

# **MackKaye Harbor Boat Ramp Shoreline Restoration**

**SAN JUAN COUNTY DEPARTMENT OF ENVIRONMENTAL STEWARDSHIP**

## **Project Specifications**

Prepared by Coastal Geological Services

July 13, 2020  
(Revised April 21, 2022)

*This Page Intentionally Left Blank*

## **Section 1 – General Requirements and Definitions**

### 1.1 General Requirements

The project specifications presented here define work scope and minimum requirements associated with the implementation / construction of the proposed MacKaye Harbor Beach Restoration Project. The Special Provisions provided in the following sections supplement the WA Department of Transportation Standard Specifications listed below (referred to as WSDOT thereafter), with new, replaced or modified requirements specific to this project.

- WSDOT Specification: Standard Specifications for Road, Bridge, and Municipal Construction (M 41-10), WA Department of Transportation, 2020.

This project specifications supplement and further explain design notes presented in Final Design Drawing Sheets. They do not replace or modify design sheet notes.

In addition, Contractor shall refer to permit documents for all permitting conditions & constraints and other regulatory requirements.

### 1.2 Definitions

- County: San Juan County Environmental Stewardship
- PM: Project Manage / Owner, or PM assigned representative, San Juan County Environmental Stewardship
- Inspector: PM assigned field inspector for Engineer
- Consultant: Coastal Geologic Services, Inc. (CGS)
- Engineer: CGS project engineer, Engineer assigned representative, or Engineering Geologist
- Contractor: Contactor awarded construction of project
- Sheet (s): Final Design Drawing Sheet(s) (see Bid Item #4, Planset)

## Section 2 – Project Description

2.1 Project Name: MacKaye Harbor Beach Restoration Project

2.2 Project Location: Norman Road, Lopez Island, WA 98261

2.3 Project Objective

The objectives of this project are to remove beach rock cover and deteriorated / failed bank rock armor on an 880 FT long reach of beach to restore natural coastal processes at the northeast shore of MacKaye Harbor, and to enhance nearshore habitat through beach nourishment and native vegetation to promote forage fish spawning and Juvenile salmonid migration. The project is also aimed to preserve and enhance public use of county's existing boat launch, landing, picnic, and beach access facilities at this public access area.

2.4 Project Scope

The project WORK consists of furnishing all construction, labor, equipment, and materials, and performing all operations in connection with the construction as detailed on the Final Design drawing sheets.

The scope of the project includes the following main components (Table 1):

- a. Remove dense rock cover, approximately 325 CY from the upper intertidal beach above elevation + 5 FT, MLLW, as indicated on Sheets 6, 7, 10, and 11. Remove up to 15 CY of scattered rocks of sizes of 1-3 man on the lower beach (elevation between 3 FT to 5 FT) per field instruction. Haul rock to county designated upland stockpile site.
- b. Remove deteriorated shore revetment rocks, approximately 615 CY as indicated on Sheets 6,7, 10, and 11. The quantity includes 110 CY of large angular armor rock and 25 CY of 3"-10" quarry spalls for salvage use on site (for rebuild of a rock wall). Haul all unused rock to county designated upland stockpile site.
- c. Excavate to set back the existing bank at parking area south of the float dock. Excavate a keyway for re-installing a new rock wall.
- d. Rebuild a 50 FT long rock wall and end protection with approximately 110 CY salvaged large armor rock, 25 CY salvaged quarry spalls, and supplemented with imported cobble for backfill.
- e. Place and grade 1430 tons of imported beach nourish materials, mixed with excavated native soil (approved onsite), as per plans.
- f. Install 0.35 acres of upland native vegetation (not in this contract, installed by County later)

2.5 Project Quantities

Material quantities shown in Table 1 are approximate, estimated based on available survey data and / or field observations. Quantities are provided for reference to Contractor for bidding purposes. Job measurement is further defined in Section 2.6. Details of material specifications are presented in Section 3.

