bucket, hydraulic cutterhead, and hopper dredge operations. A summary of results from this study are presented below and are a first step towards the development of a dredge sounds database which will encompass a range of dredge plant sizes and operational features.

Dredging operations generally produce lower levels of sound energy but last for more extended periods of time than more intense construction activities (e.g., pile driving) (Nightengale and Simenstad 2001). These sounds have been documented to be continuous and low frequencies (< 1000 Hz) and are within the audible range of listed species of both whales (7Hz–22kHz) and sea turtles (100-1000Hz) (Clarke et al., 2002). Noise generated by a cutterhead suction dredge is continuous and muted and results from the cutterhead rotating within the bottom sediment and from the pumps used to transport the effluent to the placement area. The majority of the sound generated was from 70 to 1,000 Hz and peaked at 100 to 110 dB range. Though attenuation calculations were not completed, reported field observations indicate that the cutterhead suction dredge became almost inaudible at about 500 meters (Clarke et al., 2002).

The noise generated from a hopper dredge is similar to a cutterhead suction dredge except there is no rotating cutterhead. The majority of the noise is generated from the dragarm sliding along the bottom, the pumps filling the hopper, and operation of the ship engine/propeller. Similar to the cutterhead suction dredge, most of the produced sound energy fell within the 70 to 1,000 Hz range; however, peak pressure levels were at 120 to 140 dB (Clarke et al., 2002).

Mechanical dredges (clam shell or bucket) are relatively stationary and produce a repetitive sequence of sounds generated by winches, bucket impact with the substrate, bucket closing, and bucket emptying. The noise generated from a mechanical dredge entails lowering the open bucket through the water column, closing the bucket after impact on the bottom, lifting the closed bucket up through the water column, and emptying the bucket into an adjacent barge. Based on the data collected for this study, which included dredging of coarse sands and gravel, the maximum noise spike occurs when the bucket hits the bottom (120 dB peak amplitude). A reduction of 30 dB re 1 µPa/m occurred between the 150 m and 5,000 m listening stations with faintly audible sounds at 7-km. All other noises from this operation (i.e., winch motor, spuds, etc.) were relatively insignificant (Clarke et al., 2002).

According to Richardson et al. (1995) the following noise levels may be detrimental to marine mammals:

- Prolonged Exposure of 140 dB re 1 µPa/m (continuous manmade noise), at 1 km may cause Permanent Hearing Loss; and
- Prolonged Exposure of 195 to 225 dB re 1 µPa/m (intermittent noise), at a few meters or tens of meters, may cause Immediate Hearing Damage

But he states, “Many marine mammals would avoid these noisy locations, although it is not certain that all would do so.” In a study evaluating specific reaction of bowhead whales to underwater drilling and dredge noise, Richardson et al. (1990) also noted that bowhead whales often move away when exposed to drillship and dredge sound; however, the reactions are quite variable and may be dependent on habituation and sensitivity of individual animals. Received noise levels diminish by about 60 dB between the noise source and a radius of 1 km (Richardson et al, 1995). For marine mammals to be exposed to a received level of 140 dB at 1 km radius, the source level would have to be about 200 dB re 1 micro Pa-m. Furthermore, few human activities emit continuous sounds at source levels greater than or equal to 200 dB re 1 micro Pa-m; however, supertankers and icebreakers may exceed the 195 dB noise levels.

According to Clarke et al. (2002), hopper dredge operations had the highest sustained pressure levels of 120-140 dB among the three measured dredge types; however, this measurement was taken at 40 m from the operating vessel and would likely attenuate significantly with increased distance from the dredge. Based on: (1) the predicted noise impact thresholds noted by Richardson et al. (1995), (2) the background noise that already exists within the marine environment, and (3) the ability of marine mammals to move away from the immediate noise source, noise generated by mechanical, cutterhead, and hopper dredge activities will not affect the migration, nursing/breeding, feeding/sheltering or communication of large whales.

Although behavioral impacts are possible (i.e., a whale changing course to move away from a vessel), the number and frequency of vessels present within a given project area is small and any behavioral impacts would be expected to be minor. Furthermore, the implementation of the North Atlantic Right Whale Conservation Plan (Appendix E) will minimize impacts to discountable levels.

5.01.5.2 Vessel Strike

The risk of whale/vessel interactions during hopper dredging is very low, especially when hopper dredge dragheads are on the bottom of a channel or borrow site and the hydraulic suction is engaged. During actual dredging operations, a hopper dredge is typically traveling at 2 to 3 knots. USACE implementation of the North Atlantic Right Whale Conservation Plan (Appendix E) and BOEM's commitment to the 10-knot speed restriction will reduce the risk of whale/vessel interactions when vessels are in transit to a placement or borrow site.

5.01.5.3 Effect Determination for Whales

Any effects to large whales due to the maintenance dredging of navigation channels will be insignificant.

5.01.5.4 Effects on Right Whale Critical Habitat

USACE and BOEM sent NMFS an analysis of the proposed action impacts on Right whale critical habitat (Appendix I). Much of the proposed action area falls within the proposed critical calving habitat for North Atlantic Right whales (NARWs). NMFS defines the physical features that are essential to the conservation of the NARW as being: "(1) Sea surface conditions associated with Force 4 or less on the Beaufort Scale; (2) Sea surface temperatures of 7°C to 17°C; and (3) Water depths of 6 to 28 meters, where these features simultaneously co-occur over contiguous areas of at least 231 km^2 of ocean waters during the months of November through April" (81 FR 4837).

This proposed action consists of maintenance dredging of material from navigation channels in the South Atlantic region. This action will have no effect on the essential habitat features of the right whale calving area. Excavation of dredge material does not affect water temperature or sea surface roughness. Maintenance dredging will not appreciably alter the authorized depth of navigation channels, since the activity merely returns the channel to its authorized depth. These actions would occur only in relatively small areas described in Appendix B. Material excavation is expected to occur within a combined area representing only a small fraction of the calving area critical habitat. At any given time, dredging activities would only occur in an even smaller fraction of this area.

5.02 Proposed Action #2 (Transportation of Dredged Material)

The specific IPFs are shown in Table 7.

Table 7. Species Specific IPFs for Proposed Action #2

Transportation		Impact Producing Factors										
Specific Action	Species/Habitat	Entrainment	Beach Profile Slope Adjustment/ Equilibration	Turbidity	Sedimentation	Benthic Disturbance / Burial	Bathymetric Change	Hydraulic/ Hydrologic Changes	Noise	Vessel Strike	Temporary Obstructions	
											Submerged /Floating Pipeline	Lighting
Transportation: Pipeline	Sea Turtles			X	X	X			X		X	
	Fish Species			X	X	X			X			
	Corals			X	X	X					X	
	Johnson's Seagrass			X	X	X					X	
	Whales								X			
Transportation: Hopper	Sea Turtles			X	X	X			X	X		X
	Fish Species			X	X	X			X			
	Corals			X	X	X						
	Johnson's Seagrass					X						
	Whales								X	X		
Transportation: Barge/Scow/Tug	Sea Turtles			X	X	X			X			X
	Fish Species			X	X	X			X			
	Corals			X	X	X						
	Johnson's Seagrass			X	X	X						
	Whales								X			

5.02.1 Sea Turtles

The transportation of dredged material by hopper dredge, tug, scow, barge or hydraulic cutterhead pipeline will have no effect on sea turtles.

5.02.1.1 Turbidity, Sedimentation, Burial

Turbidity could be generated during the transportation of dredged material via overflow of the scows or hoppers, or sloshing of material during transport. Cutterhead pipelines could develop leaks resulting in turbidity plumes. The impacts of these circumstances are temporary and minor and even if temporarily enveloped in a sediment plume, the possibility of injury or burial of normal, healthy sea turtles by dredged material transport is discountable.

5.02.1.2 Noise

Noise from the transportation of dredged material will have discountable effects on sea turtles.

5.02.1.3 Vessel Strike

Interactions with vessels transporting material (hoppers and scows) may elicit startle or avoidance responses and the effects of the proposed action may result in temporary changes in behavior of sea turtles (minutes to hours) over small areas, but are not expected to change the distribution of any sea turtles in the action area. Given the relatively slow speed of dredge vessels, the ability for sea turtles to move out of the way, and the anticipated avoidance behavior by sea turtles at the sea surface or in the water column, the chance of vessel strike is discountable.

5.02.1.4 Lighting

Lighting impacts will be similar to those discussed in Section 5.01.1.6. By utilizing the PDCs for lighting mentioned in Section 4, the lighting impacts to sea turtles will be insignificant.

