

**CITY OF ISLE OF PALMS, SOUTH CAROLINA  
REQUEST FOR BIDS (RFB) 2022-04  
CONSTRUCTION OF MARINA BULKHEAD MODIFICATION AND REPAIR**

The City of Isle of Palms is seeking bids from qualified contractors for the alteration of a marine bulkhead to include a six-foot wide Ipe deck and treated pine handrail. The existing timber bulkhead is 335' long and has an existing timber cap. The modification will include removing the existing cap and installing new posts to support the expanded decked area. Additionally, the alteration will include a new guardrail constructed of 4"x6" posts, 5/4" Ipe cap, rope guards, and low voltage downlighting.

In addition to the modifications described above, which are detailed in the attached documentation, the contractor should include a \$10,000 allowance to account for miscellaneous repairs to the bulkhead and \$1,500 for light fixtures for new posts.

This request is being made and awarded pursuant to the City's procurement ordinance. The City reserves the right to reject any and all bids and to waive irregularities.

Bids should be submitted to the following:

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

**Deadline for Questions**

The deadline for questions is 5:00 p.m., Eastern Time, Friday, October 14<sup>th</sup>, 2022. Bidders should send questions regarding this Request for Bids to Douglas Kerr in writing or email to [dkerr@iop.net](mailto:dkerr@iop.net). Questions received before this deadline will be answered via addendum posted on the City's website at <http://www.iop.net/requests-for-bids-proposals>. Questions received after this deadline will not be answered.

If an addendum is issued, Bidders must acknowledge receipt of the addendum with their bid.

**Deadline for Submissions**

The deadline for submission is 10:00 a.m., Eastern Time, Friday, October 21<sup>st</sup>, 2022. Bids will be received at the front desk of the Building Department, on the first floor of 1207 Palm Boulevard, Isle of Palms, South Carolina 29451 in a ~~sealed~~ envelope. Sealed envelopes must be clearly marked "RFB 2022-04, Marina Bulkhead Alteration" and include one (1) hard copy. It will be the responsibility of the bidders to verify receipt by the City.

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

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

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

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

Contractors considering submission under this RFB will be expected to have read and be prepared to enter into the attached contract, which is a part of this RFB. The City of Isle of Palms reserves the right to accept or reject any and all bids, or any parts thereof; to waive irregularities or informalities in any bid received to allow the bid to be considered; to negotiate terms and conditions with Bidders; and to select a Bidder or to cancel in whole or in part this RFB, if it is in the best interest of the City to do so. Those bids determined not to be in compliance with provisions of this RFB and the applicable laws and or regulations will not be processed.

By signing its bid, Bidder certifies that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agrees to provide the City upon request any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable both to Bidder and its subcontractors or sub-subcontractors; or (b) that Bidder and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14. Pursuant to Section 8-14-60, "A person who knowingly makes or files any

false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Bidder agrees to include in any contracts with its subcontractors language requiring its subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14 and (b) include in their contracts with subcontractors, language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14.

### **Scope of Work**

A site visit to the marina bulkhead is required prior to submitting a bid as the condition of the existing bulkhead must be evaluated as part of the work.

The scope of work for the project includes, but is not limited to the following:

1. Remove the existing timber cap from the bulkhead
2. Clear, excavate and grade the area necessary to accommodate a new six-foot wide deck incorporated into the bulkhead
3. Install new supporting 4"x8" posts with concrete footings six feet back and in line with existing piles (approximately 6'4" on center- 55 posts) for the full 335 feet of new deck
4. Install 2"x6" girders to connect existing bulkhead 8x8 piles to new 4x8 posts. Two girders at each new post- one on each side
5. Install new 2"x6" floor joists on top of the new girders at 16" on center to support a new Ipe deck. The area of this framing and the new deck will be 6'x335'
6. Install 54 new 4"x6" posts to create a continuous guardrail at the edge of the deck. The posts will have an Ipe cap, two taught ropes to create a guard and low voltage LED lighting to illuminate the new deck area. The new posts will require blocking below the existing nailer
7. Install 5/4x6 Ipe decking over the new framing in an area of 6'x335'
8. Pricing must include a \$10,000 allowance to repair portions of the existing bulkhead. The area and cost of these repairs are to be mutually agreed to by the City and the chosen contractor. Any portion of the allowance not used, will be reduced from the bid amount. Any amount over \$10,000 will require a change order
9. All nails and screws must be stainless steel and all lags and bolts shall be hot dipped galvanized steel, and all framing lumber shall be 2.5 CCA marine grade pressure treated pine
10. Install a low voltage lighting system to energize 54 new fixtures. All wiring must be in non-metal conduit and all connections must be waterproof and in appropriate waterproof boxes
11. Pricing must include a \$1,500 allowance for the 54 lighting fixtures. The fixtures will be low voltage courtesy lights to illuminate the new deck area and will be chosen by the City. The installation cost associated with the lighting must be included in the bid. Any portion of the \$1,500 allowance not used, will be reduced from the bid amount. Any amount over \$1,500 will require a change order
12. Replace any parking stops or signs that were displaced under item 1 of this scope of work

