



*The Materials Checklist provides a detailed description of all files needed within the BCarbon and Pre-Issuance Packages for developer and BCarbon reference.*

BCarbon Package: high level checklist

File	File type	Description
Application form	PDF	Provided by BCarbon, to be filled out by Developer
Sealed Engineer Report	PDF	A package, composed of multiple files/file types, encompassing the requirements of the Engineer Report.
Map 1	Esri shp & KML	Project Boundary & Area For all maps, please submit both SHP and KML
Map 2	Shp & KML	NWI inventory for Project Area
Map 3	Shp & KML	HRI SLAMM run for Project Area
Map 4	Shp & KML	Blue Carbon Database (BCD) for Project Area
Map 5	Shp & KML	Project Area with all landownership boundaries delineated
Ecological Site Analysis	PDF, shp, KML, jpg, MS Excel (.xlsx)	A package, composed of multiple files/file types, encompassing the requirements of the Ecological Site Analysis.
Spreadsheet 1	MS Excel file (.xlsx)	Spreadsheet for input of data from Project to calculate Wetland Carbon Stocks and Project Emissions. Provided by BCarbon, to be filled out by Developer
Insurance LOI	PDF	Letter of Intent between Project Developer and Insurance Company towards pursuit of an insurance policy for the Living Shoreline in the Project Area

## Pre-issuance Package: high level checklist

File	File type	Description
Executed Insurance Contract	PDF	Copy of official documents confirming insurance agreement between Developer and Insurance Agency
Permitting approval from USACE	PDF	Copy of official documents from USACE approving permit application
Permitting approval from GLO	PDF	Copy of official documents from GLO approving permit application
Documentation of actual project emissions	PDF, MS Excel file (.xlsx)	Any updates to Spreadsheet 1 associated with the actual project emissions and further information learned during the course of construction. Additional documentation (as available) may be submitted as well, including confirmation of shipping from point A to B, contact information + address for manufacturer, maps showing the route taken by shipment, etc.
Engineer's Statement of construction	PDF	Copy of official document from Project Engineer certifying the construction of the Living Shoreline
Detailed monitoring and maintenance plan	PDF	Plan for 50-year monitoring and maintenance of the Living Shoreline Project. See checklist below for further details on required contents.
Signed landowner agreements	PDF	Agreements between Developers and all landowners with property claims within the Project Area.

Line-by-line checklist

# 1. *B*Carbon Package

## Sealed Engineer Report

- Details of the Living Shoreline structure design
  - Size, scale, and configuration of the living shoreline
  - Construction design drawings that identify, along the entire length of the shoreline to be protected:
    - Dimensions
    - Placement
    - Orientation
    - Building materials
    - Construction methods
- Summary of system parameter analysis, for example:
  - Erosion history
  - Tidal range
- Summary of hydrodynamic parameters, for example:
  - Waves
  - Wakes
  - Currents
  - Storm surge
- Summary of terrestrial parameters, for example:
  - Upload slope
  - Shoreline slope
  - Width
- Construction site analysis
  - Buildability Criteria
    - Details regarding the construction of the Living Shoreline, including:
      - Assessment of how construction materials will be transported to the site
      - Strategies for project construction that will minimize damage to the wetlands and surrounding bay bottom habitats
      - The following guiding questions should be considered:
        - Can building materials be staged near the site?

- Are there suitable upland locations that can be used to stage materials?
  - Can the project be constructed from the edge of the shoreline, or does it have to be built from the water?
  - Are there existing deep-water channels nearby that could be used to facilitate construction?
  - How variable is water depth at different times of year to access the site?
- Bathymetry
    - Information regarding the bathymetry/water depth along the shoreline
    - The mean low water (MLW) and mean high water (MHW) contour identified
  - Wave Analysis
    - Analysis of the following:
      - Wind-driven fetch (especially during low water conditions)
      - Wave energy
      - Shoreline directionality
      - Frequency of exposure to high energy conditions
  - Alternative Analysis
    - Design alternatives
    - Action vs. No Action alternatives relative to the proposed solution
      - Focusing on the proposed design's effect on limiting erosion and stimulating sedimentation of the shoreline, and how these benefits would evolve over the lifetime of the Project
  - Geotechnical Survey
    - May be necessary as part of the project pre-engineering if there is a determination by the Project Developer or BCarbon that soils on the site will not support certain project types
- Estimation of cost of construction
  - Statement of Rebuilding Cost
    - Estimation of the cost impacts of the following major storm scenarios:

December 2023

- Category 2
- Category 3
- Category 4
- Category 5
- Affirmation that the project is designed with the intent to withstand storms less intense than a Category 2 storm and that the estimated cost for restoration for storms less than Category 2 is estimated to be negligible based upon the project design

## Maps

- Map 1 – Project Boundary & Project Area
- Map 2 – NWI Wetland Inventory within Project Boundary
- Map 3 – HRI SLAMM run within Project Boundary
- Map 4 – Blue Carbon Database results within Project Boundary
- Map 5 – property lines and land ownership within Project Boundary

## Ecological Site Analysis

- Site description of protected wetlands and associated uplands.  
Includes the following:
  - Site visit logs
  - Photographs
  - Wetland delineations
  - Vegetation assessments
  - NWI database or USDA NRCS soils maps
- Percent Vegetative Cover
  - Assessment of vegetative cover percentage using remote sensing, aerial photography, or drone-based imagery
  - Historical or temporal wetland imagery, if available
  - Field survey of status of the wetland
- Native plant species identification (if suitable or introduced species to replace invasive species)
- Ortho-imagery
  - Aerial analysis of shoreline decay or retreat over time
  - Qualitative description of anticipated landscape loss or decay given non-construction of the living shoreline
- Oyster Reefs

December 2023

- Identify presence or absence of oyster reefs with a desktop review and field survey maps of oyster reefs
- Seagrass Beds
  - Identify presence or absence of oyster reefs with a desktop review and field survey maps of oyster reefs
- Threatened and endangered species analysis
- Cultural resources assessment
  - Identify presence or absence of cultural resources/important archaeological sites. Desktop analysis to be supplemented by live site review (if required by the Texas historical commission)
- Provide Coastal Boundary Survey (CBS) by Licensed State Land Surveyor (LSLS)
  - Note: only required if part/all of project is located on public lands

### **Spreadsheet 1 for calculating carbon credits**

All data for the following equations:

- Equation 1: Regeneration and Protection Carbon credits
  - PA: Project Area in acres as determined by HRI SLAMM
  - WCS: value of SOC stock in tCO<sub>2</sub>e/acre determined by Texas BCD for the Project Area
  - PE: Project Emissions
- Equation 2: Project Emissions (PE)
  - QMT: mass of living shoreline material transported for Project
  - D: distance material is transported
  - EFTM: emission factor for transportation mode
  - FE: estimate of emissions from fabrication of any new materials
- Equation 3: Emission Factor (EFTM)
  - EFTM of CO<sub>2</sub>: CO<sub>2</sub> emission factor based on mode of transportation
  - EFTM of CH<sub>4</sub>: CH<sub>4</sub> emission factor based on mode of transportation
  - EFTM of N<sub>2</sub>O: N<sub>2</sub>O emissions factor based on mode of transportation
  - FE: emissions from the fabrication of material for Project

### **Insurance Documentation**

December 2023

- Insurance LOI

## **2. Pre-Issuance Package**

### **Pre-Issuance Documents**

- Engineer's Sealed Statement of Construction
- Executed Insurance Contract
- Permit from USACE
- Permit from GLO (if applicable)
- Final project emissions validation, including:
  - Verification/proof of transportation from facility to project site
  - Verification/proof of methods used to produce construction materials, if applicable (i.e. proof of extrusion of new concrete, and associated data)
- Detailed Monitoring and Maintenance plan, as developed in collaboration with BCarbon, including:
  - Plan for construction/installation of RSETs, if none exist in Project Area
  - Detailed plan for long-term monitoring, including who shall be responsible for each monitoring task:
    - Horizontal and vertical sediment accretion
    - Health and extent of the wetland
    - Water quality
    - Physical integrity of the structure
    - And others as needed
  - Detailed description of financial reserves dedicated to monitoring and maintenance
  - Relevant approvals for potential ownership transfers (i.e. signoff from new owner on monitoring plan)
- Signed Landowner Agreements for *all* landowners holding titles within the Project Boundary