5.02.1.5 Effect Determination for Sea Turtles

No effects to sea turtles are expected from Proposed Action #2, transportation of dredge material.

5.02.1.6 Effects on Critical Habitat

Critical Habitat exists for the leatherback, hawksbill, green, and loggerhead sea turtles. Descriptions of the critical habitat can be found in Appendix A (2008 SARBA) and within Appendix F (Loggerhead Sea Turtle Critical Habitat Analysis). Based on a review of existing critical habitat designation for leatherback, hawksbill, and green sea turtle species, as well as a review of previous and ongoing dredging project locations, no projects have been documented in or in the vicinity of any existing designated critical habitat. While critical habitat does exist for loggerhead sea turtles in the action area, none of the primary constituent elements (discussed and defined in Appendix F) will be affected due to the implementation of the PDCs for this Proposed Action. Therefore, USACE and BOEM conclude that this Proposed Action will have no effect on designated critical habitat for leatherback, hawksbill, green, and loggerhead sea turtle species.

5.02.2 Fish Species – Atlantic Sturgeon, Shortnose Sturgeon, Smalltooth Sawfish, Nassau Grouper, Giant Manta Ray, Scalloped Hammerhead

5.02.2.1 Turbidity, Sedimentation, Burial

Turbidity could be generated during the transportation of dredged material via overflow of the scows or hoppers, sloshing of material during transport. Cutterhead pipelines could develop leaks resulting in turbidity plumes. The impacts of these circumstances are temporary and minor and even if temporarily enveloped in a sediment plume, the possibility of injury, or burial of normal, healthy listed fish species by dredged material transport is discountable.

5.02.2.2 Noise

Noise from the transportation of dredged material will have discountable effects on listed fish species.

5.02.1.3 Effect Determination for Fish

No effects to listed fish species are expected from Proposed Action #2, transportation of dredge material, due to the discountable nature of any possible effects.

5.02.2.4 Effects on Atlantic Sturgeon Critical Habitat

The transportation of dredged material will have no effect on the essential features supporting Atlantic sturgeon critical habitat that were described in Section 5.01.2.6.

5.02.3 Listed Corals

5.02.3.1 Turbidity, Sedimentation, Burial

USACE estimates there are approximately 2,014 acres of ingress/egress routes in southeastern Florida, Puerto Rico and the U.S. Virgin Islands where listed corals could be present, and calculated the type of benthic habitat cover within that area (See Appendix F). The overflow of sediment from the transportation of dredged material may affect listed corals that are located near the ingress/egress routes. Descending sediment plumes discharge at the surface, or pumping of sediment load over the side may travel down drift of the disposal areas.

Listed corals can be found within 100% of the 2,014 acres of area calculated for ingress/egress routes. Listed corals adjacent to beach placement or nearshore placement areas could be impacted due descending sediment plumes, where a thin layer of sediment may cover listed corals resulting in energy expenditure to rid the colony of the sediment, and if the colony is unable to remove the sediment, partial mortality may occur. However, by implementing the PDCs this is unlikely.

Indirect effects from pipeline leaks and potential sedimentation onto adjacent listed species could occur. Further details on the amount of impacts can be found in Appendix F. Impacts due to sedimentation as discussed in Appendix F and in Section 5.01.3.2 are also valid here. Any impacts would likely be temporary, and corals are likely to recover; therefore, the overall adverse effect would be discountable.

With the implementation of the PDCs discussed above, any adverse impacts through sedimentation would likely be temporary, and corals are likely to recover. Therefore, the overall adverse effect would be discountable.

5.02.1.2 Effect Determination for Corals

Transportation of dredged material by hopper dredge, tug, scow, barge, or hydraulic cutterhead pipeline may affect, but is not likely to adversely affect listed coral species.

5.02.3.3 Effects on Critical Habitat

The overflow of sediment from the transportation of dredged material, when it occurs over listed coral critical habitat, may affect critical habitat. Descending sediment from overflow at the surface may settle onto critical habitat. In areas where this might occur and essential features are present, the sediment would prevent the settlement and attachment of listed corals. However, it is likely that any sediment that covers essential features would be removed through ocean processes and, therefore, any impact would be temporary and the overall adverse effect would be discountable.

Material being transported over Acropora critical habitat to the discharge area via submerged and floating pipelines could have adverse impacts to the essential features for Acropora spp. Direct impacts to critical habitat can occur from submerged pipelines, as well as impacts from the ingress/egress of construction vessels. Indirect impacts to critical habitat could occur through pipeline leaks. Most pipeline corridors are already established in areas where the critical habitat essential features are not present or are minimal. Any adverse direct and/or indirect impact to listed corals would be temporary and with the implementation of the PDCs the action is not likely to adversely modify nearby critical habitat

5.02.4 Johnson's Seagrass

Since the effects of this action on Johnson's seagrass are previously covered under the 2001 Biological Opinion to Jacksonville District (Appendix L) they will not be discussed further in this document. All consultation requirements for Johnson's seagrass are satisfied by reference of this opinion. By complying with that Biological Opinion and pertinent PDCs of this SARBA, USACE and BOEM will minimize impacts on the species while continuing to accomplish their respective missions.

5.02.4.1 Effects on Johnson's Seagrass Critical Habitat

In the 2001 Biological Opinion to USACE Jacksonville (Appendix L), NMFS determined that navigation dredging is not likely to destroy or adversely modify Johnson's seagrass critical habitat.

5.02.6 Whales

5.02.6.1 Noise

While noise would be generated from the Proposed Action, the effects would be discountable due to the mobile source and minimal source level.

5.02.6.2 Vessel Strike

The only other IPF from this Proposed Action is due to the potential for vessel strike. Impacts from dredging operations have the potential to occur offshore during a dredge plant's transit to and from an ocean disposal site, but such interactions are extremely rare. Since consultations with NMFS were completed in the SARBO (1991, 1995, and 1997), (1) the estimated number of Right whales has increased based on the data presented in the NMFS annual stock assessments, (2) the annual support for the Right Whale Early Warning System associated with operations near or within the calving grounds has been ongoing, and (3) USACE involvement with and awareness of Right whale issues has increased significantly. Based on these factors and the success of the current Right whale protection measures, USACE expects that dredging operations are not likely to adversely affect North Atlantic Right or humpback whales. Additionally, a review of the NMFS large whale strike database does not identify any records of large whale ship strikes associated with any dredging equipment. There is an account of a dredge/whale interaction observed in 1988 when a dredge approached within 100 yards of a

Right whale and another incident in 2005. These situations are unlikely to occur in the future due to the implementation of the protection measures within the North Atlantic Right Whale Conservation Plan, submitted as Appendix F of this document.

5.02.6.3 Effect Determination for Whales

No effect on large whales is expected from transportation by pipeline or scow; however, transportation by hopper dredge may affect, but is not likely to adversely affect listed whales.

5.02.6.4 Effects on Right Whale Critical Habitat

Proposed Action #2 would not influence any of the essential features for Right whale critical habitat (described in Appendix I) and, therefore, will have no effect on critical habitat.

5.02 Proposed Action #3 (Placement of Navigation Dredged Material)

The specific IPFs are shown in Table 8.

Table 8. Species Specific IPFs for Proposed Action #3

Placement		Impact Producing Factors										
Specific Action	Species/Habitat	Entrainment	Beach Profile Slope Adjustment/ Equilibration	Turbidity	Sedimentation	Benthic Disturbance / Burial	Bathymetric Change	Hydraulic/ Hydrologic Changes	Noise	Vessel Strike	Temporary Obstructions	
											Submerged /Floating Pipeline	Lighting
DMMA	Sea Turtles											X
	Fish Species			X	X	X						
	Corals											
	Johnson's Seagrass			X	X	X						
	Whales											
ODMDS	Sea Turtles			X	X	X	X	X				X
	Fish Species			X	X	X	X	X				
	Corals			X	X	X						
	Johnson's Seagrass											
	Whales						X	X				
Nearshore	Sea Turtles			X	X	X	X	X				X
	Fish Species			X	X	X	X	X				
	Corals			X	X	X	X	X				
	Johnson's Seagrass											
	Whales						X	X				
Alongside/Downdrift	Sea Turtles			X	X	X	X	X				X
	Fish Species			X	X	X	X	X				
	Corals			X	X	X	X	X				
	Johnson's Seagrass											
	Whales						X	X				
Other Beneficial Use	Sea Turtles			X	X	X	X	X				X
	Fish Species			X	X	X	X	X				
	Corals			X	X	X	X	X				
	Johnson's Seagrass			X	X	X	X	X				
	Whales						X	X				

5.03.1 Sea Turtles

Placement of dredged material in approved upland, open water, or ODMDS placement areas will have no effect on sea turtle species. The remainder of this section discusses the placement of dredged material for beneficial uses.