The chosen contractor shall provide all materials, equipment, supplies, freight, state sales tax, labor and supervision as necessary.

Time is of the essence for this project and all work associated with this RFB must be completed within 90 days of the issuance of the Notice to Proceed.

## **Bid Format**

In responding to this request, contractors should provide a price quote for the scope of work to accomplish this work on the attached "BID FORM". Contractors should also provide a cost breakdown of the scope of work on the "ITEMIZED COST" form.

If any addenda(um) are issued, the contractor must acknowledge reviewing the addenda(um) by listing them on the BID FORM.

In addition to submitting the completed BID FORM, contractors submitting bids should provide examples of experience with similar projects. Provide a brief description of similar projects of comparable size and complexity for which the Bidder provided services within the past five (5) years. Limit information to no more than five (5) projects.

A performance bond for 100% of the construction contract amount will be required.

All such descriptions should include:

1. Project location.
2. Renovation and/or Replacement.
3. Description of original project budget versus actual cost.
4. Name and contact information for a reference with knowledge of the Bidder's work on the specified project.

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

## **Evaluation Criteria**

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

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

Recommendation of award for contract will be made based not only on price, which is an important factor, but also on quality of bid, qualifications, experience, technical

expertise, references and ability to execute the work. After careful evaluation, the Public Works Committee will make a recommendation to City Council for award of a contract

**BID FORM**

BID OF: \_\_\_\_\_

(Contractor)

BID TO: The City of Isle of Palms

(Owner)

PROJECT NAME: Bulkhead alteration

PROJECT NUMBER: RFB 2022-04

BID DATE: \_\_\_\_\_

BASE BID AGREEMENT

The undersigned, having examined all the Bidding Documents, including all Addendum(a) as follows:

shall execute the entire Work in the Bidding Documents described as the Base Bid for the lump sum of:

\_\_\_\_\_ Dollars

(\$ \_\_\_\_\_) which sum is hereafter called the BASE BID.

ITEMIZED COSTS (sum of each item should total BASE BID amount)

1. Site preparation  
\_\_\_\_\_ Cost

2. Bulkhead repair  
\$10,000 Cost

3. Bulkhead and guardrail alteration  
\_\_\_\_\_ Cost

4. Ipe decking (2010 sq')  
\_\_\_\_\_ Cost

5. Electrical system work and all materials (excluding cost of lamp fixtures)  
\_\_\_\_\_ Cost

6. Lamp fixtures  
\$1,500 Cost

7. Site clean-up and final grading  
\_\_\_\_\_ Cost

TOTAL BASE BID \_\_\_\_\_



## **DATE FOR COMMENCEMENT AND SUBSTANTIAL COMPLETION**

The Date for Commencement shall be established in the Notice to Proceed. The Contractor shall not incur any expense until the contract has been awarded. An award requires that either the Contract be signed by both the awarding authority and the contractor or a Notice to Proceed is executed.

All work for additions shall be substantially completed (as evidenced by the date on the CERTIFICATE OF SUBSTANTIAL COMPLETION) within: NINETY (90) calendar days from the date set forth in the NOTICE TO PROCEED, subject to adjustments as provided in the Contract Documents.

Final completion of all work shall be performed within: THIRTY (30) calendar days from the scheduled contract time for substantial completion, subject to adjustments as provided in the Contract Documents.

The undersigned further agrees that from the compensation to be paid, the owner may retain as liquidated damages the sum of one thousand dollars (\$1,000) for each calendar day the actual contract time for Substantial Completion for the project exceeds the specified or adjusted contract time for Substantial Completion as provided in the Contract Documents.

