Onsite Wetland Mitigation Plan
Replacement of Alligator River Bridge
Tyrell/Dare Counties
TIP HB-0001
WBS No. 49475.1.1
June 16, 2023

1.0 BASELINE INFORMATION

The North Carolina Department of Transportation (NCDOT) proposes to replace the 2.83-mile-long Lindsay C. Warren bridge number 7 on U.S.64 over the Alligator River in Tyrrell and Dare Counties (TIP Project HB-0001). The bridge replacement will replace the existing swing-span bridge with a modern two-lane, fixed span, high-rise bridge on new location just north of the existing bridge (Figure 1). HB-0001 will span approximately 4.6 miles in length.

HB-0001 is located within the Pasquotank River basin, Hydrologic Unit 03010205, the coastal plain physiographic region of North Carolina. The topography within the project vicinity is flat to very gently sloping, with level floodplains along the Alligator River. Elevations within the study area range from 0ft to 10ft above sea level, and areas near the shoreline of Alligator River are subject to lunar and wind tides. Land use in the project vicinity consists primarily of vast wetlands associated with the Alligator River National Wildlife Refuge and other conservation properties, along with a few residential homes near US 64 and water access facilities for recreational and commercial uses.

Within the study area of HB-0001, only one drainage canal and two types of jurisdictional wetlands were identified. The chosen alternative for this project will permanently impact 0.050 acres of Coastal Marsh wetlands along with 10.73 acres of Riparian Wetlands.

2.0 SITE SELECTION

HB-0001 was reviewed for potential onsite wetland restoration along portions of the existing causeway of US 64 which will be abandoned. On the west side of the Alligator River, approximately 0.15 miles (0.75 acres) of existing causeway will be abandoned (Figure 2a). On the east side, approximately 0.70 miles (7.50 acres) will be abandoned (Figure 2b). Once closed to traffic, causeway fill material can be removed, and the corridor returned to the natural elevations of the adjacent wetlands.

Extensive wetlands occur throughout the existing US 64 corridor outside of NCDOT Right-of-Way. Natural wetland communities tend to occur as gradual gradients between Tidal Freshwater Marsh near the shoreline of Alligator River and Riverine Swamp Forest farther from the shoreline. Tidal Freshwater Marsh communities are more frequently subjected to tidal flooding and are vegetated with tall grasses and herbs such as black needlerush (*Juncus roemerianus*), sawgrass (*Cladium mariscoides*), smooth rush (*Juncus effusus*), cattail (*Typha latifolia*), and phragmites (*Phragmites australis*), with a few scattered woody stems. These communities

transition gradually to Riverine Swamp Forest with increasing woody stem height and density, as flooding frequency diminishes. Riverine Swamp Forest communities are dominated by trees and shrubs, such as pond pine (*Pinus serotina*), loblolly pine (*Pinus taeda*), red maple (*Acer rubrum*), willow oak (*Quercus phellos*), sweetbay magnolia (*Magnolia virginiana*), and wax myrtle (*Morella cerifera*).

NCDOT is proposing to restore this natural wetland community gradient by removing the existing causeway on abandoned portions of US 64 to match the elevations of the adjacent wetlands. The existing natural wetlands adjacent to the fill slopes ranged in elevation from approximately 0-1 feet above mean sea level, with the Tidal Freshwater Marshes tending to occur at the lower end of this gradient (up to approximately 0.75 feet msl) and the Riverine Swamp Forests occurring at the upper end of the wetland elevation gradient. The existing causeway elevation of US 64 ranges from approximately 2-3 feet above mean sea level, which will necessitate the removal of approximately 35,000 cubic yards of material. Determination of the final target elevations of the wetland communities and the quantities of fill material to be removed will be calculated during the design phase, once detailed elevation surveys are completed.