**Table 1. Job quantities and measurements**

| Job Item  | Quantity         | Unit | Job Measurement  | Notes  |
|---|------------------|------|--|--|
| Dense Beach Rock Removal                          | 325              | CY   | By Truck Trip and Vol Estimate Record, including quantity of salvaged rock for rock wall (~135 CY) | Quantity approximate   |
| Scattered Beach Rock Removal                      | 15               | CY   |  | Retain 110 CY large angular rock and 25 CY backfill rock on beach for reuse. Unused rock after rock wall construction shall be hauled to stockpile site                            |
| Revetment Rock Removal                            | 625              | CY   |  |  |
| Bank Excavation, Refill on Beach (field verified) | 240              | CY   | Lump Sum   | Quantity for reference (see 2.6 a)<br>Material to be reused for beach Nourishment on site upon field approval.<br>If not approved, it shall be counted as debris to be hauled out. |
| Rebuild 50' Rock Protection                       | 155              | CY   | Lump Sum   | Quantity for reference (see 2.6 a)<br>110 CY salvaged large angular armor rock; 25 CY salvaged backfill rock, 20 CY (30 tons) imported beach cobble                                |
| Beach Nourishment placement (imported material)   | 1,430            | TON  | Gravel Pit Receipts, Unit Price  | Total 1460 ton imported material, dry (30 tons for rock backfill)  |
| Debris Haul-out                                   | Field Determined | CY   | Disposal site ticket or agreed volume estimate onsite  | Including collected beach materials and/or excavated materials not suitable for reuse  |
| Upland Planting (by county)                       | 0.30             | AC   | N/A, installed by County   | Imported Material  |

**2.6 Job Measurement and Payment**

- a. Measurement of lump sum bid items will be based on the value of work completed relative to the value of work remaining under the bid item. Estimated quantity is provided for reference only.
- b. Measurement of unit price bid items for imported materials will be based on the quantity of weight as documented by weight tickets or receipts obtained from the pit site or supplier at the time of material pickup. If barge is used for transporting material, barge cost shall be added to the Mob / Demob cost.
- c. Material export quantities hauled to the storage site shall be determined by visual assessment of each truckload (volume quantity) by both Contractor and PM / Engineer or their representative. The Contractor needs to keep a record of the truck trips and estimated loads. As a check to the export quantity hauled, the rock stockpiles will be measured following the completion of the material haul. Unit Price shall include cost of material, transported to site, and loading / offloading (excluding Barge use). The salvaged rock used for rock wall installation will be measured and counted with the same unit price as the haul-out rock.
- d. Payment for Work governed by unit prices will be made on the basis of the measurements and quantities of Work that are incorporated in or made necessary by the Work and accepted by the PM, multiplied by the unit price.
- e. For this project imported material cost and labor cost for constructing / installing the material are separate bid items.

## Section 3 – Materials

### 3.1 General

All imported and salvaged materials to be installed or placed for the project shall be pre-approved by Engineer prior to construction. Specification sheets, gradation sheets / reports, sample materials or scaled material photos (with a tape measure placed by the side for reference) shall be submitted and reviewed prior to large quantity shipment to the project site.

### 3.2 Rock Wall Rock

- a. All rock materials for rock wall structures shall be hard, rough, and durable angular quarry stones, free of organic material, infilled joints, seams or other defects. Rock quality shall meet WSDOT Standard Standards (2020) as stated in WSDOT 9-13.1 and 9-13.7 (1).
- b. For this project armor rock for the rock wall will be salvaged on site. Rock sizes for rock wall is shown on Sheet 11, Detail 1. Refer to Table 2 for rock weight and dimension conversions. Large size angular rock ranging 3-man to 4-man shall be used as per design plans and sections. In general, more regular armor rocks in shape, such as, rectangular, tabular, or cubic shall be selected for reuse. Armor rocks in irregular shape may be used while matching with surrounding rocks in shape and interlock one other. No rounded rock shall be permitted. Small quantity of 2-man rocks may be used mixed with large rocks for wall-end revetments to fill voids and improve rock interlock.

**Table 2. Rock size per WSDOT 9-13.7(1)**

| ROCK SIZE  | ROCK WEIGHT (lbs) | AVERAGE DIMENSION (in)* |
|------------|-------------------|-------------------------|
| 1-MAN ROCK | 50 to 200         | 12 to 18                |
| 2-MAN ROCK | 200 to 700        | 18 to 28                |
| 3-MAN ROCK | 700 to 2,000      | 28 to 36                |
| 4-MAN ROCK | 2,000 to 4,000    | 36 to 48                |
| 5-MAN ROCK | 4,000 to 6,000    | 48 to 54                |
| 6-MAN ROCK | 6,000 to 8,000    | 54 to 60                |