THIS AGREEMENT IS SUBJECT TO BINDING ARBITRATION PURSUANT TO SOUTH CAROLINA CODE SECTION 15-48-10, ET SEQ., AS AMENDED

STATE OF SOUTH CAROLINA    )                                   RFB 2022-04 Bulkhead Alteration  
  )  
COUNTY OF CHARLESTON    )

THIS AGREEMENT (“Agreement”) is made and entered into this \_\_\_\_ day of \_\_\_\_\_, 2022, by and between the City of Isle of Palms, S.C., a South Carolina municipal corporation (“City”), and \_\_\_\_\_ (“Contractor”).

WHEREAS, Contractor was the successful bidder under the City’s solicitation for bids for the Compactor Enclosure; and

WHEREAS, the parties hereto desire to enter into this Agreement to set forth the exact rights, duties and obligations of each party regarding the services to be performed by Contractor pursuant to the bid.

THEREFORE, in consideration of the mutual covenants and promises set forth herein,

City and Contractor agree as follows:

1. SCOPE OF WORK.

A. Contractor agrees to provide all labor, equipment, tools, materials, supplies, and incidentals necessary for the Bulkhead Alteration project, pursuant to the bid submitted by Contractor to City dated \_\_\_\_\_ (the “Bid”), a copy of which is attached hereto as “Exhibit I” and made a part of this Agreement by reference thereto. In the event of any conflict between the provisions of this Agreement and the Solicitation, the term of this Agreement shall control.

B. Contractor agrees to use its best skill and attention and be solely responsible for all means, methods, techniques, sequences, and procedures in the performance of the work on the Project. Contractor hereby warrants to City that all work on the Project shall be performed in a good and workmanlike manner. Contractor agrees to comply with all applicable federal, state and local laws, rules and regulations regarding all work performed by Contractor pursuant to this Agreement.

2. CONTRACT PRICE. For all work under this Agreement, City agrees to pay to

Contractor the sum of \_\_\_\_\_ (\$ \_\_\_\_\_) Dollars, payable upon completion of the Project.

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

4. COMPLETION SCHEDULE. TIME IS OF THE ESSENCE. Contractor agrees to complete the Project within ninety (90) days from the date of this Agreement. Provided, however, that if performance by the Contractor is delayed for reasons or causes beyond the control of Contractor (including but not limited to, acts of God, weather conditions, site conditions, labor or material shortages, delays caused by City, and casualty losses) the Project completion date shall be extended accordingly.

5. INSURANCE. Contractor agrees to maintain comprehensive general liability insurance coverage on the work under the Project in an amount not less than \$1,000,000.00 per person, \$2,000,000.00 per claim, and \$250,000.00 per claim for property damage. Contractor also agrees to maintain worker's compensation coverage on its employees as required by the State of South Carolina workers' compensation laws. All insurance coverage required hereunder shall be with companies approved in advance by City, who shall be named as an additional insured on all such policies. Proof of such insurance shall be provided to City prior to commencement of any work by Contractor.

6. PERMITS, FEES AND LICENSES. Contractor agrees to apply for, obtain and pay for all permits, fees, licenses and inspections by governmental agencies necessary for the Contractor's proper performance and completion of the Project, including, but not limited to, a City business license.

7. INDEMNIFICATION. Contractor agrees to hold harmless and indemnify City and its officers, agents and employees from and against any loss or damage, including all reasonable attorney's fees and expenses, incurred as a result of any and all claims, demands, causes of action, suits, judgments, fines or penalties (including but not limited to all fees and expenses incurred as a result of death or injury to persons or for loss of or damage to property) arising out of or in connection with Contractor's performance of the work under this Agreement.

8. SITE INVESTIGATION. Contractor acknowledges that Contractor has had the opportunity to inspect the service areas, has determined the nature of the work and the difficulties and facilities attending performance of the work, and all other matters which Contractor contemplates may in any way affect the work under this Agreement.

