

AMENDMENT TO AGREEMENT  
AMENDMENT NO. 01

Project Name: Town of Sunset Beach 2016 Shoreline Management and Pre-dredge Analysis (Phase 1)

Project No.: 9269-00

THE AGREEMENT, dated February 17, 2016, between The Town of Sunset Beach, NC and Moffatt & Nichol for services on the above named Project is hereby amended as follows:

1.0 SERVICES

See Exhibit A Statement of Services titled "Town of Sunset Beach 2016 Shoreline Management & Pre-Dredge Analysis Phase 2 – Design Scope of Work" dated May 23, 2016.

2.0 CHARGES OR PAYMENTS

Change the Fixed Lump Sum amount from \$29,952.00 to \$242,106.00 for an increase of \$212,154.00.

3.0 OTHER AMENDMENTS

None

Except as expressly amended herein, all provisions contained in the aforementioned Agreement and its Amendments shall remain in full force and effect and are hereby incorporated herein by this reference.

**MOFFATT & NICHOL**

By: 

Name: Tim Reid, P.E.

Title: Vice President

Date: 5-23-2016

**TOWN OF SUNSET BEACH**

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

Name: \_\_\_\_\_

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

Date: \_\_\_\_\_

**EXHIBIT "A"**

**STATEMENT OF SERVICES**

Town of Sunset Beach  
2016 Shoreline Management & Pre-Dredge Analysis  
Phase 2 – Design Scope of Work  
May 23, 2016

**BACKGROUND & UNDERSTANDING**

The Town of Sunset Beach (Town) has completed the initial phase of the 2016 Shoreline Management and Pre-Dredge Analysis and intends to evaluate the path forward. The proposed work involves the maintenance dredging of Mary's and Turtle Creek along with the North Shore Drive feeder canal and adjoining finger canals. The work also includes the initial dredging of Jinks Creek and the Canal Drive Bay Area.

The outline below provides the anticipated tasks necessary to complete the design phase of the overall project. The tasks derive from comments received during the March 24, 2016 agency coordination meeting and conclude with the next agency coordination meeting. Please note the proposed work does not consider the necessary efforts to permit an upland disposal site, but does provide a path to identify a site for further development.

The total lump sum fixed cost for the design phase equals \$212,154.<sup>00</sup>. The tasks included in Phase 2 will provide an engineered design suitable for permitting and a dredge volume necessary to estimate construction costs. In addition, Phase 2 includes some initial environmental work that will be necessary for Mary's and Turtle Creek. The schedule for Phase 2 covers a 6 month time frame with project construction most likely occurring in the winter or 2017-2018.

**TASK 1 - PROJECT COORDINATION**

M&N will continue to provide coordination efforts through the Phase 2 of the project, anticipated for a 6 month duration. The efforts include written progress reports documenting the project status and current work efforts on a monthly basis. M&N staff will also remain available for conference calls and email correspondence at the Town's convenience to discuss the project and answer any questions that may arise. M&N anticipates one (1) Town council meeting and one (1) public meeting may be necessary within the next phase of work to update the council and Town residents on the project status. M&N will prepare for and attend these meetings at the request of the Town. In addition, as the initial step in Phase 2 M&N will assist the Town in applying for a Water Resource Develop project grant through DEQ. **The grant may provide up to a 2:1 cost share for the design, engineering, and construction of the proposed project.**

Fixed Lump Sum Cost for Task 1 - Project Coordination: \$16,465

**TASK 2 - REFINED DESIGN**

Based on the comments received at the March 24<sup>th</sup> Agency Coordination Meeting, Moffatt & Nichol (M&N) will provide a refined design template for the dredge areas suitable for permitting each phase of the project. The design will provide cross-sections and plan view drawings showing the work area and dredge depths. M&N will develop the design based on the navigation goals established by the Town and will coordinate with the environmental agencies responsible for permitting the project to help provide an acceptable template to the agencies and Town.