\* AVERAGE DIMENSION = (LENGTH+WIDTH+HEIGHT)/3

### 3.3 Filter Layer Rock and Backfill Rock

- a. The filter layer rock for the base of the rock wall shall be salvaged ANGULAR spalls with mixed size of 3" - 8" (approximately 10CY). Larger size spalls may be hand picked out.
- b. Two different sizes of backfill rocks shall be placed respectively to create two layers of backfill behind the rock wall starting at about 6" below existing grade (refer to Section 5.9 for installation).
  - Larger size backfill rock: 3"-10" (mixed) backfill rock salvaged from the site. This salvaged backfill rock shall be angular or semi-angular spalls or small-size ripraps, to be filled immediately behind rock wall.
  - Smaller size backfill rock: using imported streambed cobble, to be filled in between larger size backfill rock and the excavated soil bank. See Section 3.4b for cobble specification details.

### 3.4 Beach Nourishment Aggregates

- a. All beach nourishment aggregates shall be naturally occurring and free of debris, wood, and other organics or deleterious material. Gravel and cobble materials shall be water-rounded, well-graded, and contain no more than 10% fractured rock.
- b. Cobble for upper beach nourishment near bank toe shall consist of a mixed equal weight mixture (50% to 50%) of 4" minus and 8" minus streambed cobbles, or using 100% 6" minus streambed cobbles per WSDOT 9-03.11(2) gradation. Pit site mixing is not required. Material mixing can be done onsite with excavator. The gradations for the cobble sizes are shown in Table 3.

**Table 3. 4", 6" and 8" streambed cobble gradation, WSDOT 9-03.11(2)**

| 4" Minus Sieve Size | Percent Passing | 6" Minus Sieve Size | Percent Passing | 8" Minus Sieve Size | Percent Passing |
|---------------------|-----------------|---------------------|-----------------|---------------------|-----------------|
| 4"                  | 99-100          | 6"                  | 99-100          | 8"                  | 99-100          |
| 3"                  | 70-90           | 5"                  | 70-90           | 6"                  | 70-90           |
| 1 1/2"              | 20-50           | 2"                  | 30-60           | 3"                  | 30-60           |
| 3/4"                | 10 max          | 3/4"                | 10 max          | 3/4"                | 10 max          |

- c. Gravels for lower beach nourishment (elevation below +6 FT) shall conform to the following gradation specifications, WSDOT 9-03.12(5). Pit-run gravel mix may be considered with Engineer's pre-approval for the cost saving, if its gradation (or after certain mixing) closely matches Table 4 gradation requirements.

**Table 4. Gravel gradation, WSDOT 9-03.12(5)**

| Sieve Size | Percent Passing |
|------------|-----------------|
| 1 1/2"     | 99-100          |
| 1"         | 50-100          |
| 3/4"       | 0-20            |
| 3/8"       | 0-2             |
| No. 200    | 0-1.5           |

- d. For forge fish beach nourishment at elevation between +6 FT and +9.0 FT, the aggregates shall consist of 60% (530 tons) fish mix, with gradation as specified in Table 6, and 40% (360 tons) of the same beach gravel per WSDOT 9-03.12(5) as specified in Table 5. The two materials shall be mixed onsite before being placed on the beach.

**Table 5. Fish mix aggregate gradation (WDFS)**

| Sieve Size | Percent Passing |
|------------|-----------------|
| 5/8"       | 100             |
| 3/8"       | 90-100          |
| 1/16"      | 40-50           |
| No. 100    | 0-50            |

## Section 4 – Construction Planning and Preparation

4.1 The Contractor shall meet all specific construction planning and preparation requirements as described below. Contractor's construction work plan and site preparation shall be reviewed / checked and approved by PM and Engineer at minimum 3 days prior to the start of any actual construction work. Work schedule shall be updated at minimum 3 days prior to the next scheduled construction item is to start.

### 4.2 Work Plan, Equipment, and Personnel

The Contractor shall submit a written Construction Work Plan no later than seven (7) days prior to the scheduled start of construction. County needs 14 days advance notice prior to construction to notify public that boat launch is closed. The boat launch may be open on weekends if the contractor doesn't work weekends. The contractor can park equipment and store materials in the rock dump site. No physical work is to be performed at the site until the Construction Work Plan is reviewed and approved by PM and Engineer.