9. **BINDING ARBITRATION.** Any dispute or controversy arising under or in connection with this Agreement shall be submitted to binding arbitration in accordance with the requirements of the South Carolina Uniform Arbitration Act as then in effect ("SCUAA"). All arbitration proceedings shall be conducted in Charleston County, South Carolina. The arbitrators shall be selected as provided in the SCUAA, and the arbitrators shall render a decision on any dispute within ninety (90) days after the last of the arbitrators has been selected. If any party to this Agreement fails to select an arbitrator with regard to any dispute submitted to Arbitration under this Section within thirty (30) days after receiving notice of the submission to arbitration of such dispute, then the other party or parties shall select an arbitrator for such nonselecting party, and the decision of the arbitrators shall be final and binding upon all the parties to the dispute, their personal representatives, legal representatives, heirs, successors and assigns. The prevailing party in any such proceeding shall be entitled to reimbursement by the losing party, in addition to any damages awarded, for all reasonable costs and expenses, including attorney's fees, incurred in any such proceeding, including all trial and appellate levels. Nothing contained in this Section shall preclude either party from seeking injunctive relief through a court of competent jurisdiction in connection with the Arbitration, and the prevailing party shall also be entitled to reimbursement by the losing party for all reasonable fees and costs, including attorney's fees, incurred in the proceedings seeking injunctive relief.

10. **BREACH.**

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

B. Unless authorized by this Agreement, if the Contractor completely ceases work on the Project for a period of fifteen (15) days, or defaults or persistently fails or neglects to carry out the Project, the City may, after seven (7) days' written notice to the Contractor, complete the Project and if the unpaid balance of the contract price exceeds the City's actual cost of completing the Project, such excess shall be paid to the Contractor, but if such expense exceeds the unpaid balance, the Contractor shall pay the difference to the City.

11. **EFFECT OF WAIVER OR CONSENT.** A waiver or consent, express or implied, to or of any breach or default by a party in the performance of its obligations under this Agreement is not a consent or waiver to or of any other breach or default in the performance by that party of the same or any other obligations of that party with respect

to this Agreement. Failure on the part of a party to complain of any act of the other party or to declare a party in default with respect to this Agreement, irrespective of how long that failure continues, does not constitute a waiver by that party of its rights with respect to that default until the applicable statute-of-limitation period has run.

12. SUB-CONTRACT OR ASSIGNMENT. Contractor agrees not to enter into any subcontracts or assignments pertaining to the performance of all or any part of this Agreement, either voluntarily or by operation of law, without prior written approval of City.

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

14. GOVERNING LAW; SEVERABILITY. This Agreement is governed by and shall be construed and interpreted in accordance with the laws of the State of South Carolina. If any provision of this Agreement is held invalid or unenforceable to any extent by a court of competent jurisdiction, the remainder of this Agreement is not affected thereby and that provision shall be enforced to the greatest extent permitted by law.

15. ENTIRE AGREEMENT. This Agreement constitutes the entire agreement between the parties hereto relating to the subject matter hereof, and supersedes and nullifies all prior or contemporaneous contracts, agreements, understandings or representations, whether oral or written, which are not expressly stated in this agreement. Neither party is relying upon any representation not expressly contained herein. This Agreement may be amended and modified from time to time only upon the written mutual consent of City and Contractor.

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

IN WITNESS WHEREOF, the City and Contractor have hereunto set their hands and seals, by and through the undersigned officers, as of the day and year first above written.

WITNESS:

Contractor:

\_\_\_\_\_  
(#1 as to Contractor)

By: \_\_\_\_\_

\_\_\_\_\_  
(#2 as to Contractor)