5.03.1.1 Turbidity, Sedimentation, and Burial

Placement of dredged material for beneficial uses, including but not limited to beach placement, nearshore placement, placement downdrift of channels, marsh creation, thin layer placement, land creation, fish and wildlife habitat enhancements, fisheries improvements, and wetland restoration may affect but is not likely to adversely affect sea turtle species. These actions may result in elevated turbidity for brief periods of time during the construction. Even if temporarily

enveloped in a sediment plume, the possibility of injury, or burial of normal, healthy sea turtles by dredged material (i.e., sand and silt) disposal, is discountable. The effects of burial on benthic infauna are considered minor because it is anticipated that the recovery time for benthic epifauna and infauna will be relatively quick. Additionally, NMFS has never received a report of an injury to a sea turtle or sturgeon resulting from burial in, or impacts from, dredged material disposal, neither from inshore nor offshore disposal sites, anywhere the USACE conducts dredged material disposal operations (NMFS 2015).

5.03.1.2 Bathymetric and Hydraulic/Hydrologic Changes

The beneficial uses covered under this Proposed Action will alter the bathymetry/topography of placement areas, which could alter foraging behavior or disrupt access to and from nesting beaches. When placed on a beach, nearshore, or open water environment, these sediments will be shaped by natural processes and may affect, are not likely to adversely affect any sea turtle species. Beneficial use projects have an inherent goal of keeping sediment in the natural system. While minor effects can be noted during the construction of a beneficial use project, the long-term benefits of any of the described activities outweigh the minor effects.

5.03.1.3 Lighting

The presence of artificial lighting on or within the vicinity of nesting beaches can be detrimental to critical behavioral aspects of the nesting process, including nesting female emergence, nest site selection, and the nocturnal sea-finding behavior of both hatchlings and nesting females. Details on lighting effects are discussed in the 2008 SARBA (Appendix A1, Section 4.01.1, p 120 and Section 4.04.2, pp 137-8). With the implementation of the PDCs, these effects are discountable.

5.03.1.4 Effect Determination for Sea Turtles

Proposed Action #3, except for downdrift/alongside channel and for ODMDS, may affect, but is not likely to adversely affect sea turtles. No effect on listed sea turtles is expected for downdrift/alongside and for ODMDS channel placement.

5.03.1.5 Effects on Critical Habitat

Critical Habitat has been designated for the leatherback, hawksbill, green, and loggerhead sea turtles. Based on a review of existing critical habitat designation for leatherback, hawksbill, and green sea turtle species, as well as a review of previous and ongoing dredging project locations, no projects have been documented in or in the vicinity of any existing designated critical habitat. Therefore, USACE and BOEM conclude that Proposed Action #3 will not affect designated critical habitat for leatherback, hawksbill, and green sea turtle species.

Appendix G details the effects of this action on Loggerhead critical habitat. NMFS designated critical habitat for the loggerhead sea turtle in a final ruling on July 10, 2014 (FR Vol. 79, No. 132). This ruling established critical habitat for 5 habitat types: nearshore reproductive, overwintering, breeding, migratory, and sargassum. The habitat type most likely to be influenced by this Proposed Action is nearshore reproductive habitat. NMFS states that the

primary impacts to nearshore reproductive habitat would come from loss of habitat conditions that allow for "(a) hatchling egress from the water's edge to open water; and (b) nesting female transit back and forth between the open water and the nesting beach during nesting season." Beneficial use projects, specifically nearshore placement and beach placement, will not result in barriers or dramatic altering of the slope of the beach approach for nesting females because of the relatively fast equilibration of nourishment projects. By utilizing the PDCs for Proposed Action #3, USACE and BOEM conclude that this action will not adversely modify nearshore reproductive habitat.

Breeding and migratory critical habitat is in close proximity to central and south Florida projects. Beneficial use projects will not result in long-term adverse modifications to this critical habitat as no permanent structures are constructed.

Because none of the essential features (discussed in Appendix G) will be adversely affected, this proposed action will not adversely modify loggerhead critical habitat.

5.03.2 Fish Species – Atlantic Sturgeon, Shortnose Sturgeon, Smalltooth Sawfish, Nassau Grouper, Giant Manta Ray, Scalloped Hammerhead

5.03.2.1 Turbidity, Sedimentation, and Burial

The effects of burial on benthic infauna are considered minor because it is anticipated that the recovery time for benthic epifauna and infauna will be relatively quick. By following the PDCs described in Section 4.0, this effect is insignificant.

5.03.2.2 Bathymetric and Hydraulic/Hydrologic Change

Bathymetric changes and/or hydraulic/hydrologic changes resulting from beneficial use projects discussed in Section 4.03 could alter foraging behavior of listed fish species; however, these changes will not create any adverse effects to listed fish species.

5.03.2.3 Effect Determination on Fish Species

No effects to listed fish are expected from Proposed Action #3, due to the insignificant nature.

5.03.2.4 Effects on Atlantic Sturgeon Critical Habitat

ODMDS placement, beach placement, nearshore placement, or alongside channel placement will have no effect on Atlantic sturgeon critical habitat. Placement of dredged material in upland disposal areas produces effluent back to the receiving waters. This effluent creates temporary elevated turbidity and minor water quality impacts. Since the effect of this is temporary and minor and the receiving waters will be unaffected by the action in the long term, this action is unlikely to affect critical habitat. Similar effects could be realized from marsh creation, wetland enhancements, thin layer placement or other beneficial uses that take place within/surrounding Atlantic sturgeon critical habitat. Since the effects are temporary and minor, and the beneficial aspects to the ecosystem greatly outweigh those aspects, placement

of dredged material may affect, but is not likely to adversely modify Atlantic sturgeon critical habitat.

5.03.3 Listed Corals

Materials dredged from navigational channels will be placed at a nearshore disposal site, an offshore ODMDS, or an approved upland disposal site.

5.03.3.1 Turbidity

Turbidity will be generated during the placement of dredged material; however, with the implementation of the PDCs, placement of dredged material may affect but is not likely to adversely affect listed corals.

5.03.3.2 Sedimentation

Indirect adverse effects to listed corals may occur through the disposal of dredged material into nearshore disposal areas. Although most disposal areas primarily consist of unconsolidated material where corals would not be present, nearby hardbottom and reefs may contain listed species. The discharged material could travel outside of the construction template if work is concurrent with storms or strong currents. Hardbottom habitats are known to be within 1,000 feet of some borrow areas in southeast Florida; however, typically effects are not seen more than 400 feet from borrow areas due to the nature of the material being dredged. Therefore, indirect effects may occur to listed coral species but would be temporary, and corals are likely to recover; therefore, the overall adverse effect would be discountable.

5.03.3.3 Benthic Disturbance/Burial

With the implementation of the PDCs, any adverse effects to listed corals due to this Proposed Action will be discountable.

5.03.3.4 Bathymetric Change

With the implementation of the PDCs, this Proposed Action will not adversely affect listed corals.

5.03.3.5 Effect Determination for Corals

With the implementation of PDCs, the use of an approved upland disposal site will have no effect on listed corals or designated critical habitat. Sedimentation from nearshore and offshore disposal sites are not likely to adversely affect listed corals, especially with the implementation of PDCs. The ODMDSs are located in deep water (in excess of 500 feet) off of the continental shelf, and placement of material in them has no effect on listed corals as they are not present in water of that depth. If beneficial use on a beach was accomplished, then the effects would be the same as those described below for beach nourishment.

5.03.3.6 Effects on Critical Habitat

With the implementation of the PDCs, this Proposed Action may affect, but is not likely to adversely modify listed coral critical habitat for placement nearshore or beneficial use. For placement in an ODMDS or confined disposal, no effect to critical habitat is expected.

5.03.4 Johnson's Seagrass

Since the effects of this action on Johnson's Seagrass are previously covered under the 2001 Biological Opinion to Jacksonville District (Appendix L), they will not be discussed further in this document. All consultation requirements for Johnson's seagrass are satisfied by reference of this opinion. By continuing to comply with that Biological Opinion and pertinent PDCs of this SARBA, USACE and BOEM are continuing to minimize impacts of maintaining safe and efficient navigation on the species. The only placement areas where seagrasses may be encountered is in beneficial placements, which may affect, but are not likely to adversely affect Johnson's seagrass.