3.0 SITE PROTECTION INSTRUMENT

The proposed mitigation site is located within the current NCDOT Right-of-Way for US 64. After US 64 is realigned for HB-0001, abandoned portions of the US 64 corridor will be blocked from continued transportation use. While under NCDOT ownership, NCDOT will manage the site to prohibit all use inconsistent with its use as mitigation property, including any activity that would materially alter the biological integrity or functional and educational value of the site, consistent with the mitigation plan. Several permit agencies (NCDCM, USACE, NCDWR) have recommended that the eastern portion of the proposed mitigation site be transferred to the adjacent Alligator River National Wildlife Refuge after close-out. NCDOT will pursue this option following site close-out, assuming that USFWS is amenable and that there are no legal impediments to transfer. Proposed causeway removal on the western side of HB-0001 is adjacent to private property. NCDOT will be required to protect the mitigation site in perpetuity by virtue of the HB-0001 permit authorizing impacts to jurisdictional wetlands. Therefore, should NCDOT transfer the mitigation site to a third-party recipient, protection measures will be enacted to guarantee that the site's wetland functions and values are maintained.

The site is designated on the plan sheets as a mitigation area and will be placed on the Environmental Analysis Unit Mitigation GeoDatabase. This database is provided to all NCDOT personnel as a record of mitigation sites and their attributes, including location and prohibited activities.

4.0 OBJECTIVES

The goal of this mitigation project is to remove approximately 35,000 cubic yards of fill material from portions of the existing US 64 corridor to restore Tidal Freshwater Marsh and Riverine

Swamp Forest wetlands. Preliminary estimates indicate that approximately 0.50 acres of Tidal Freshwater Marsh wetland and 7.75 acres of Riverine Swamp Forest wetlands can be restored, though precise natural community boundaries may be difficult to define given the gradual hydrologic transition which characterizes the area. Final quantities and determination of restored area will be refined during project design, monitoring, and close-out. Overall, removing fill material from the existing causeways will allow NCDOT to offset approximately 8.25 acres of the wetland impacts associated with HB-0001 at the actual impact site. Once construction for the new bridge has been completed, traffic will be removed from the existing highway, the fill material will be graded down to the target wetland elevation, and the site will be planted with native species representative of the natural wetland community. Restored wetland community gradients will be reflective of the impact areas of HB-0001 and the adjacent wetlands outside of the ROW.

5.0 MITIGATION WORK PLAN

The restoration site will be constructed in conjunction with TIP HB-0001, once the bridge is completed and traffic diverted to the new facility. The designated restoration areas along the abandoned US 64 corridor will be graded to match target elevations of the adjacent wetland communities. As such, target elevations for the restoration area will exhibit a gradual elevation gradient from lower sections near Alligator River to higher sections farther away. Final target elevations for excavation will be determined during the design phase. In addition, the NCDOT Geotechnical Unit will perform borings to determine the characteristics of the substrate material at the proposed target elevations. If it is determined that the subsurface material at this elevation is inappropriate for planting, additional grading may be necessary to undercut the restoration area and backfill with suitable topsoil to the target elevation of the adjacent wetland communities. If needed, NCDOT will coordinate any proposed undercutting with the permit agencies during the design phase of the proposed mitigation project.

Areas targeted for Tidal Freshwater Marsh wetlands based on adjacent natural community vegetation will be planted on 3 ft. centers with marsh grass plugs at a density of 4,840 plants per acre. Species planted will be black needle rush (*Juncus roemerianus*), smooth cord grass (*Spartina alterniflora*), and salt meadow cordgrass (*Spartina patens*), depending upon availability.

Areas targeted for Riverine Swamp Forest wetlands will be planted 6 feet to 10 feet with random spacing averaging 8 feet on center. Approximately 680 trees per acre will be planted. Species planted will include (based on availability) pond pine (*Pinus serotina*), bald cypress (*Taxodium distichum*), pond cypress (*Taxodium ascendens*), overcup oak (*Quercus lyrate*), swamp black gum (*Nyssa biflora*), and water tupelo (*Nyssa aquatica*).

Invasive phragmites is present in wetland communities outside of NCDOT Right-of-Way and may encroach on the mitigation site following construction. NCDOT will attempt to control phragmites during the monitoring period to limit its prevalence on the site and to enhance the survival of planted target species. However, complete control of phragmites is likely to be unrealistic during the monitoring period and especially after close-out.

6.0 PERFORMANCE STANDARDS

The vegetation component of the Tidal Freshwater Marsh wetlands will be deemed successful if the following criteria are met:

1) At year five, the average of all vegetative monitoring plots should have a scale value of 5 (>75% vegetative cover) consisting of wetland herbaceous species, not including any invasive species.