Title: \_\_\_\_\_

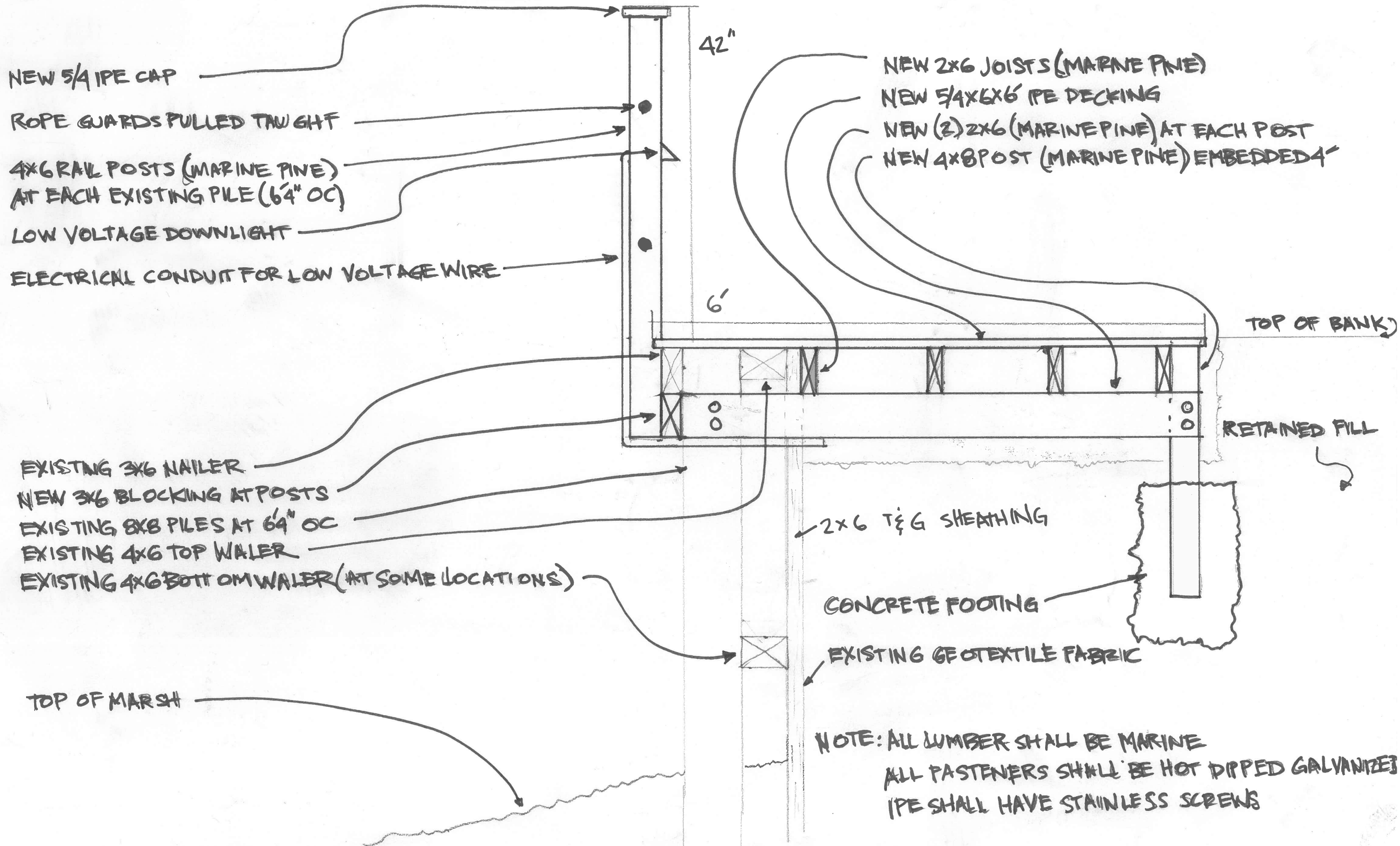
The City of Isle of Palms, S.C.:

\_\_\_\_\_  
(#1 as to City)

By: \_\_\_\_\_

\_\_\_\_\_  
(#2 as to City)

Title: \_\_\_\_\_



NEW 5/4 IPE CAP

ROPE GUARDS PULLED TIGHT

4x6 RAIL POSTS (MARINE PINE)  
AT EACH EXISTING PILE (64" OC)

LOW VOLTAGE DOWNLIGHT

ELECTRICAL CONDUIT FOR LOW VOLTAGE WIRE

42"

6'

NEW 2x6 JOISTS (MARINE PINE)

NEW 5/4x6x6" IPE DECKING

NEW (2) 2x6 (MARINE PINE) AT EACH POST

NEW 4x8 POST (MARINE PINE) EMBEDDED 4"

TOP OF BANK

RETAINED FILL

EXISTING 3x6 NAILER

NEW 3x6 BLOCKING AT POSTS

EXISTING 8x8 PILES AT 64" OC

EXISTING 4x6 TOP WALKER

EXISTING 4x6 BOTTOM WALKER (AT SOME LOCATIONS)

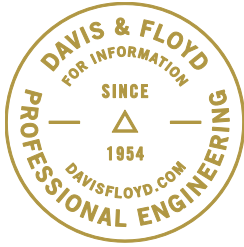
2x6 T&G SHEATHING

CONCRETE FOOTING

EXISTING GEOTEXTILE FABRIC

TOP OF MARSH

NOTE: ALL LUMBER SHALL BE MARINE  
ALL FASTENERS SHALL BE HOT DIPPED GALVANIZED  
IPE SHALL HAVE STAINLESS SCREWS



# ***“IOP Marina Existing Bulkhead Structural Inspection” for City of Isle of Palms***

***Final Report – June 27, 2022***

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## **Isle of Palms Marina Structural Inspection of Existing Bulkhead**