Based on the comments received at the referenced agency coordination meeting the USACE will require some type of hydraulic modeling showing the proposed work in Jinks Creek will not create additional shoaling in the AIWW crossing. The USACE will most likely also require modeling to show tidal velocities traversing the ‘S’ curve in Jinks Creek will not create additional scour to alter the creek’s historic alignment after project construction. The USACE also recommended analyzing how Tubbs Inlet would adjust with the proposed work. To address these concerns M&N will conduct a hydraulic model analysis of Jinks Creek to identify the relative change in tidal velocities expected from the proposed work. The model analysis will build upon a 2005 analysis of the AIWW in Sunset Beach and will show the relative change in velocities between existing and ‘with project’ conditions. The analysis will focus on the AIWW crossing with Jinks Creek, the ‘S’ curve and the entrance to Tubbs Inlet. **(This work assumes the USACE will accept a hydraulic model analysis and will not require a morphologic model. Prior to initiating this task M&N will verify the acceptance of a hydraulic model with USACE staff. A morphologic model shows anticipated shoaling and scour areas, where a hydraulic model shows where velocities magnitudes experience a change. With a hydraulic model, the shoaling or scour effect may be estimated from the velocity magnitude change.)**

To complete the modeling analysis, M&N will contract Geodynamics to collect additional topographic and bathymetric survey data surrounding Tubbs Inlet. The initial survey work collected during Phase I focused on the potential dredge areas and did not capture the conditions of the inlet, as the modeling task was not required at the initiation of Phase I. Quantifying the current conditions of Tubbs Inlet will be necessary to describe the inlets anticipated response. The survey area within the AIWW will also be expanded to identify existing conditions within the federal navigation channel. This bathymetric survey will aid in simulating the tidal velocities within Jinks Creek and may also serve as a pre-construction survey for the AIWW. (The USACE will most likely require a comparison of the pre-construction conditions with annual surveys obtained after the Jinks Creek work is complete.) The list below shows the estimated lump sum fixed cost for the Refined Design task for each work area. The estimated cost for Jinks Creek includes the anticipated surveying and modeling efforts described above.

Mary’s & Turtle Creek:	\$5,234
Canal Drive Feeder and Finger Canals:	\$3,194
Jinks Creek & North Shore Drive Feeder Canal:	\$61,822
Surveying for Jinks Creek Modeling (Geodynamics):	\$31,682
<b>Fixed Lump Sum Cost for Task 2 - Refined Design:</b>	<b>\$101,932</b>

### **TASK 3 - SEDIMENT TESTING**

Testing will be required in each proposed work area to classify the sediment composition for proper placement or disposal. M&N will contract with Catlin Engineers to collect and test the proposed sediment samples and provide written results of the tests. M&N will calculate composite information for each work area based off the test results provided by Catlin. M&N will use the composite information to estimate the volume of material requiring upland disposal and the volume of beneficial re-use material available within the proposed work template. M&N will provide a written report to the Town containing the testing results and volumetric estimates.

Collection of grab samples will most likely suffice for areas previously dredged where the material is not anticipated to be beach quality. These areas include Mary’s Creek, Turtle Creek and the North Shore Drive finger canals. The available volume, and material type, in these locations are anticipated to discourage beneficial use placement. However, vibracore samples will be required within areas believed to contain

suitable material for beneficial re-use placement such as Jinks Creek. The sediment composition may vary for the remaining North Shore Drive feeder canal and the Canal Drive bay area. Therefore, the sediment sampling in these areas will consist of a combination of vibracore samples and grab samples. Material testing of the collected sediments will occur in accordance with the USACE “Sediment Testing Guidelines for Dredged Material Proposed for Disposal in Federal Project Disposal Areas by Applicants” dated May 2009 and the NCDQM Technical Standards for Beach Fill Projects (15A NCAC 07H.0312).

Figure 2 shows a sediment sampling plan acceptable to DCM. The plan proposes to collect the sediment samples in the following locations and densities:

- Jinks Creek – 13 Vibracore samples
- North Shore Drive Feeder Canal – 5 vibracore samples; 2 grab samples
- North Shore Drive Finger Canals – 1 grab sample each (4 total samples)
- Canal Drive Bay Area – 4 vibracore samples; 2 grab samples
- Mary’s & Turtle Creek – 1 grab sample each (2 total samples)

**(The increased level of testing above State guidelines is proposed to help identify the maximum volume of potential beneficial re-use material. The Town of Ocean Isle has expressed an interest in receiving beneficial use material and participating as a cost sharing partner for the sand placement. Capturing all of the material eligible for beneficial re-use will help reduce the overall project cost for the Town of Sunset Beach.)** Sediment testing is not anticipated along the beach front for beneficial use material placement, or within the USACE disposal islands.