5.03.4.1 Effects on Critical Habitat

The only placement areas where seagrasses may be encountered is in beneficial placements. As indicated in the 2001 Biological Opinion to USACE Jacksonville (Appendix L), NMFS determined that navigation dredging and associated activities are not likely to destroy or adversely modify Johnson's seagrass critical habitat.

5.03.6 Whales

5.03.6.1 Bathymetric Change

As described in Appendix J, water depth would only be slightly modified by the placement of dredge material at designated sites. Dredged material disposal would not produce appreciable mounding that would act as an impediment to whale migration pathways. Additionally, these actions would occur only in relatively small areas described in the BOEM action areas detailed in Appendix B, and other action areas would be too close to shore to affect whales.

5.03.6.2 Noise

Noise generated from the transportation and/or placement of dredged material is insignificant and discountable.

5.03.6.3 Vessel Strike

Impacts from dredging operations have the potential to occur offshore during a dredge plant's transit to and from an ocean disposal site but such interactions are rare. Since consultations with NMFS were completed in the SARBO (1991, 1995, and 1997), (1) the estimated number of Right whales has increased based on the data presented in the NMFS annual stock assessments, (2) the annual support for the Right Whale Early Warning System associated with operations near or within the calving grounds has been ongoing, and (3) the Corps' involvement with and awareness of Right whale issues has increased significantly. Based on these factors and the

success of the current Right whale protection measures, the Corps expects that dredging operations is not likely to adversely affect North Atlantic Right or humpback whales. Additionally, a review of the NMFS large whale strike database does not identify any records of large whale ship strikes associated with any dredging equipment. There is an account of a dredge/whale interaction observed in 1988 when a dredge approached within 100 yards of a Right whale and another incident in 2005. These situations are unlikely to occur in the future due to the implementation of the protection measures within the North Atlantic Right Whale Conservation Plan, submitted as Appendix F of this document.

5.03.6.4 Effect Determination on Whales

No effects from Proposed Action #3 to large whales are expected.

5.03.6.5 Effects for Right Whale Critical Habitat

As indicated in Appendix I, none of the essential features supporting the designation for critical habitat would be appreciably impacted by the implementation of this action and, therefore, beneficial use of dredged material is not likely to adversely modify NARW designated critical habitat. All other placement activities will have no effect on NARW designated critical habitat.

5.04 Proposed Action #4 (Beach Nourishment)

The specific IPFs are shown in Table 9.

Table 9. Species Specific IPFs for Proposed Action #4

Beach Nourishment	Impact Producing Factors										
Species/Habitat	Entrainment	Beach Profile Slope Adjustment/ Equilibration	Turbidity	Sedimentation	Benthic Disturbance / Burial	Bathymetric Change	Hydraulic/ Hydrologic Changes	Noise	Vessel Strike	Temporary Obstructions	
Specific Action										Submerged /Floating Pipeline	Lighting
Sea Turtles		X	X	X	X	X	X	X		X	X
Fish Species		X	X	X	X	X	X	X			
Corals			X	X	X					X	
Johnson's Seagrass											
Whales											

5.04.1 Sea Turtles

5.04.1.1 Beach Profile Slope

Beach nourishment is the introduction of sediment along a shoreline to supplement the natural littoral (longshore) drift. Beach nourishment projects are designed and constructed to equilibrate to a more natural profile over time relative to the wave climate of a given area. Sediment compatibility analyses are a significant consideration in the design of beach nourishment project so to assure that dredged sediments are consistent with the native beach characteristics. Considering the variability in native beach sediment characteristics among projects, compatibility analyses are extensively coordinated with environmental resource agencies to assure compliance with federal, state, and/or local requirements. Sand is pumped to the beach by pipeline either directly from the dredge (e.g., cutterhead suction dredge) or from an offshore pumpout station (e.g., hopper dredge) and shaped using earth-moving equipment. The beach building process typically involves the use of bulldozers and other heavy equipment to distribute the sediment as it falls out of suspension at the outflow end of the

pipeline. The sediment slurry is often diffused as it is released from the terminal pipe in order to reduce the flow velocity onto the beach and minimize the risk of creating scour holes. Dikes are constructed on one or two sides of the effluent area to allow for extended settlement time of suspended solids in order to reduce turbidity levels in the near shore environment. It is unnecessary and impractical to artificially grade beach slopes below the mean low water elevation since they will be shaped by wave action to the natural slope. As such, the long-term effects of beach nourishment on the beach slope are considered insignificant to sea turtle.

5.04.1.2 Turbidity, Sedimentation, Benthic Disturbance/Burial

Placement of dredged material for beach nourishment may result in elevated turbidity for brief periods of time during the construction. Even if temporarily enveloped in a sediment plume, the possibility of injury, or burial of normal, healthy sea turtles by dredged material (i.e., sand and silt) disposal is discountable. The effects of burial on benthic infauna are considered minor because it is anticipated that the recovery time for benthic epifauna and infauna will be relatively quick. Additionally, NMFS has never received a report of an injury to a sea turtle (or sturgeon) resulting from burial in, or impacts from, dredged material disposal, neither from inshore or offshore disposal sites, anywhere the USACE conducts dredged material disposal operations (NMFS 2015).

Nearshore hardground habitat is utilized by sea turtles for feeding. NMFS has expressed a concern about the extent of direct burial of nearshore hardbottom habitats by sand placement, particularly worm reefs (*Phragmatopoma lapidosa*) along southeastern Florida. Nearshore hardbottom habitat is not common among all southeastern US beach nourishment projects, but is more common in certain areas, particularly in Florida, Long Bay, SC, and southern NC. Nearshore hardbottom reefs (including worm reefs – common feeding grounds for green sea turtles) in FL are within 200 m of the shore and have a patchy distribution among large expanses of soft-bottom consisting of coarse sediments (SAFMC 2009). In other regions, nearshore hardbottom is characterized as low relief, patchy, and surrounded by large expanses of sand (Burgess et al., 2011). Nearshore hardbottom habitat is subjected to sand transport/dispersion and intermittent burial and exposure through a variety of manners including the natural distribution of ephemeral sand movement (Burgess et al., 2011; SEAMAP-SA, 2001). Hardbottom habitat may be affected by beach nourishment in several ways including increased turbidity during sand placement, direct burial by fill, and indirect burial as fill is transported offshore and alongshore by waves and currents (Burgess et al., 2011). Hardbottom habitat can be extremely variable due to fluctuations in hydrodynamic conditions and larval availability (Osman, 1977; Bros, 1987). Some studies have documented the burial of nearshore hardbottom habitat (Bishop et al., 2006; Lindeman and Snyder, 1999; Rakocinski et al. 1996); however, these effects have also been found to be temporary and minor and in some cases insignificant.

In summary, nearshore hardbottom habitat that is utilized by sea turtles will not be significantly impacted by beach nourishment projects. However, the equilibration of beach fill results in sediment movement seaward as the beach equilibrates. This process results in the potential for nearshore hardbottom habitat (if present in the project area) to be covered by a thin layer of

sand. However, the changes are not significantly greater than seasonal and event driven variation and are not likely to contribute to an adverse effect on sea turtle populations. This is especially true in light of the long-term environmental benefits of beach nourishment to nesting sea turtles.

5.04.1.3 Bathymetric Change

The Proposed Action will alter the bathymetry/topography of beach nourishment areas, including the surf zone. These sediments will be shaped by natural processes and may affect, but are not likely to adversely affect any sea turtle species. While minor effects can be noted during the construction of a beach nourishment project, the long term benefits overwhelmingly make up for it by contributing to continued sea turtle usage of the affected beach for nesting.

5.04.1.4 Noise

Noise effects on sea turtles from beach nourishment will be discountable.

5.04.1.5 Submerged/Floating Pipeline

With the implementation of the PDCs, pipelines will not cause a barrier to sea turtle ingress or egress.

5.04.1.6 Lighting

By implementation of the PDCs, lighting effects will be discountable to sea turtles under NMFS jurisdiction.

5.04.1.7 Effect Determination for Sea Turtles

With the implementation of the PDCs, it is expected that there will be no effect to sea turtles from Proposed Action #4.

5.04.1.8 Effects on Critical Habitat

Based on a review of existing critical habitat designation for leatherback, hawksbill, and green sea turtle species, as well as a review of previous and ongoing dredging project locations, no projects have been documented in or in the vicinity of any existing designated critical habitat and thus no effect. Additionally, the proposed actions will not significantly alter the ability for female loggerhead sea turtles to access nesting sites within areas designated as loggerhead critical habitat. Therefore, the Corps believes that the proposed activities will not adversely modify designated critical habitat for loggerhead sea turtle species.