2) A minimum of 70% of the plots shall contain the target (planted) species.

The vegetation component of the Riverine Swamp Forest wetlands will be deemed successful based on the survival rate of planted seedlings. A 320 stems per acre survival criterion for planted seedlings will be used to determine success for the first three years. The required survival criterion will decrease by 10% each year after the third year of vegetation monitoring (i.e. for an expected 290 stems per acre for year 4 and 260 stems per acre for year 5).

7.0 MONITORING REQUIREMENTS

7.1 Tidal Freshwater Marsh Monitoring

The monitoring requirements for the Tidal Freshwater Marsh portions of the restoration site will follow the National Marine Fisheries Service guidance, which is as follows:

Target elevations will be verified during construction to ensure the restoration area achieves the same hydrologic regime as the adjacent Tidal Freshwater Marsh wetlands. The quantitative marsh vegetation monitoring will be accomplished in accordance with the draft guidelines for "Site Monitoring Surveys for Emergent Marsh Mitigation", established by the National Marine Fisheries Service, through the evaluation of randomly distributed 1 square meter plots located by GPS within the site.

NCDOT will perform the monitoring described above for five years or until the site is deemed successful.

7.2 Riverine Swamp Forest Monitoring

The monitoring requirements of the Riverine Swamp Forest portions of the restoration site will be as follows:

Target elevations will be verified during construction to ensure that the restoration area achieves the same hydrologic regime as the adjacent Riverine Swamp Forest. The quantitative forest

vegetation monitoring will be accomplished utilizing fifty feet by fifty feet (50' x 50') monitoring plots that will be established upon completion of the site grading and planting.

NCDOT will monitor the site for a minimum of five years or until the site is deemed successful.

8.0 OTHER INFORMATION

N/A

9.0 DETERMINATION OF CREDITS

NCDOT is proposing to offset approximately 8.25 acres of wetland impacts with coastal marsh/riparian wetland restoration as mitigation for some of the permanent wetland impacts associated with HB-0001. Final credit quantities will be refined through the design, monitoring, and close-out phases of the project. An as-built report will be submitted within 60 days of completion of the project. The final determination of amount of mitigation will be based upon successful completion of the monitoring requirements and meeting of the performance standards.

9.1 CREDIT RELEASE SCHEDULE

NCDOT proposes immediate, full release of the proposed wetland restoration credits as on-site mitigation for some wetland impacts associated with HB-0001. Final credit quantities will be approved at project close-out.

10.0 GEOGRAPHIC SERVICE AREA

NCDOT proposes to use the restoration credits exclusively as onsite wetland mitigation for HB-0001.

11.0 MAINTENANCE PLAN

Once monitoring is completed and the site is closed out, it will be placed in the NCDOT Stewardship Program for long term maintenance and protection.