The Construction Work Plan shall include:

- a. A list of key construction personnel and the supervisory chain of responsibility
- b. A list of equipment and manufacturer's specifications
- c. Work implementation procedures, sequence, and estimated schedule, including construction of beach access, temporary staging, materials stockpiling, and water management
- d. Brief SPCC plan, including strategies to contain fluids if a hydraulic line is broken. Both HPA and DNR license recommend use of veggie hydraulic fluid for equipment used on the beach
- e. Brief TESC plan specifically for bank excavation and rock wall construction, including materials and action plan (refer to Section 5.6g and 5.8k requirements)
- f. Debris disposal and / or recycling sites.

The work plan, especially job status and schedule revisions shall be updated and reported weekly to PM and Engineer in general. In case of any schedule changes PM and Engineer shall be informed at least 48 hours in advance.

### 4.3 Pre-construction Survey, Marking, and Stake Setup

The Contractor is required to participate in a pre-construction site walk-through with PM, Inspector and Engineer.

The Contractor shall be responsible for setting, maintaining, and resetting all stakes for the Work based on job requirements set forth in Section 5. The Contractor shall refer to primary monuments on Sheet 2 (SCJ-MON-4 and SCJ-MON-5) and control points (reach divisions and cross-section locations) as defined on Sheet 3 for measuring and stake setting. A new rebar benchmark shall be installed at the location defined on Sheet 9 per permit requirement.

Calculations, surveying and measuring required for setting and maintaining the necessary lines and grades shall be the Contractor's responsibility. Stake setup shall be inspected and approved by the Engineer on site.

Stake setting or marking shall include but not be limited to the following:

- a. Construction beach access locations
- b. Project limits and reaches limits
- c. Staging and stacking areas
- d. Crossing of nine transects
- e. Excavation limits and new rock wall alignment
- f. Beach nourishment grades and boundaries.



## Section 5 - Construction Implementation

### 5.1 Work Execution

- a. The Contractor shall consider executing the work reach by reach sequentially, taking into consideration the daily workable low tide window. Any wall structure element under construction shall not be left vulnerable to rising tides and waves. The beach work area and any temporary foreign items on the beach shall be cleared or secured before the beach is submerged by the rising tide.
- b. The Contractor is responsible for maintaining the integrity of the existing floating dock structures and necessary wave protection functionality provided to the structure throughout the construction period. Temporary protection measures are necessary to cover the exposed soil bank to prevent it from water submergence and wave erosion. Additional protection may be necessary south of the dock at the rock wall and beach access area in case of a predicted storm scenario to prevent excessive bank erosion in any vulnerable or important areas.
- c. The contractor is required to follow instructions and consider recommendations provided by the Engineer or PM in the field, especially the components that requires field determination.

### 5.2 Construction beach Access

The Contractor shall use beach access defined in the "MacKaye Harbor Shoreline Restoration Construction site map". The goal is to achieve temporary safe beach access for heavy equipment and for transporting construction materials to achieve work efficiency while minimizing disturbance to the existing bank and beach surface from equipment movement. Steel plates shall be installed as needed.

### 5.3 Wood Clearing

Large wood and logs on the upper beach and near the toe line shall be cleared and stockpiled prior to beach cleanup. Large wood and logs shall be placed back on the upper beach within the project area as detailed in Section 5.12. The two large tree stumps and surrounding big rocks near Cross Section 8 (See Sheet 7) shall be left in place.

### 5.4 Beach Debris (Garbage) Haul Out

All debris and other foreign materials removed from the beach and not designated for reuse or for the rock dump site, shall be disposed of off the project site at an accepted disposal site. This item will be paid by quantity in CY and its removal approved by the PM prior to the haul.

### 5.5 Clear Beach Rocks and Remove Bank Revetment

- a. Remove dense rock cover from the beach face for areas indicated on Sheets 6 and 7. Large beach boulders (size > 3.5 FT) shall remain in place. Small size rocks (< 1 FT on the longest dimensions) shall also be left on the beach. No below-grade beach excavation is required for removing the rock on beach. The exception to the 1 FT minimum rock size to remain in place, is to gather 25 CY of small angular rock (3-10") per Section 3.3 for rock wall filter layer and backfill (see 5.5d).
- b. Remove and clear all designated sections of existing revetment rock (size > 1 FT) from the bank and near bank toe as per plans on Sheets 6 and 7. Oversized boulders (size > 3.5 FT) may be retained. The same exception for quarry spalls in 5.5a applies here as well. Any geotextile fabrics if found shall be removed.
- c. Remove scattered rocks of 1 man - 3 man on the lower beach between elevations 3 FT to 5 FT. Rock removal on the lower beach shall be filled verified following PM or Inspector's instruction. No excavation of native beach shall be allowed. Large natural boulders (size > 3.5 FT) shall be retained on the beach.
- d. Rock removal near Section 8 shall follow plan sheet note and PM / Inspector or Engineer instructions on site. Large boulders and wood shall be retained. Two or three additional boulders may be purposely placed at the location to create more natural-looking boulder clusters.
- e. Visually pick and stockpile on beach a minimum of 110 CY of large size angular rocks (mixture of 3-man