5.04.2 Fish Species – Atlantic Sturgeon, Shortnose Sturgeon, Smalltooth Sawfish, Nassau Grouper, Giant Manta Ray, Scalloped Hammerhead

5.04.2.1 Beach Profile Slope

Beach nourishment projects are designed and constructed to equilibrate to a more natural profile over time relative to the wave climate of a given area.

5.04.2.2 Turbidity, Sedimentation, Benthic Disturbance/Burial

These factors were discussed in Section 5.04.1.2 and will have discountable effects on listed fish species.

5.04.2.3 Bathymetric Change

The Proposed Action will alter the bathymetry/topography of beach nourishment areas, including the surf zone. These sediments will be shaped by natural processes and may affect, but are not likely to adversely affect any listed fish species.

5.04.2.4 Noise

Noise effects on listed fish species from beach nourishment will be discountable.

5.04.2.5 Effect Determination for Fish Species

No effects are expected from Proposed Action #4 to listed fish species.

5.04.2.6 Effects on Atlantic Sturgeon Critical Habitat

This Proposed Action will have no effect on Atlantic Sturgeon critical habitat because it is not located proximally to any beach nourishment project.

5.04.3 Listed Corals

The effects of beach nourishment on corals are discussed in the corals analysis in Appendix F. This analysis only includes the discharge of dredged and fill material for beach nourishment along the shoreline within previously authorized fill templates and extends seaward to where the toe of fill equilibrates and includes the adjacent nearshore benthic habitat where hardbottom or consolidated sediment is present, and therefore listed corals could be present or Acropora spp. critical habitat may occur.

5.04.3.1 Turbidity, Sedimentation, Burial

As the discharged material equilibrates and moves offshore through natural forces such as waves and currents, a natural sloping beach results within the nearshore littoral zone and depth of closure to where the designed fill template terminates. Given the characteristics of littoral drift and potential storms during and post construction, the discharged material may travel outside of the depth of closure and indirectly affect adjacent hard bottom where listed coral species could be present. However, the nearshore habitat is ephemeral and is naturally covered and uncovered with sand/sediment through natural processes and any amount of material that may travel outside of the design template of the project will likely be moved through those same natural processes. The overall benthic community structure of shallow subtidal nearshore and surf-zone hardbottom are usually dominated by biota that is resilient to episodic variations in sediment cover and scouring, listed corals are not typically found in this dynamic habitat. Survivorship of hardbottom benthos (i.e. corals) in the surfzone is dependent upon the length of the burial episode and the amount of overlying sediment (Hague et al, 2009; Kruempel et al, 2010). All future beach nourishment activities in this analysis have been previously constructed

and all impacts to hardbottom assessed. Due to the empheral nature of nearshore hardbottom habitats, it is reasonable to expect additional hardbottom within previously filled templates to be uncovered over time as the fill material moves out of the system between nourishment events. Listed corals could colonize those exposed areas. However, the likelihood of coral settlement occurring in these ephemeral areas is low, as well as the corals growing to a substantial size, given that re-nourishment events typically occur every 3-10 years.

5.04.3.2 Effect Determination for Corals

Due to the ephemeral nature of the nearshore and other reasons discussed, Proposed Action #4 may affect, but is not likely to adversely affect listed corals.

5.04.3.3 Effects on Critical Habitat

Effects to designated critical habitat would only occur due to nourishment activities located within the geographic boundary of the critical habitat (Figure 1 and 2 of Appendix F), and where essential features are present. The Proposed Action is not likely to directly impact critical habitat because these projects are utilizing existing fill templates where impacts have already occurred in critical habitat where the essential features occur. If essential features become re-exposed within existing fill templates it would be directly impacted once material is discharged within that template. These re-exposed areas are likely ephemeral in nature and go through a cycle of exposure and burial by sediments. Indirect impacts may occur to adjacent critical habitat that contains essential features beyond previous impacts due to sedimentation from turbidity and or storm events occuring simutaneously during discharge of dredged material, these impacts would be temporary and natural conditions would be expected to return to preconstruction conditions. Therefore, this action is not likely to adversely modify coral critial habitat.

5.04.4 Johnson's Seagrass

Beach nourishment will have no effect on Johnson's seagrass as the species is not found along beachfronts.

5.04.5 Whales

5.04.5.1 Effect Determination for Whales

Beach nourishment will have no effect on any listed whale species as construction takes place on the beachfront and surf zone.

5.04.5.2 Effects on Right Whale Critical Habitat

Beach nourishment will have no effect on Right whale critical habitat as construction takes place on the beachfront and surf zone.

5.05 Proposed Action #5 (Borrow Area Dredging)

Borrow area dredging is conducted very similar to navigation dredging. That is the equipment used is generally the same. All of the IPFs for the various species addressed for maintenance

navigation dredging apply to borrow areas dredging as well. The only issues not previously addressed are related to bathymetric changes and hydraulic/hydrologic changes. The specific IPFs are shown in Table 10.

Table 10. Species Specific IPFs for Proposed Action #5

Borrow Area Dredging	Impact Producing Factors										
Species/Habitat										Temporary Obstructions	
Specific Action	Entrainment	Beach Profile Slope Adjustment/ Equilibration	Turbidity	Sedimentation	Benthic Disturbance / Burial	Bathymetric Change	Hydraulic/ Hydrologic Changes	Noise	Vessel Strike	Submerged /Floating Pipeline	Lighting
Sea Turtles	X		X	X	X	X	X	X			X
Fish Species	X		X	X	X	X	X	X			
Corals			X	X	X						
Johnson's Seagrass											
Whales								X	X		

5.05.1 Sea Turtles

5.05.1.1 Bathymetric and Hydraulic/Hydrologic Changes

Borrow area dredging is performed to provide a source of sand for a beach nourishment project (CSRM) or an ecosystem restoration project. As such, sediments are removed from an area and a new bottom is created. New sediments may start infilling immediately after the dredging is complete. These bathymetric changes will not adversely affect individual sea turtles. Periodically, USACE and/or BOEM can reuse borrow areas that have not been emptied of compatible sand in one dredging event or after they have infilled with beach compatible material. However, new borrow areas periodically need to be identified for any number of reasons. Changes in bathymetry can alter wave and current patterns in the nearshore environment. However, the extent of these impacts to sea turtle individuals would be discountable.

5.05.1.2 Effect Determination for Sea Turtles

The effects of borrow area dredging on sea turtles would be the same as those for navigation dredging depending upon equipment type.

5.05.1.3 Effects on Critical Habitat

This action will have no effect on critical habitat for sea turtles, except the loggerhead. For the loggerhead, the action may affect but is not likely to adversely modify critical habitat based upon the analysis presented in Appendix G.

5.05.2 Fish Species – Atlantic Sturgeon, Shortnose Sturgeon, Smalltooth Sawfish, Nassau Grouper, Giant Manta Ray, Scalloped Hammerhead

As discussed in Section 5.0, all the IPFs for borrow area dredging are the same as for Proposed Action #1 (Navigation Dredging), except for the below.

5.05.2.1 Bathymetric and Hydraulic/Hydrologic Changes

Borrow area dredging is performed to provide a source of sand for a beach nourishment project and possibly an ecosystem restoration project. As such, sediments are removed from an area and a new bottom is created. New sediments may start infilling immediately after the dredging is complete. These bathymetric changes will not adversely affect listed fish species. Periodically, USACE and/or BOEM can reuse borrow areas that have not been emptied of compatible sand in one dredging event or after they have infilled with beach compatible material. However, new borrow areas periodically need to be identified for any number of reasons. Changes in bathymetry can alter wave and current patterns in the nearshore environment. However, the extent of these impacts to listed fish species individuals would be negligible.

5.05.2.2 Effect Determination for Fish Species

The effects of borrow area dredging on fish species would be the same as those for navigation dredging depending upon equipment type.

5.05.2.3 Effects on Atlantic Sturgeon Critical Habitat

This Proposed Action does not take place near Atlantic sturgeon critical habitat and therefore will have no effect on it.

5.05.3 Listed Corals

5.05.3.1 Turbidity

Offshore borrow sites are mostly comprised of unconsolidated sediments, and do not contain suitable habitat where corals colonize; therefore, direct impacts to listed corals are not likely. Indirect impacts through sedimentation and turbidity may occur if listed corals are present on adjacent hardbottom. Per the PDCs, a buffer for hardgrounds located adjacent to the borrow areas would be maintained. A detailed analysis can be found in Appendix F.