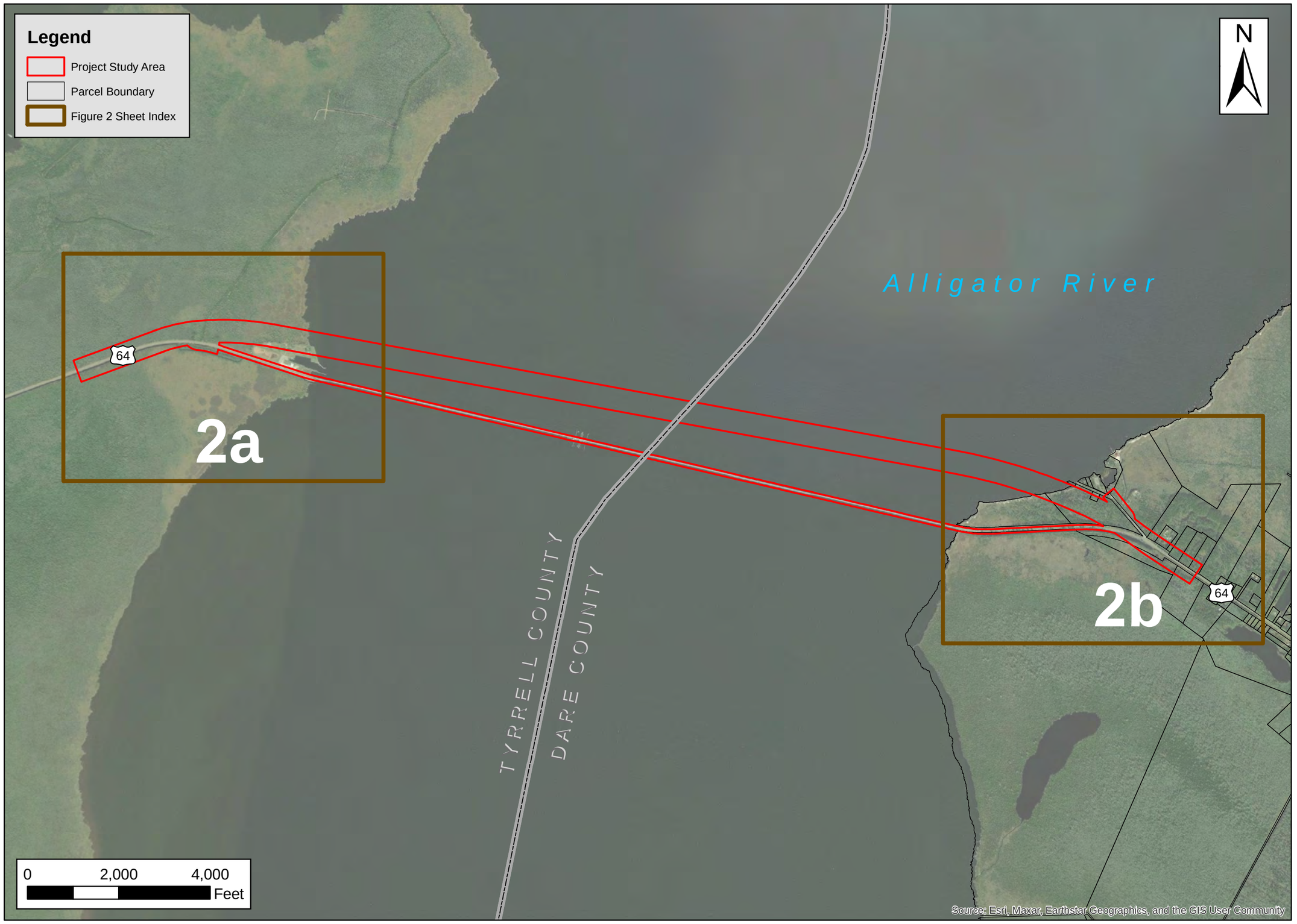
If an appropriate third-party recipient (i.e. Alligator River National Wildlife Refuge) is identified in the future, then transfer of the property will include a conservation easement or other measure to protect the natural features and mitigation value of the site in perpetuity.

12.0 LONG TERM ADAPTIVE MANAGEMENT PLAN

The restoration area will be managed by the NCDOT and protected from impacts according to the mitigation plan. Encroachments into the area will be investigated and appropriate measures taken to minimize any negative effects. In the event that unforeseen issues arise that affect the management or mitigation value, a remediation plan will be developed by NCDOT in coordination with the permit review agencies.

13.0 FINANCIAL ASSURANCES

NCDOT is held by permit conditions associated with HB-0001 to preserve the coastal marsh/riparian wetland restoration area. NCDOT has established funds for each project and within each Division to monitor the mitigation site and to protect it in perpetuity.



THREE OAKS ENGINEERING · THREE OAKS ENGINEERING ·

Prepared For:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

Replace U.S. 64 Tyrrell County Bridge No. 7 over the Alligator River.