The list below provides the lump sum fixed cost for the sediment sampling and analysis:

Sediment Analysis - Mary’s & Turtle Creek:	\$1,008. <sup>25</sup>
Sediment Analysis - Canal Drive Feeder and Finger Canals:	\$1,008. <sup>25</sup>
Sediment Analysis - Jinks Creek & North Shore Drive Feeder Canal:	\$11,716. <sup>50</sup>
Sediment Collection & Testing Costs (Catlin):	\$43,059
<b>Fixed Lump Sum Cost for Task 3 - Sediment Testing:</b>	<b>\$56,792</b>

#### **TASK 4 - USACE DISPOSAL LOCATIONS**

As part of the initial work for this project, M&N obtained conceptual authorization from the USACE to use an AIWW disposal island for sediment non-compatible for beneficial re-use on the beach. The USACE stated multiple disposal islands would be available (pending the construction period) for use near Sunset Beach. However, the islands may require improvements pending the volume quantity proposed for placement and the islands current conditions. (Based on experience with the dredging of Eastern Channel adjacent to Oak Island, improvements to the disposal islands may range up to \$60,000 or more to satisfy USACE requirements.)

In an effort to determine the level of improvements (if any) required to place the dredge material within a disposal island, M&N will help select an appropriate island for use. As part of this effort M&N will inspect the current conditions of the disposal islands most appropriate for use. Up to three (3) disposal islands may be considered and evaluated for further development. Photographs will be logged and a general description of the level of work required for each island will be provided. Based on the inspection results M&N will recommend one (1) island for material placement. The recommendation will consider the estimated level of work required to prepare the island for material placement, the volumetric quantity anticipated for the site, and the construction cost (pipe line distance) for using the island. **(No survey work is included for**

**the disposal islands at this stage; however, survey work will most likely be required in the future to document pre-construction conditions and volumetric capacity.)**

Fixed Lump Sum Cost for Task 4 – USACE Disposal Location is: \$6,325

### **TASK 5 - OYSTER SURVEY**

The Division of Coastal Management (DCM) has requested an oyster survey be performed in Mary's and Turtle creeks due to know populations of shellfish in these systems. M&N will conduct the necessary surveys following protocols provided by DCM. It is assumed that approximately 130,000 square feet of creek bottom will require survey. Upon completion of in-field sampling, a report of findings will be provided to DCM and other relevant agencies for review. Our staff will coordinate mitigation options with relevant agencies to determine a course of action. Findings and mitigation options will be discussed with the Town and will be provided in the report.

Fixed Lump Sum Cost for Task 5 – Oyster Survey is: \$22,183

### **TASK 6 – AGENCY COORDINATION MEETING (PRE-PERMIT SUBMITTAL)**

Based on the results of the above tasks, M&N will request and chair a 2<sup>nd</sup> agency coordination meeting with representatives of the Town, the USACE, CAMA, and others to discuss the proposed project. M&N will present the refined design of the work areas along with the results of the environmental studies to the invited members. A copy of the results will be provided to the attendees a minimum of 1 week prior to the meeting to allow each member ample review of the project. A written summary of the meeting will be provided to all participants along with contact information for each attendee. M&N will address all questions presented at the coordination meeting, either at the meeting or through follow-up discussions.

This meeting is anticipated to serve as a pre-submittal meeting for the permit application. The outcome will confirm the path for permitting the project and should identify any additional concerns maintained by the agencies. This should accelerate the permitting process and reduce the potential for additional information requests from the agencies. M&N will provide a written summary of the meeting to all participants to help record the discussion.

Fixed Lump Sum Cost for Task 6 – Agency Coordination Meeting is: \$6,427

### **TASK 7 - CONCEPTUAL COST ESTIMATE (CONSTRUCTION)**

Based on the results of the agency coordination meeting, M&N will provide a conceptual estimate of construction costs, including development of construction plans and specifications, bidding the project, and construction oversight. The cost estimate will be based on the project parameters defined to date and will identify assumptions of outstanding items (such as the selection & development of a USACE disposal island.) The cost estimate will also identify any changes in the permitting process incurred from the agency comments.

Fixed Lump Sum Cost for Task 7 – Conceptual Cost Estimate is: \$2,030

The above information is provided to help the Town of Sunset Beach evaluate moving forward with the proposed work. The table below summarizes the estimated costs and defines a recommended next step for the project. Steps excluded from the estimate include negotiating / permitting use of any USACE disposal island (or other upland site). The scope also excludes potential efforts necessary to secure a cost share agreement with the Town of Ocean Isle for beneficial re-use material placement and general project coordination costs for future phased work.

The schedule for the work proposed in the next step extends approximately 180 days (6 months) from the notice to proceed, with construction of the project most likely occurring no sooner than the winter of 2017-2018. This schedule could be shortened, however the current length considers a phased approach and provides opportunities for the Town to evaluate moving forward at each step.