to 4-man rocks) and collect approximately 25 CY of filter rock / backfill rock for reuse in constructing the new rock wall. Refer to Section 3.2 and 3.3 for rock quality requirements and proper sizes and dimensions (Table 2).

- f. Haul out all unused rocks to county designated upland stockpile area.

#### 5.6 Bank Realignment and Excavation for Wall Installation

- a. Realign bank by cutting back existing bank in front of the south parking area as per plans (Sheet 7).
- b. Bank slope shown on section detail (Sheet 11) is approximate. Ensure bank stability while and after excavating the bank.
- c. Bank excavation shall minimize soil disturbance. Install proper and necessary temporary slope stabilization and / or erosion control measures as necessary.
- d. Excavate a keyway (trench) to the grade indicated on rock wall detail, Sheet 11, and enough width for base rock installation. Avoid over excavation below required grade or beyond extents necessary. Avoid unnecessary earth disturbance in the surroundings. Thoroughly compact the keyway base with a hand-held soil compactor or with excavator bucket.
- e. Subgrade below base rock should slope approximately 3% landward as indicated on Detail 1, Sheet 11.
- f. Use excavated native soil for depression fill on the beach as approved and instructed by Engineer. Distribute remaining approved excavated material on the beach nourishment area as instructed by PM or Engineer. In case any part of the material is not suitable for beach reuse it shall be hauled and disposed of as debris (see Section 5.4).
- g. Excavation work shall occur on dry beach through a low tide period. All exposed bank area shall be protected for the high tide inundation and wave impact if inundation is expected before the rock wall is constructed. Rock wall construction shall follow the bank excavation as soon as possible. Bank excavation and rock wall construction may progress section by section to prevent trench inundation and bank erosion.

#### 5.7 Placement of Base Filter Layer

- a. Place salvaged filter rock/spalls to form a thin base filter layer up to 1 ft thickness for installing (first course) base rock. Engineer will instruct the base preparation and determine the filter layer thickness according to actual ground conditions. Compact placed quarry spalls with excavator bucket until a non-yielding surface is achieved. The finished grade shall not exceed the design grade of the rock toe.
- b. Maintain approximately 3% slope landward or inward at the finished base grade for increased rock wall stability. No overhang is allowed.

#### 5.8 Rock Wall Rock Placement

- a. Rock wall shall be constructed with a batter of approximately 1:4 (horizontal: vertical) per design sheets 11, with a relatively smooth wall face and a uniform crest elevation as defined on Sheet 11, Section 5.
- b. Base rock (bottom course) shall be compacted into filter layer to achieve full contact with minimal voids.
- c. Rocks shall be placed against one other as tightly as possible, to minimize gaps and holes. A minimum of 3-point contact and good interlock are required. To achieve that, rock selection and placing orientation based on its size, shape, and matching the surrounding are critical. If a chosen rock cannot fit in at a given location in such a way to satisfy these requirements, it shall be set aside for later use and a new rock shall be tried.
- d. For wall stability, the top surface of each rock shall slope slightly landward (downward toward the retained bank) at 2%-10%. This slope is most critical for the cap rock (top course) stability, where a small slope should be achieved with no exceptions.
- e. Each rock shall have sufficient width to achieve the design wall thickness with a tolerance of up to minus 6 inches.
- f. Rock that is narrower than the design thickness of the wall shall bear on at least two rocks of the course

below to avoid continuous vertical voids. Front bearing points should be no further than 6 inches behind the adjacent rock face.