HB-0001 Project Design Map

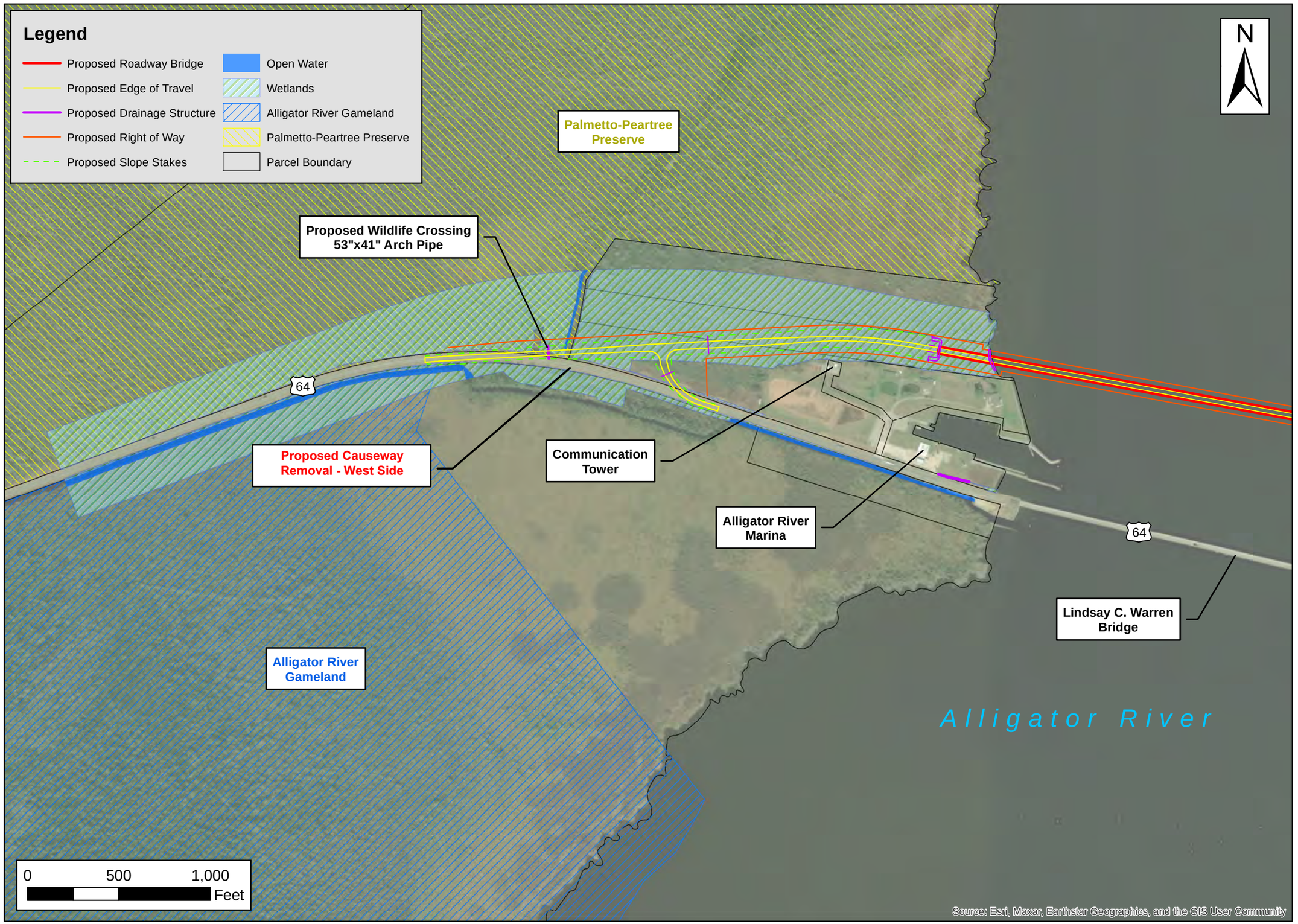
Federal Aid No. NHPB-0001(156)
WBS # 49475.1.1

Tyrrell & Dare Counties

Date:	February 2023
Scale:	As Shown
Job No.:	HB-0001
Drawn By: CMR	Checked By: JSM

Figure

1



THREE OAKS ENGINEERING

Prepared For:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

Replace U.S. 64 Tyrrell County Bridge No. 7 over the Alligator River.