**Summary of Costs for Phase 2**

<b>Task</b>	<b>Fixed Lump Sum Cost</b>
1. Project Coordination	\$16,465. <sup>00</sup>
2. Refined Design	\$101,935. <sup>00</sup>
3. Sediment Testing	\$56,792. <sup>00</sup>
4. USACE Disposal Locations	\$ 6,325. <sup>00</sup>
5. Oyster Survey	\$22,183. <sup>00</sup>
6. Agency Coordination Meeting	\$ 6,427. <sup>00</sup>
7. Conceptual Cost Estimate	\$ 2,030. <sup>00</sup>
<b>Total</b>	<b>\$212,154.<sup>00</sup></b>

M&N appreciates the opportunity to assist the Town of Sunset Beach and would be happy to discuss the proposed path or provide additional information regarding our understanding of the project.

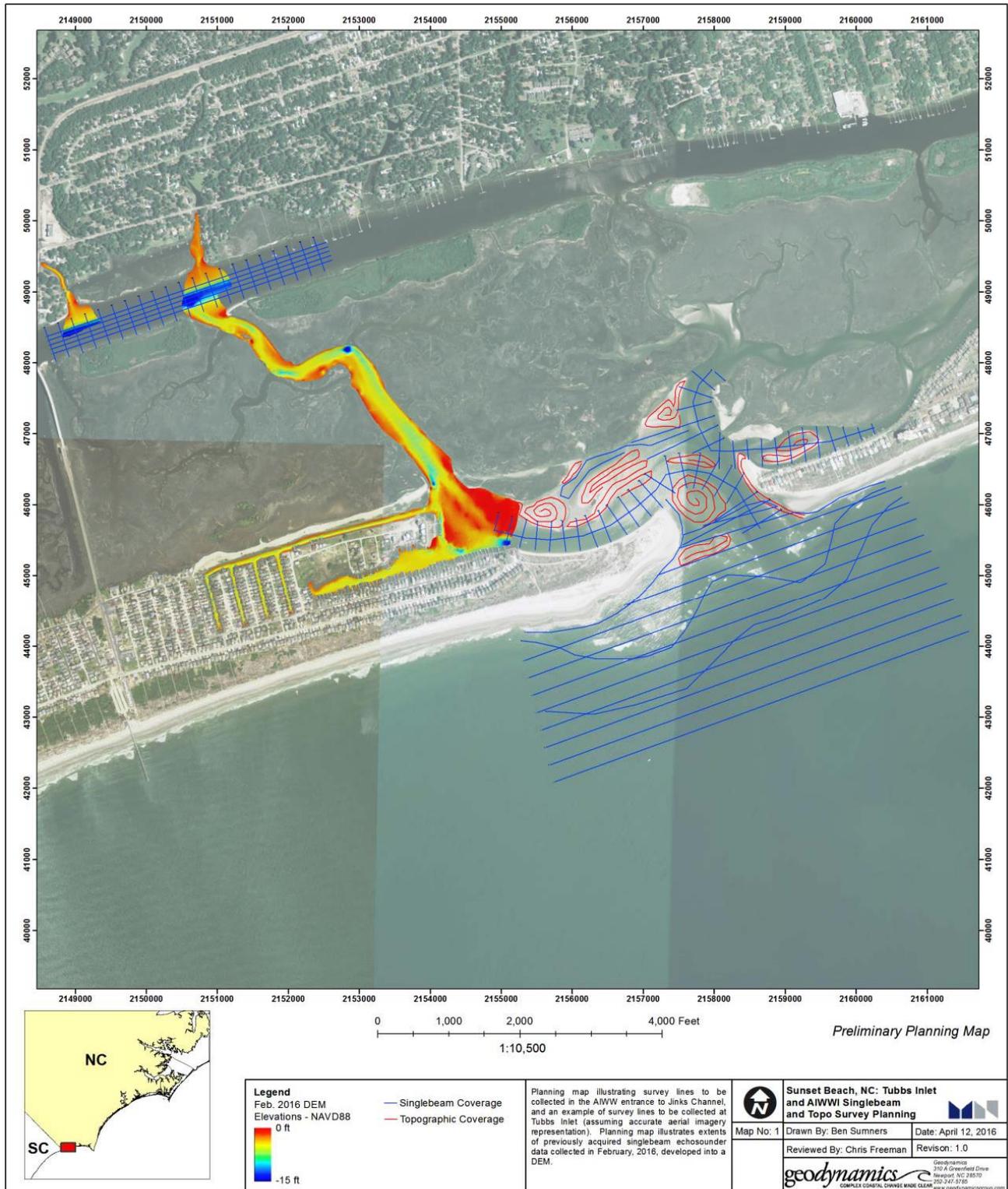


Figure 1. Phase 2 Proposed Survey Line work (Geodynamics)