5.05.3.2 Sedimentation

While a 400 foot buffer will be maintained around all hardground habitat, sedimentation monitoring may occur to document the effects on surrounding listed coral habitat. Due to the implementation of the PDCs, this Proposed Action may affect, but is not likely to adversely affect listed corals.

5.05.3.3 Benthic Disturbance

Dredging of borrow areas north of Palm Beach County would have no effect to any listed corals, because it is outside of the geographic range of where those species would occur. The Corps estimated that there was a total of approximately 2,171 acres identified for borrow areas (Table 13 of Appendix F) within the action area described above. These offshore borrow sites are mostly comprised of unconsolidated sediments, and do not contain suitable habitat where corals colonize. Approximately 89% of the borrow areas contain unconsolidated sediment, and it is unlikely to find any listed coral within areas of unconsolidated sediment.

5.05.3.4 Bathymetric and Hydraulic/Hydrologic Changes

Since the bathymetric changes will occur within the areas identified for potential existing and future borrow areas, these changes will have no effect on listed corals.

5.05.3.5 Effect Determination for Corals

Due to implementation of the PDCs, Proposed Action # 5 may affect, but is not likely to adversely affect listed corals.

5.05.3.6 Effects on Critical Habitat

The proposed action is not likely to directly impact critical habitat because borrow sites are mostly comprised of unconsolidated sediments where essential features for critical habitat are not present. If critical habitat is adjacent to the work area, indirect effects from turbidity and sedimentation that could cover essential features of critical habitat could occur. However, these impacts would be temporary, as the sediment would be removed through ocean currents. Overall, this Proposed Action is not likely to adversely modify coral critical habitat. Additional discussion can be found within Appendix F.

5.05.4 Johnson's Seagrass

There would be no effect to Johnson's seagrass due to borrow area dredging, because these offshore borrow areas are not proximate to Johnson's seagrass habitat.

5.05.5 Whales

The effects of this action on whales would be the same as that identified for Proposed Action #1 (USACE Maintenance Navigation Dredging).

5.06 Proposed Action #6 (Geotechnical and Geophysical Investigations)

As previously stated, these surveys are used to help characterize the bottom features, sediment type, and presence of various resources. Despite there being a chance for minimal benthic disturbance and minor noise related disturbances, this action is not likely to adversely affect any marine species. The specific IPFs are shown in Table 11.

Table 11. Species Specific IPFs for Proposed Action #6

G&G Surveys	Impact Producing Factors										
Species/Habitat										Temporary Obstructions	
Specific Action	Entrainment	Beach Profile Slope Adjustment/ Equilibration	Turbidity	Sedimentation	Benthic Disturbance / Burial	Bathymetric Change	Hydraulic/ Hydrologic Changes	Noise	Vessel Strike	Submerged /Floating Pipeline	Lighting
Sea Turtles								X			X
Fish Species								X			
Corals											
Johnson's Seagrass											
Whales								X	X		

Geophysical acoustic sources typically used by USACE and BOEM for executing the proposed action are shown in Table 12.

Table 12. Geophysical acoustic sources typically used by USACE and BOEM

Type of Sound Source	Example	Source Level (dB re 1 µPa at 1m)	Pulse Durations (ms)	Operating Frequencies (kHz)
Side-scan sonar	EdgeTech 4200	218 (210-226) dB (rms)	0.6-26 ms	6, 105, 200, 210, 240, 410, 540, 1,600
Side-scan sonar	Klein 3900	249 dB (rms)	200usec	455-900
Side-scan sonar	Klein 3000	234 – 242 dB	25 – 400 µs	135 - 445
Multi-beam Echosounder	Simrad EM2000	207 dB (rms) and 218 dB (peak)[a]	0.2 ms	200
Multi-beam Echosounder	Kongsberg EM 2040	208 dB (rms)	0.2 ms	200-400
Multi-beam Echosounder	Reson 7125	223 dB (rms)	33-300usec	200-400
Multi-beam Echosounder	R2 Sonic 2024	221 dB (rms)	Unavail.	200-400
Multi-beam Echosounder	Reson 7111	223 dB	0.8 µs -500 µs	100
Multi-beam Echosounder	Reson T20-P	200W / 300W	30-300 µs (CW) 0.3 – 10 ms (FM)	200 - 400
Single Beam Echosounder	Odom CV200	203dB (rms)	5ms	24-200
Single Beam Echosounder	Teledyne Odom Hydrotrac	152 dB (rms)	.01 ms at 24 kHz, .1 ms at 200 kHz	24-340
Boomer	Applied Acoustics 251	212 dB	120 – 180 µs	0.1 - 5
Boomer	Applied Acoustics 301	215 dB	200 µs	0.1 – 7.5
Boomer	Applied Acoustics 252	212 dB	200 µs	0.1 - 5
Sub-bottom profiler	Knudsen 3202	209 dB (est.)	0.63 – 64 ms	3.5
Sub-bottom profiler	EdgeTech DW-216	160 dB (rms)	20 ms	2-16
Sub-bottom profiler	EdgeTech DW106	216 dB (rms)	40 ms	2-6
Sub-bottom profiler	EdgeTech SB512i	212 dB (rms)	5-50 ms	0.5-12
Sub-bottom profiler	Geopulse	186 (p-p)	20 ms	3.5

[a]Peak pressure value from specification sheet found at:
http://www.km.kongsberg.com/ks/web/nokbg0240.nsf/AllWeb/C75143F8AA145B48C12575E500276CA4

5.06.1 Sea Turtles

5.06.1.1 Noise

These actions occur during small durations of time and never in any area for extended periods of time. Because of the mobility of sea turtles, the effects of this action from noise will be discountable.

5.06.1.2 Lighting

By implementing the PDCs for this action, the effects of lighting aboard vessels used to accomplish this action will be discountable.

5.06.1.3 Effect Determination for Sea Turtles

No effects to listed sea turtles or their critical habitat are expected from Proposed Action #6. The proposed action will not alter any of the PCE's for sea turtle critical habitat.

5.06.1.4 Effects on Critical Habitat

The proposed action will not alter any of the PCE's for sea turtle critical habitat.

5.06.2 Fish Species – Atlantic Sturgeon, Shortnose Sturgeon, Smalltooth Sawfish, Nassau Grouper, Giant Manta Ray, Scalloped Hammerhead

5.06.2.1 Noise

These actions occur during small durations of time and never in any area for extended periods of time. Because of the mobility of fish species, the effects of this action from noise will be discountable.

5.06.2.2 Effect Determination for Fish Species

No effects to listed fish are expected from Proposed Action #6.

5.06.2.3 Effects on Atlantic Sturgeon Critical Habitat

This Proposed Action will have no measurable effect on any of the essential features for Atlantic Sturgeon critical habitat and therefore will have no effect on critical habitat.

5.06.3 Listed Corals

These activities would have no effect on listed corals or their critical habitat with the implementation of the PDCs described above.

5.06.4 Johnson's Seagrass

This action would have no effect on Johnson's seagrass and its critical habitat

5.06.5 Whales

5.06.5.1 Noise

None of the activities under this action produce sound in significant amount of duration or time to adversely affect whales. These effects are considered discountable.

5.06.5.2 Vessel Strike

By implementing the requirements of the North Atlantic Right whale conservation plan (Appendix E), the chance of vessel strike resulting from any USACE action is discountable.

5.06.5.3 Effect Determination for Whales

No effects to whales or NARW critical habitat are expected from Proposed Action #6.

5.07 Proposed Action #7 (Emergency Dredging)

Since this Proposed Action is mainly to notify NMFS that these actions may take place quickly and unexpectedly due to an emergency, there is no change to the effects described in previous actions and no need to restate anything in this section. Therefore, the effects will be commensurate with the Proposed Action taking place, whether it is emergency navigation dredging or beach nourishment, etc.

5.08 Proposed Action #8 (Bed-Leveling)

A history of bed-leveling consultation and details on the effects can be found within Appendices A2 and C. The specific IPFs are shown in Table 13.