HB-0001 Project Design Map

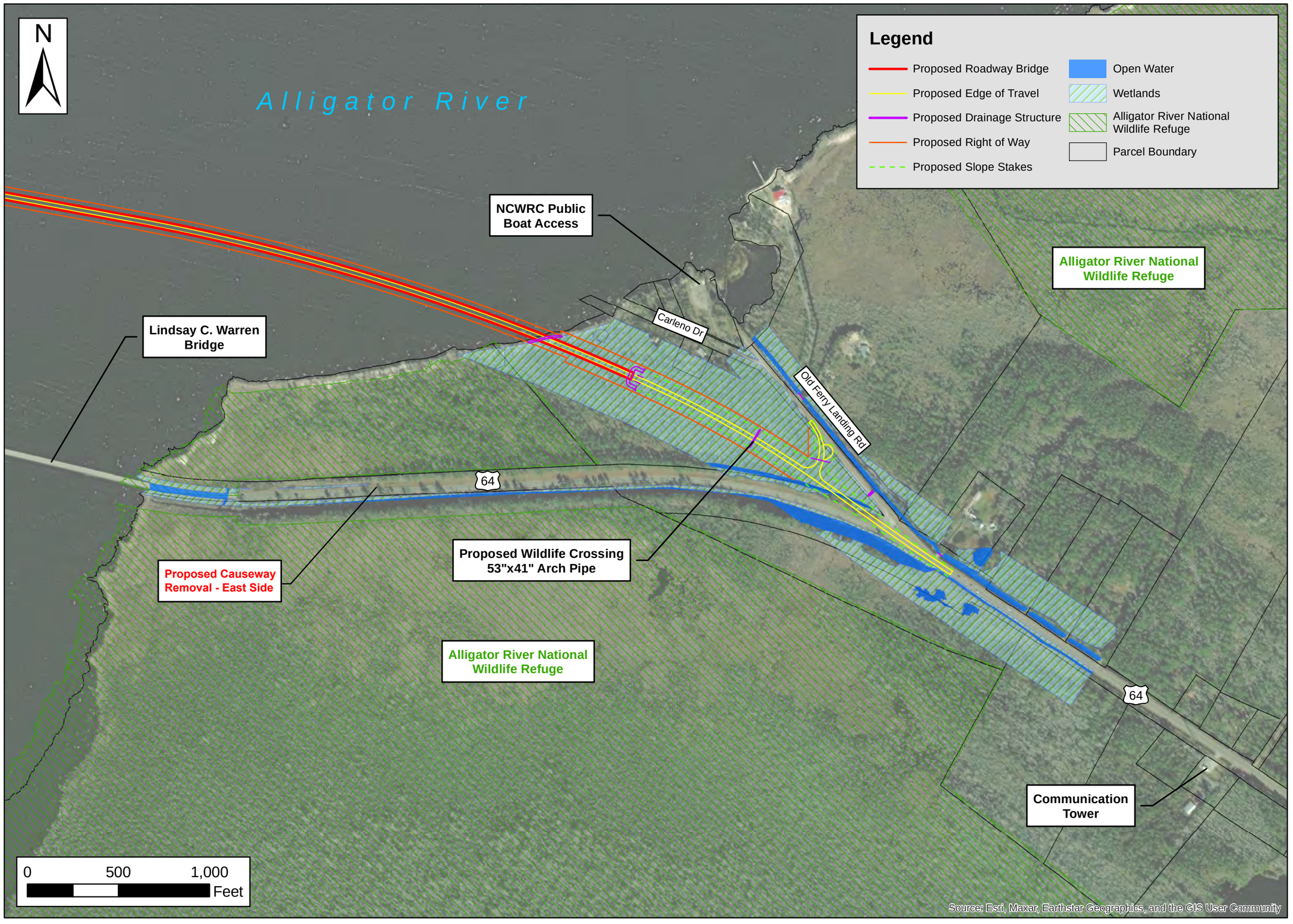
Federal Aid No. NHPB-0001(156)
WBS # 49475.1.1

Tyrrell County

Date:	May 2023
Scale:	As Shown
Job No.:	HB-0001
Drawn By: CMR	Checked By: JSM

Figure

2a



THREE OAKS ENGINEERING

Prepared For:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

Replace U.S. 64 Tyrrell County Bridge No. 7 over the Alligator River.

HB-0001 Project Design Map

Federal Aid No. NHPB-0001(156)
WBS # 49475.1.1

Dare County

Date:	May 2023
Scale:	As Shown
Job No.:	HB-0001
Drawn By: CMR	Checked By: JSM

Figure

2b