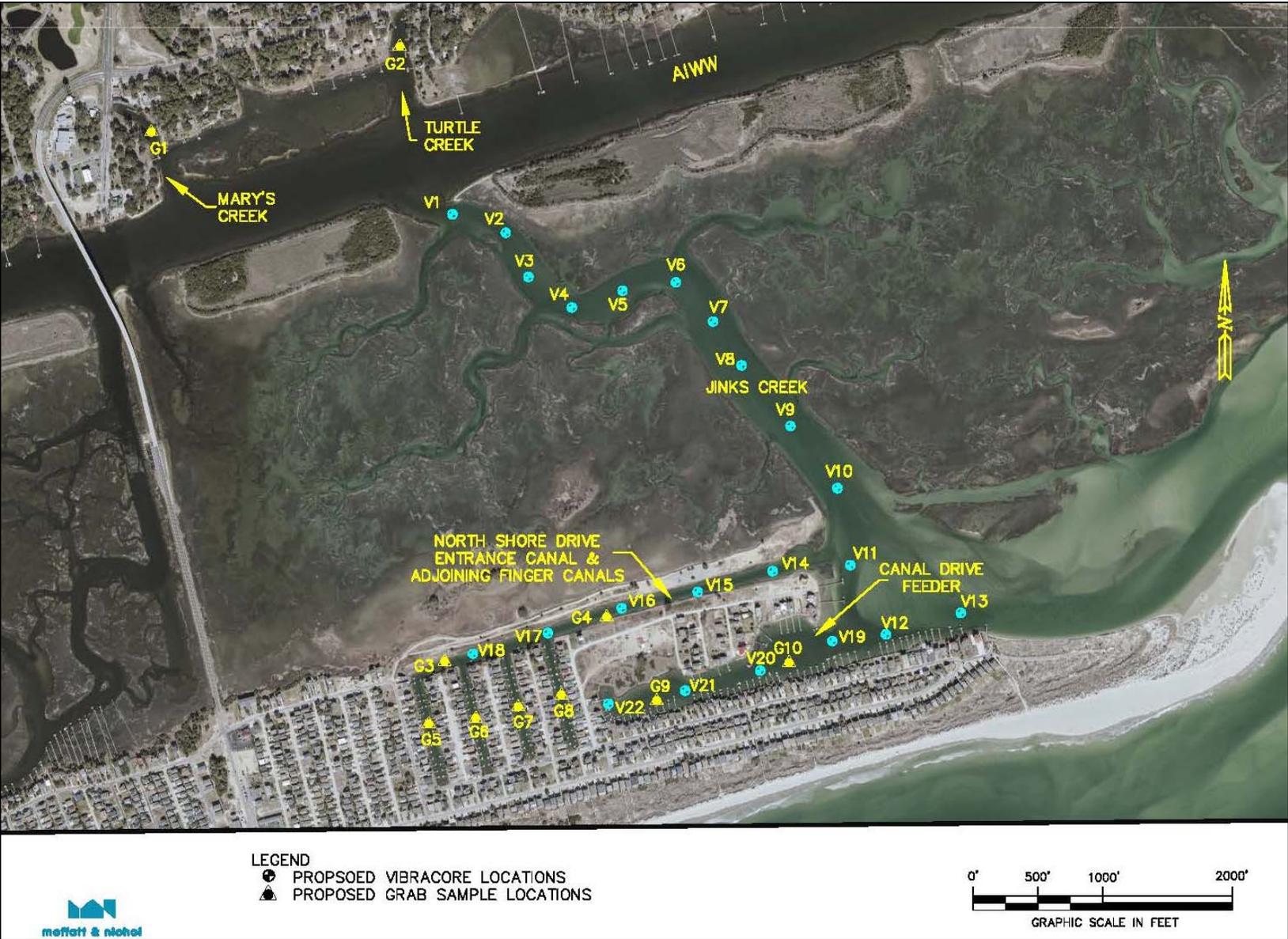


Figure 2. Phase 2 Proposed Sediment Sampling Plan

**EXHIBIT "B"**

COMPENSATION AND PAYMENT