Table 13. Species Specific IPFs for Proposed Action #8

Bed Leveling	Impact Producing Factors										
Species/Habitat	Entrainment	Beach Profile Slope Adjustment/ Equilibration	Turbidity	Sedimentation	Benthic Disturbance / Burial	Bathymetric Change	Hydraulic/ Hydrologic Changes	Noise	Vessel Strike	Temporary Obstructions	
Specific Action										Submerged /Floating Pipeline	Lighting
Sea Turtles	X		X	X	X			X			X
Fish Species	X		X	X	X			X			
Corals			X	X	X						
Johnson's Seagrass											
Whales								X	X		

5.08.1 Sea Turtles

5.08.1.1. Entrainment

Use of bed-levelers may affect, and is likely to adversely affect sea turtles. However, it is often used as a tool to minimize sea turtle take. Hopper dredges will tend to create ridges and valleys when dredging. During the later stages of dredging (e.g., “cleanup” dredging), the draghead can fall or slide off the ridges and follow the path of the trenches. Sea turtles can rest in these trenches and become susceptible to entrainment when the dredged attempts to level the high spots (Hales et al., 2005). Bed levelers can be more efficient than hoppers in removing the high spots, effectively reducing the duration of dredging and reducing turtle takes. More information on bed-leveling impacts can be found in Appendices A2 and C.

5.08.1.2 Turbidity, Sedimentation, and Burial

Bed levelers will produce turbidity during operations and potentially cause sedimentation outside of the navigation channel. A study of the effects of bed-levelers used for the purposes of agitation dredging within a tidal river (Savannah River), consisting of predominantly fine grained maintenance sediments (i.e. clay, silt, and fine sand), found that turbidity plumes were normally seen no more than one-half way across the channel and no more than 3 to 5 meters above the bottom (42 foot plus water column depth). TSS readings near the bottom were found up to 790 mg/l 1,000 feet downstream, vary between 400 to 575 mg/l at 2000 feet downstream, and up to 300 mg/l 3000 feet downstream. These effects are considered discountable.

5.08.1.3 Noise

Bed leveling produces low levels of noise that would only temporarily disturb sea turtles.

5.08.1.4 Lighting

The lighting effects are the same as were previously discussed in Section 5.01.1.6.

5.08.1.5 Effect Determination for Sea Turtles

Proposed Action #9 may affect, but is not likely to adversely affect listed sea turtle species, except the leatherback sea turtle, where no effects are expected.

5.08.1.6 Effects to Sea Turtle Critical Habitat

This action will have no effect on any designated sea turtle critical habitat.

5.08.2 Fish Species – Atlantic Sturgeon, Shortnose Sturgeon, Smalltooth Sawfish, Nassau Grouper, Giant Manta Ray, Scalloped Hammerhead

5.08.2.1. Entrainment

Like sea turtles, demersal fish species have the potential to be entrained/impinged by these dredges. Depending on site-specific conditions (season, DO, water temperature, etc.), various components of sturgeon behavior (foraging, resting, etc.) require benthic orientation or specific orientation to deep holes. Recognizing that the intent of bed-leveling devices are to disturb the bottom in order to smooth post dredging mounds and holes in a navigation channel, it is possible that bed leveling could impact sturgeon behavior patterns. However, considering the mobility of sturgeon as well as the slow (1-2 knots) movement of the bed leveling devices, it is unlikely that sturgeon will be incidentally taken during bed leveling activities.

The NMFS 2003 GRBO states that “although bed-levelers were suspected of having the potential to take turtles, the use of bed-levelers for cleanup operations is probably preferable to use of hopper dredges, since turtles that are foraging/resting/brumating on irregular bottoms are probably more likely to be entrained by suction dragheads because: (1) sea turtle deflectors on hopper dredge suction dragheads are less effective on uneven bottoms at deflecting sea turtles away from the suction dragheads; (2) hopper dredges operate considerably faster than bed-leveler dredges (5 knots vs. 2 knots); and (3) bed levelers do not use suction (NMFS 2003c).” This logic holds true for benthic oriented sturgeon as well; thus, bed leveling is likely the preferred mechanisms for post dredging cleanup operations to minimize impacts to shortnose and Atlantic sturgeon by hopper dredging operations.

Considering that bed leveling operations used in channel dredging projects and are performed in manner that allow for mobile animals to move out of the way, the likelihood of an encounter with listed fish species is discountable.

5.08.2.2 Turbidity, Sedimentation, and Burial

Bed-levelers will produce turbidity during operations and potentially cause sedimentation outside of the navigation channel. These effects are discountable.

5.08.2.3 Noise

Bed-leveling produces low levels of noise that would only temporarily disturb fish species.

5.08.2.4 Effect Determination for Fish Species

Bed-leveling operations will have no effect on listed fish species.

5.08.2.5 Effects on Atlantic Sturgeon Critical Habitat

This Proposed Action will have no measurable effect on any of the essential features for Atlantic sturgeon critical habitat and, therefore, will have no effect on critical habitat.

5.08.3 Listed Corals

5.08.3.1 Turbidity, Sedimentation, and Disturbance

This practice inherently will produce suspended sediments and therefore sedimentation back within and surrounding the channels. The extent of this would be no greater than normal dredging with a hydraulic or other mechanical dredge. This action, if conducted adjacent to listed coral habitat, may affect but is not likely to adversely affect listed corals.

5.08.3.2 Effects on Critical Habitat

This action, if conducted in navigation channels adjacent to listed coral critical habitat may have minor sedimentation effects, but is not likely to adversely modify it.

5.08.4 Johnson's Seagrass

The effects on Johnson's seagrass are adequately addressed in the 2001 Biological Opinion issued by NMFS to the USACE Jacksonville District (Appendix L). However, the Opinion does not specifically discuss bed leveling. Since the Biological Opinion covers maintenance dredging and the impacts of this action on Johnson's seagrass would be the same as the impacts from Proposed Action #1, the findings of the 2001 Biological Opinion on Johnson's seagrass are still considered valid and are hereby incorporated by reference, which indicate that activities associated with dredging (bed leveling would be an associated activity) may affect, but is not likely to adversely affect Johnson's seagrass.

5.08.4.1 Effects on Critical Habitat

In the 2001 Biological Opinion to USACE Jacksonville (Appendix L), NMFS determined that navigation dredging and associated activities are not likely to destroy or adversely modify Johnson's seagrass critical habitat.

5.08.5 Listed Whales

This Proposed Action will have no effect on listed whales nor NARW critical habitat.

5.09 Proposed Action #9 (Modifications to Existing, Authorized Navigation Channels)

This section will address the impacts of changes related to modifying an authorized channel, not to the act of dredging itself. The action considers shifts in channel framework within the authorizing language for that channel. The specific IPFs are shown in Table 14.

Table 14. Species Specific IPFs for Proposed Action #9

Modifications to Navigation Channels	Impact Producing Factors										
Species/Habitat										Temporary Obstructions	
Specific Action	Entrainment	Beach Profile Slope Adjustment/ Equilibration	Turbidity	Sedimentation	Benthic Disturbance / Burial	Bathymetric Change	Hydraulic/ Hydrologic Changes	Noise	Vessel Strike	Submerged /Floating Pipeline	Lighting
Sea Turtles					X	X	X				
Fish Species					X	X	X				
Corals					X	X	X				
Johnson's Seagrass					X	X	X				
Whales					X	X	X				

5.09.1 Sea Turtles

5.09.1.1 Benthic Disturbance/Burial

Modifications to navigation channels are primarily used to improve the safety and efficiencies of existing ship traffic. These changes, where performed, would only disturb a minimal amount of area within the scope of the authorized projects. Benthic impacts and effects on sea turtles would be similar to those described in Section 5.01.1.4. With the implementation of the applicable PDCs the effects of this proposed action on benthic community will have no effect on sea turtle species.

5.09.1.2 Bathymetric Change

As with any modification to a navigation channel, bathymetric changes will occur. Similar to the findings above, these changes would only disturb a relatively small amount of bottom habitat and would be within the authority of the authorized navigation project. With the implementation of the applicable PDCs the effects of this proposed action on bathymetric changes will have no effect on sea turtle species.

5.09.1.3 Hydraulic/Hydrologic Change

The minor channel modifications would result in small-scale changes to the hydrologic regime. With the implementation of the applicable PDCs, the effects of this proposed action on hydraulic/hydrologic changes will have no effect on sea turtle species.

5.09.1.4 Effect Determination for Sea Turtles

With the implementation of the applicable PDCs, the effects of Proposed Action #9 will have no effect on listed sea turtle species.

5.09.1.5 Effects on Critical Habitat

Similar to the effects of navigation dredging discussed in Appendix G, the channel modifications within the authority of existing authorized channels would result in small scale changes to the

hydrologic regime. However, these changes would have no effect on any sea turtle critical habitat.

5.09.2 Fish Species – Atlantic Sturgeon, Shortnose Sturgeon, Smalltooth Sawfish, Nassau Grouper, Giant Manta Ray, Scalloped Hammerhead

5.09.2.1 Benthic Disturbance/Burial

Modifications to navigation channels are primarily used to improve the safety and efficiencies of existing ship traffic. These changes, where performed, would only disturb a minimal amount of area within the scope of the authorized projects.