- g. Undersized rocks shall only be occasionally used and evenly distributed over the wall face. No more than two small rocks shall be allowed lining together.
- h. Due to rock irregularities, some void spaces are inevitable despite reasonable construction efforts. Voids greater than 6 inches in any linear dimension shall not be permitted. Where such voids cannot reasonably be avoided by rock selection or careful placement, these voids may be filled with "chinking" rocks consisting of large quarry spalls.
- i. The chinking rock should be immovable by hand before the rock course above has been installed, and it should be verified that chinking suitably restrains wall backfill.
- j. All chinking and filling shall be carried out from or at close to the rear face of the wall. All small rock pieces shall be secured in position by the weight of the rock on top and by the compacted backfill.
- k. Properly secure and protect exposed bank and wall construction in progress (including backfill materials) from wave impact and wave erosion at the end of each workday or prior to each rising tide.

#### 5.9 Rock Wall Backfill

- a. Refer to Section 3.3b for specification details of backfill rock.
- b. Backfill shall follow the completion of no more than two courses (tiers) of rock wall stacking until the finished grade shown in drawings is achieved. Always inspect the rock stacking to a satisfaction before backfilling the wall. Backfill shall progress at each layer-lift with no more than 1 FT in thickness.
- c. At each lift always fill half of the back space immediately behind the rock wall first, with larger size salvaged backfill rock. Inspect and manually place large spall rock behind large wall holes or voids as necessary to prevent backfill rock from escaping the wall holes. Fill up back-half space against the bare bank surface with smaller size imported cobble material. Compact each lift thoroughly with excavator bucket before placing the next lift. Continuing this backfill process as rock wall is stacking higher until the design crest elevation is reached.
- d. Fill the keyway (trench) in front of wall with excavated sediments and consolidate it to the existing beach grade before placing beach nourishment materials.

#### 5.10 Install Wall-Ends Rock Revetment

- a. Regrade bank slope and excavate a base rock basin 1 FT below normal beach grade at the two ends of the rock wall for installing a transition rock revetment per plans, Sheet 9.
- b. Place a filter rock layer over the exposed bank slope with salvaged spalls at about 1 ft thickness.
- c. Install rock revetment by stacking up mixed size 2-man to 3-man rocks to achieve a smooth finished slope of approximately 1.3-1.5:1.
- d. Begin placement of rock at the base and continue placement from the core to the surface working up the slope. Extend sloped rockery pile to the front of the rock wall as shown on plans, Sheet 9.
- e. Ensure all placed rocks are tightly interlocked one another.

#### 5.11 Beach Nourishment Placement

- a. Beach nourishment aggregates shall be mixed on site in desired proportions in accordance with Section 3.4 specifications prior to installation.
- b. Prior to placement, fill depressions with excavated sediment, regrading disturbed upper beach as seen necessary to ensure the desired nourishment aggregates are more evenly distributed, and the desired aggregate thickness on the upper beach can be achieved. Avoid any unnecessary disturbance to the existing beach surface as practically possible, especially to the lower beach.
- c. A few portions of the shoreline bank have been eroded from winter storms and may need to be smoothed

before placing beach nourishment. This is a field decision with the Engineer, PM, or inspector.

- d. Beach nourishment shall be executed reach by reach or section by section. The required material quantities shall be properly calculated, transported and evenly dumped onto the upper beach.
- e. Spread and grade beach nourishment aggregates from upper beach down to achieve desired proposed beach profiles as generally shown on Sheets 10 and 11.
- f. Beach nourishment materials shall be placed in an order from upper beach working down to lower beach as per plans (Sheets 8 to 11). Where different materials are specified across the beach profile (on the south reaches south of the jetty), beach nourishment shall follow the order as given below.
  - Firstly, place the cobble material on the upper end of the beach (Elevation > 9 FT or 10 FT)
  - Secondly, place mixed gravely sand for forge fish spawning between elevations 6 FT and 9 FT
  - At last place the gravel material below Elevation 6 FT

#### 5.12 Large Wood Reinstallation

On-site logs / untreated large woody debris (LWD) shall be reinstalled on the upper beach area after completion of beach nourishment. Log placement shall follow the instruction provided by PM / Engineer on site during construction or inspected by the Engineer.

## Section 6 – Construction Oversight and Inspections

### 6.1 Construction Oversight

- a. Engineer, PM or their representative will generally be present on site or available on call through key construction phases to provide additional instructions, answer questions, and conduct inspections.
- b. Pre-arrangement will be worked out between Contractor and Engineer/PM for onsite oversight schedule based on Contractor's construction plan and schedule.
- c. Construction oversight and inspection will focus on
  - Rock removal
  - Salvageable material and imported material
  - Rock wall construction and existing revetment repair
  - Beach nourishment placement
- d. The Contractor shall submit field photos on a daily basis while construction is occurring onsite. Engineer's intermediate inspection may either be on site or through the review of the field photos.