D&F Job No. 032000.01

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### **PREPARED FOR:**

City of Isle of Palms  
Mr. Douglas Kerr  
Director of Building, Planning, and Licensing  
P.O. Drawer 508  
Isle of Palms, SC 29451

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### **PREPARED BY:**

Davis & Floyd, Inc.  
P.O. Box 61599  
North Charleston, SC 29419  
(843) 554-8602





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## 1.0 – Introduction

In accordance with the Davis & Floyd, Inc. (D|F) proposal for professional services entitled “Isle of Palms Marina Structural Inspection of Existing Bulkhead” dated April 12, 2022, the structural inspection of the existing bulkhead is complete. The scope of work for this project consisted of performing a visual inspection of the existing timber bulkhead to assess its current structural condition and making general recommendations for repairs or replacement of deteriorated items observed during the inspection, if applicable.

This report presents the findings of the bulkhead’s structural inspection, opinion of its current structural condition, and general repair recommendations.

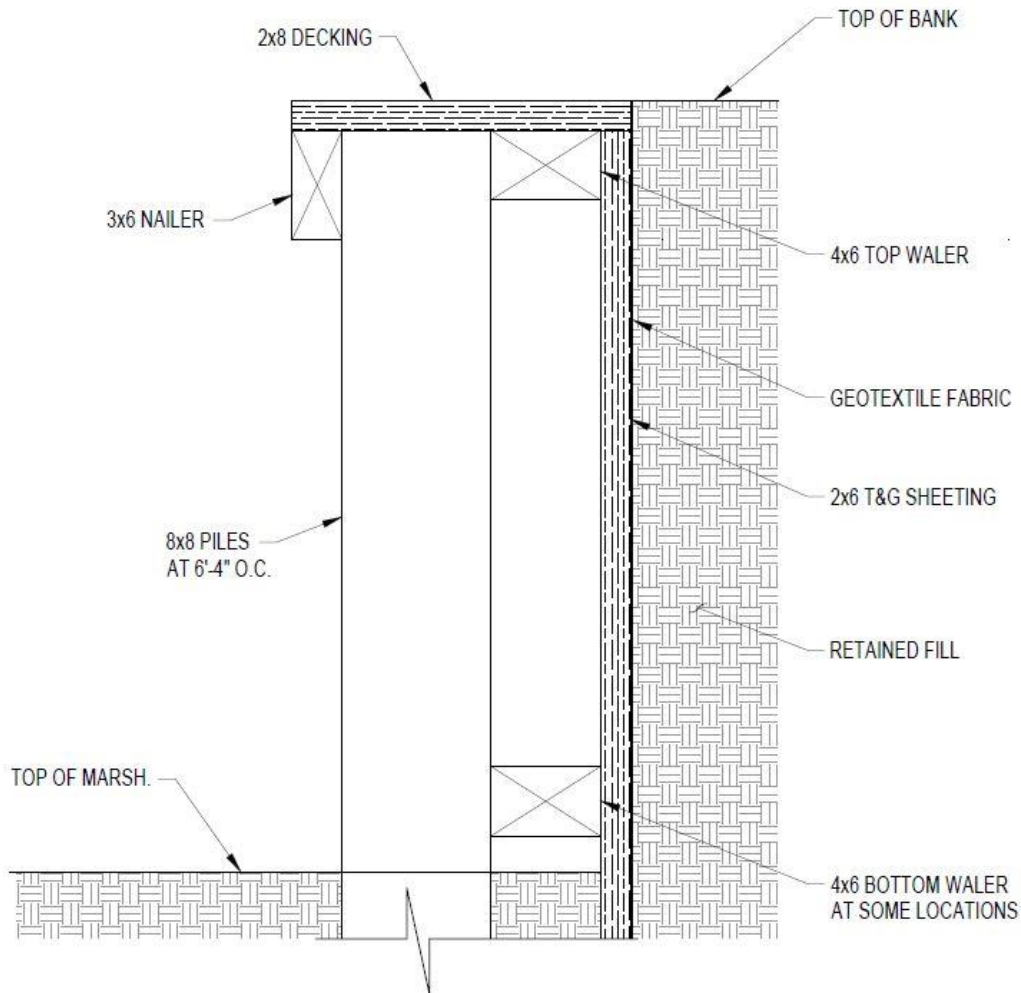
## 2.0 – Existing Bulkhead Description

The existing bulkhead is located along the North edge of the parking lot at the Isle of Palms Marina located at 50 41<sup>st</sup> Avenue, Isle of Palms, SC. The bulkhead, which is constructed from preservative treated timber, acts as a retaining wall to support the earth fill used to construct the parking lot along the edge of the marsh. An aerial of a portion of the marina showing the existing bulkhead can be seen in Figure 2.1 below. The bulkhead is approximately 330 feet in total length.