5.09.2.2 Bathymetric Change

As with any modification to a navigation channel, bathymetric changes will occur. Similar to the findings above, these changes would only disturb a relatively small amount of bottom habitat. The change may affect and is not likely to adversely affect sea turtle species.

5.09.2.3 Hydraulic/Hydrologic Change

The minor channel modifications would result in small-scale changes to the hydrologic regime. These changes and the impacts on fish species would be discountable.

5.09.2.4 Effect Determination for Fish Species

With the implementation of the applicable PDCs, the effects of Proposed Action #9 will have no effect on listed fish species.

5.09.2.5 Effects on Atlantic Sturgeon Critical Habitat

Channel modifications will result in minor changes to bathymetry, which will in turn result in similarly minor changes to hydraulics and hydrology. These changes will minimally impact water quality parameters. Some of these parameters are essential features of Atlantic sturgeon critical habitat, such as salinity and dissolved oxygen. The impacts to these parameters will be discountable in the larger context of the critical habitat determination and the protection of migration pathways for the species to and from spawning grounds. Therefore, the minor channel modifications within the authority of existing authorized channels are not likely to adversely modify Atlantic sturgeon critical habitat.

5.09.3 Listed Corals

This Proposed Action will have no effect on listed corals and is further described within Appendix F.

5.09.3.1 Effects on Critical Habitat

Minor channel modification in coral critical habitat would require further coordination with NMFS to validate the not likely to adversely modify effect determination.

5.09.4 Johnson's Seagrass

The effects of this action on Johnson's seagrass are covered under the 2001 Biological Opinion to Jacksonville District (Appendix L), which indicate that activities associated with dredging (minor channel modifications would be an associated activity) may affect, but are not likely to adversely affect Johnson's seagrass.

5.09.4.1 Effects on Critical Habitat

In the 2001 Biological Opinion to USACE Jacksonville (Appendix L), NMFS determined that navigation dredging and associated activities are not likely to destroy or adversely modify Johnson's seagrass critical habitat.

5.09.5 Listed Whales

This proposed action would have no effect on listed whales.

5.09.5.1 Effects on Critical Habitat

The minor bathymetric changes that would occur would not do so on a scale that would affect the essential features, previously discussed and documented in Appendix I, of NARW critical habitat. Therefore, the Proposed Action is not likely to adversely modify NARW critical habitat.

6.0 SUMMARY OF EFFECT

Proposed Activity		Effect Determination - Species																Effect Determination - Critical Habitat							
		Sea Turtles						Listed Corals	Large Whales			Johnson's Seagrass	Sturgeon sp.	Nassau Grouper	Scalloped Hammerhead	Giant Manta Ray	Smalltooth Sawfish	Loggerhead Critical Habitat	Green Critical Habitat	Hawksbill Critical Habitat	Leather-back Critical Habitat	NARW Critical Habitat	Atlantic Sturgeon Critical Habitat	Johnson's Seagrass Critical Habitat	Coral Critical Habitat
Proposed Activity Description	Specific Activity	*Leatherback*	*Loggerhead*	*Green*	*Kemp's Ridley*	*Olive Ridley*	*Hawksbill*		*NARW*	*Humpback*	*Sperm*														
Proposed Action #1 (Navigation Dredging)	Hydraulic Hopper	NE	MALAA	MALAA	MALAA	MALAA	MALAA	MANLAA	NE	NE	NE	NE	MALAA	NE	NE	NE/MANLAA*	NE	NE	NE	NE	NE	NE	NE	NLAM	NLAM
	Hydraulic Cutterhead	NE	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	NE	NE	NE	MANLAA	MANLAA	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAM	NLAM
	Mechanical Dredge	NE	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	NE	NE	NE	MANLAA	MANLAA	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAM	NLAM
	Side Cast and Split Hull Hopper	NE	NE	NE	NE	NE	NE	N/A	NE	NE	NE	N/A	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	N/A
	Closed Net Trawling	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	N/A	NE	NE	NE	NE	MALAA	MANLAA	MANLAA	MANLAA	MANLAA	NE	NE	NE	NE	NE	NE	NE	NE
	Tissue Sampling	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	N/A	N/A	N/A	N/A	N/A	MANLAA	N/A	N/A	N/A	N/A	N/A				N/A	N/A	N/A	N/A
	Tagging	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	N/A	N/A	N/A	N/A	N/A	MANLAA	N/A	N/A	N/A	N/A	N/A				N/A	N/A	N/A	N/A
Proposed Action #2 (Dredged Material Transportation)	Hopper	NE	NE	NE	NE	NE	NE	MANLAA	MANLAA	MANLAA	MANLAA	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAM	NLAM
	Scow	NE	NE	NE	NE	NE	NE	MANLAA	NE	NE	NE	MANLAA	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAM	NLAM
	Pipeline	NE	NE	NE	NE	NE	NE	MANLAA	NE	NE	NE	MANLAA	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAM	NLAM
Proposed Action #3 (Dredged Material Placement)	Beach Placement	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAM	NE	NE	NE	NE	NE	NE	NLAM
	Nearshore Placement	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAM	NE	NE	NE	NE	NE	NE	NLAM
	Upland Disposal	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAM	NE	NE
	ODMDS Placement	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
	Downdrift/Alongside Channel	NE	NE	NE	NE	NE	NE	N/A	NE	NE	NE	N/A	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	N/A
	Other Beneficial Uses (Marsh creation, thin layer placement, land creation, fish and wildlife improvements, wetland restoration, etc)	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	NE	NE	NE	MANLAA	NE	NE	NE	NE	NE	NLAM	NE	NE	NE	NLAM	NLAM	NLAM	NLAM
Proposed Action #4 (Beach Nourishment)		NE	NE	NE	NE	NE	NE	MANLAA	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAM	NE	NE	NE	NE	NE	NE	NLAM
Proposed Action #5 (Borrow Area Dredging)		Same as PA#1																NLAM	NE	NE	NE	NLAM	NE	NE	NLAM
Proposed Action #6 (Geophysical and Geotechnical Investigations)		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Proposed Action #7 (Emergency Dredging)		Effects Depend Upon Specific Activity																							
Proposed Action #8 (Bed Leveling)		NE	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	MANLAA	NE	NE	NE	MANLAA	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NLAM	NLAM
Proposed Action #9 (Minor Channel Modifications)		NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	MANLAA	NE	NE	NE	NE	NE	NE				NLAM	NLAM	NLAM	NLAM
* when in vicinity of the FL Keys																									

Table 15. Summary of Effect Determination

7.0 LITERATURE CITED

NMFS 2015. Charleston Harbor BIOP.

STANDARD MANATEE CONDITIONS FOR IN-WATER WORK

2011

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 Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1-888-404-3922. 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, and to FWC at ImperiledSpecies@myFWC.com

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. Temporary signs that have already been approved for this use by the FWC must be used. One sign which reads *Caution: Boaters* must be posted. A second sign measuring at least 8 ½" 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. These signs can be viewed at MyFWC.com/manatee. Questions concerning these signs can be sent to the email address listed above.

CAUTION: MANATEE HABITAT

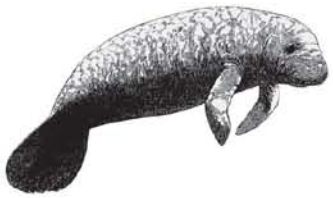
All project vessels

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

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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AS-BUILT CERTIFICATION BY PROFESSIONAL ENGINEER

Submit this form and one set of as-built engineering drawings to the U.S. Army Corps of Engineers, Enforcement Section, P.O Box 4970, Jacksonville, Florida, 32232-0019. If you have questions regarding this requirement, please contact the Enforcement Branch at 904-232-3131.

1. Department of the Army Permit Number: SAJ- - (-)

2. Permittee Information:

Name: _____

Address: _____

_____

3. Project Site Identification (physical location/address):

_____

_____

_____

4. As-Built Certification: I hereby certify that the authorized work, including any mitigation required by Special Conditions to the permit, has been accomplished in accordance with the Department of the Army permit with any deviations noted below. This determination is based upon on-site observation, scheduled, and conducted by me or by a project representative under my direct supervision. I have enclosed one set of as-built engineering drawings.

_____ _____

Signature of Engineer Name (*Please type*)

_____ _____

(FL, PR, or VI) Reg. Number Company Name

_____ _____ _____

City State ZIP

(Affix Seal)

_____ _____

Date Telephone Number

Identify any deviations from the approved permit drawings and/or special conditions (attach additional pages if necessary):

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