### 6.2 Sample Work Inspection / First Section Completion Inspection

- The Engineer or his representative will inspect the work at each main construction component as described in Section 6.1c, after the Contractor completes a sample section or the first section. Subsequent construction shall not proceed until the Engineer or his representative approves the sample work.
- Acceptance of sample work does not waive or alter any requirements or standards established by this provision.

### 6.3 Main Component Completion Inspection

- The Engineer or his representative will inspect the work after the Contractor completes the rock removal work. Work toward the subsequent stage (Rock Wall Construction) shall not proceed until the Engineer or his representative accepts the current work.
- The Engineer or his representative will inspect the work after the Contractor completes the rock wall construction. Work toward the subsequent stage (Beach Nourishment) shall not proceed until the Engineer or his representative accepts the current work.
- The Engineer or his representative will inspect the work after the Contractor completes the beach nourishment work. Work toward the subsequent stage (Large Wood Re-Installment) shall not proceed until the Engineer or his representative accepts the current work.

### 6.4 Substantial Completion Inspection

- Contractor shall notify the PM and Engineer for Substantial Completion Acceptance Inspection. The Engineer will schedule an inspection of the work with the Contractor to determine the status of completion. At the time of substantial completion, all beach and shoreline work shall be completed except that the last construction access path remains open. The Engineer may also establish the Substantial Completion Date unilaterally based on the pre-agreed construction schedule.
- If, after this inspection, the Engineer concurs with the Contractor that the work is substantially complete, the PM / Engineer, by written notice to the Contractor, will set the Substantial Completion Date. If, after this inspection the Engineer does not consider the work substantially complete and ready for its intended use, the PM / Engineer will, by written notice, to notify the Contractor giving the reasons thereafter.

- Upon receipt of written notice concurring in part or denying substantial completion, whichever is applicable, the Contractor shall pursue the work necessary to reach Substantial and Physical Completion. The Contractor shall provide the Engineer with a revised schedule indicating when the Contractor expects to reach substantial and physical completion of the work.

#### 6.5 Final Acceptance Inspection

- When the Contractor considers the work is physically complete and ready for final inspection, the Contractor shall request the PM to schedule a final inspection.
- The PM / Engineer will set a date for final inspection. The Engineer and the Contractor will then make a final inspection and the PM / Engineer will notify the Contractor in writing of all particulars in which the final inspection reveals the work incomplete or unacceptable.
- The Contractor shall immediately take such corrective measures as necessary to remedy the listed deficiencies. Corrective work shall be pursued vigorously, diligently, and without interruption until physical completion of the listed deficiencies.
- This process will continue until the PM / Engineer is satisfied the listed deficiencies have been corrected.
- If action to correct the listed deficiencies is not initiated within 7 days after receipt of the written notice listing the deficiencies, the PM may, upon written notice to the Contractor, take whatever steps necessary to correct those deficiencies pursuant to Section 6.6.
- The Contractor will not be allowed an extension of contract time because of a delay in the performance of the work attributable to the exercise of the Engineer's right hereunder.
- Upon correction of all deficiencies, the PM / Engineer will notify the Contractor, in writing, of the date upon which the work was considered physically complete. That date shall constitute the Physical Completion Date.

#### 6.6 Removal of Defective and Unauthorized Work

- If the Contractor fails to remedy defective or unauthorized work within the time specified by a written notice from the PM / Engineer, or fails to perform any part of the work required by the Contract Documents, the PM / Engineer may correct and remedy such work as may be identified in the written notice, with the County forces or by such other means as the County may deem necessary.
- If the Contractor fails to comply with a written order to remedy what the Engineer determines to be an emergency situation, the PM / Engineer may have the defective and unauthorized work corrected immediately, have the rejected work removed and replaced, or have work the Contractor refuses to perform completed using County or other forces. An emergency situation is any situation when, in the opinion of the Engineer, a delay in its remedy could be potentially unsafe, or might cause serious risk of loss or damage to the public.
- Direct or indirect costs incurred by the County attributable to correcting and remedying defective or unauthorized work, or work the Contractor failed or refused to perform, shall be paid by the Contractor. Payment will be deducted by the PM from monies due, or to become due, the Contractor. Such direct and indirect costs shall include in particular, but without limitation, compensation for additional professional services required.