**Figure 2.1. Aerial Showing Existing Bulkhead**

The exact age of the bulkhead is not known, but it was probably constructed sometime in the 1990's which would make its estimated age to be between 25 and 30 years old. The bulkhead is constructed from 8x8 square timber piles spaced at 6'-4" on center. The piles act as vertical cantilever elements and provide stability to the bulkhead. The 8x8 piles support 4x6 timber walers which span between the piles. The walers support vertical 2x6 tongue and groove sheeting boards which retain the earth behind the wall. There is a layer of geotextile fabric between the sheeting boards and fill. The geotextile fabric keeps the fill from washing through the joints between the sheeting boards. There is a 3x6 timber nailer board fastened to the exterior face of the 8x8 piles. The 3x6 nailer board supports the edge of 2x8 decking on top of the wall. A typical section of the bulkhead is shown in Figure 2.2 below and a photo showing a portion of the front elevation of the bulkhead is shown in Figure 2.3.



**Figure 2.2. Typical Bulkhead Section**



**Figure 2.3. Front Elevation of Portion of Bulkhead**

### **3.0 – Structural Inspection Findings**

On May 10<sup>th</sup>, 2022, D|F personnel conducted a visual structural inspection of the existing bulkhead at low tide to assess its current structural condition. The inspection was performed by foot in front of the bulkhead using hip waders to walk along the edge of the marsh. The inspection revealed as a whole that the existing bulkhead is in fair structural condition, however there were a several items observed requiring repair that should be addressed. These items are discussed below.

#### **3.1 – Walers**

It was observed during the inspection that the top waler located at the west end of the bulkhead has collapsed (See Figure 3.1 and Figure 3.2).



**Figure 3.1. Collapsed Top Waler at West End of Bulkhead**



**Figure 3.2. Collapsed Top Waler at West End of Bulkhead**

It was also observed that the top waler is split in several locations along the western section of the bulkhead (See Figure 3.3 and 3.4).



**Figure 3.3. Split Top Waler Near West End of Bulkhead**



**Figure 3.4. Split Top Waler Along West End of Bulkhead**

### **3.2 – Nailer Boards**

It was observed during the inspection that several of the front 3x6 nailer boards are split. Figures 3.5 and 3.6 show two of these locations.



**Figure 3.5. Split 3x6 Front Nailer Near Middle of Western Section of Bulkhead**



**Figure 3.6. Split 3x6 Front Nailer Near Eastern End of Bulkhead**

The splitting of the boards is caused by their continued exposure to wetting and drying.

### **3.3 – Piles**

It was observed during the inspection that some of the 8x8 piles have some visible deterioration (See Figure 3.7).



**Figure 3.7. 8x8 Pile with Visible Deterioration Near Base at Mudline**



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The third pile from the pier near the east end has a large knot near its base at the mudline (See Figure 3.8). The pile does not appear to be rotten at this time, but the knot will eventually cause deterioration in the pile.



**Figure 3.8. Knot in Third Pile from Pier**

It was also observed that the first pile from the east side of the first pier is rotten at the mudline (See Figure 3.9).



**Figure 3.9. Rotten Pile at Base at Mudline**

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In addition, it was observed that there is some minor deterioration on the corner of the first pile from the second pier (See Figure 3.10).



**Figure 3.10. Minor Deterioration on Corner of Pile**

The fourth pile from the west end of the second pier has a large longitudinal split along its length (See Figure 3.11).



**Figure 3.11. Longitudinal Split in Pile**

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It was also observed that some of the piles have some minor deterioration in their tops (See Figure 3.12). Most of the piles are covered by the decking, so the total number of piles with this type of deterioration could not be observed during the inspection.



**Figure 3.12. Deterioration in Top of Pile**

### **3.4 – Decking**

It was observed that most of the decking on top of the bulkhead is in poor condition (See Figure 3.13). The decking is split and deteriorated due to its constant exposure to wetting and drying.



**Figure 3.13. Deteriorated Decking**

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Some of the decking along the bulkhead is also missing in several locations (See Figure 3.14).



**Figure 3.14. Missing Decking**

### **3.5 – Connections**

It was observed that the connections of the front 3x6 nailer to the piles consists of two or four nails (See Figure 3.15 and Figure 3.16) and that the nails are rusted and in poor condition.



**Figure 3.15. Connection with Two Rusted Nails**



**Figure 3.16. Connection with Four Rusted Nails**

#### **4.0 – Opinion of Current Structural Condition**

During the inspection, the dimensions, spacings, and configurations of the existing bulkhead framing elements were measured so that a preliminary structural evaluation could be performed to estimate if the existing structure in its current condition could be used as is to support a future boardwalk and hand railing. The items that were analyzed during the evaluation were the 3x6 nailer boards and the nailed connections connecting the nailer boards to the piles. The capacity of the piles could not be evaluated because the capacity of the soils and the embedment depth of the piles into the soil is not known. The lumber was assumed to be No. 2 Southern Yellow Pine for the purposes the evaluation and the corresponding allowable stresses were determined in accordance with 2018 Edition of the National Design Specifications for Wood Construction. It was also assumed that any split or deteriorated members or connections would be replaced. The 2018 IBC does not give specific criteria for the required vertical live load capacity of docks or boardwalks for commercial use, but it does provide a minimum required live load capacity of 60 pounds per square foot for Elevated Walkways. Common industry practice is to use a design live load of 50 pounds per square foot for docks or boardwalks in residential applications and 100 pounds per square foot in commercial applications. Therefore, a design vertical live load of 100 pounds per square foot was used in the evaluation. The 2018 IBC also requires that pedestrian guard rails be designed for the greater of a uniform load of 50 pounds per linear foot of railing or 200 pounds concentrated load in any direction and to transfer this load through the supports to the structure. A maximum rail post spacing of 5 feet on center was assumed for the evaluation, so a corresponding design load of 250 pounds in any direction was used in the evaluation.

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The evaluation of the existing bulkhead structure for wind or seismic loading is beyond the scope for this project and therefore was not performed.

The results of the structural evaluation indicated that the current 3x6 nailer boards were adequate for a vertical live load of 100 pounds per square foot but was found to be inadequate for the combined vertical live load and corresponding railing loads. These results also showed that the nailed connections do not have enough capacity for the combined loading.

Therefore, based on these results the existing structure as is not adequate to support a future boardwalk and hand railing without modification.

## **5.0– General Repair Recommendations**

The structural evaluation revealed that the capacity of the existing structure is not adequate to support a future boardwalk and railing without significant modification. Generally, modifications of the structure will involve the following:

- Removal of the existing deteriorated decking.
- The replacement of the existing 3x6 nailer beams with larger properly designed joists and bolted connections to the existing piles. Also, an additional support structure would need to be designed behind the existing bulkhead to support new floor joists and longer decking.
- Replace any split or deteriorated walers supporting the tongue and groove sheeting. Also, any deteriorated sheeting would need to be replaced.
- Replace any 8x8 piles that are damaged with new piles.
- The installation of new code compliant pedestrian railing bolted to the exterior joists with appropriate blocking between the joists to distribute the lateral railing loads.
- The installation of new wood or composite decking.

## **6.0– Conclusions**

The structural inspection revealed that the existing bulkhead structure as a whole is in fair condition for its age with several deteriorated items that need to be repaired. In addition, the results of the preliminary structural evaluation revealed that the capacity of the existing structure is not adequate as is to support a future boardwalk and railing without significant modification.

In addition to the recommendations made in this report, Davis & Floyd makes the following recommendations to the City of Isle of Palms:

1. Engage D|F to perform the design of the structural modifications to the existing structure outlined in this report and prepare conceptual plans for cost estimating purposes.

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2. A construction cost estimate of the structural modifications should be developed with the assistance of a local marine contractor, so that the magnitude of the anticipated construction costs can be accurately determined. This cost should also be compared to the cost of replacing the existing bulkhead considering that the existing structure may only have a 10 to 15 year remaining service life until it needs significant repair or replacement.

D|F appreciates the opportunity to be of service to the Town of Isle of Palms for this project and looks forward to the continued involvement during the other phases of this project. If there are any questions concerning the inspection findings and recommendations contained in this report, please contact us for further assistance.

End of Report