Essential Fish Habitat Assessment Report for the All Aboard Florida Passenger Rail Project from Orlando to Miami, Florida

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United States Army Corp of Engineers

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List of Acronyms and Abbreviations

AAF	All Aboard Florida – Operations LLC
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulation
BMP	best management practice
dB	decibels
DLE	Department of Law Enforcement
DEM	Division of Emergency Management
EA	Environmental Assessment and Section 4(f) Statement (EA) for the AAF Proposed Rail Project between West Palm Beach and Miami, and adjacent areas within which the system, stations, and vehicle maintenance facility (VMF) released for public circulation and comment from October 31, 2012 through December 3, 2012.[1]
EFH	Essential Fish Habitat
East-West Corridor	Approximate 40-mile extension of the Project proposed from Cocoa to Orlando, Florida
EIS	Environmental Impact Statement
EWRAP	Estuarine Wetland Rapid Assessment Method
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEC Corridor	Florida's East Coast
FECI	Florida East Coast Industries, Inc.
FPL	Florida Power and Light
FONSI	Finding of No Significant Impact issued by FRA on January 30, 2013, based on the information in the EA.[2]
FRA	Federal Railroad Administration
FWC	Florida Fish and Wildlife Conservation Commission
HAPC	Habitat Areas of Particular Concern
HAPC	Habitat Areas of Particular Concern
I-95	Interstate 95
IUCN	International Union for Conservation of Nature
MCO	Orlando International Airport
MP	Mile Post
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
No.	Number
NOAA	National Oceanic and Atmospheric Administration
North-South Corridor	North-South 128.5-mile extension from West Palm Beach to Cocoa
Project	AAF plans to connect Southeast and Central Florida with a privately owned and operated intercity passenger rail system with stations located in Orlando, West Palm Beach, Fort Lauderdale and Miami
ROW	right-of-way
RRIF	Railroad Rehabilitation and Improvement Financing
SAFMC	South Atlantic Fishery Management Council

[1] All Aboard Florida – Operations LLC (AAF). 2012. Environmental Assessment and Section 4(f) Evaluation for the All Aboard Florida Passenger Rail Project West Palm Beach to Miami, Florida. Available at: http://www.fra.dot.gov/eLib/details/L04278.
[2] United States Department of Transportation (USDOT), Federal Railroad Administration (FRA). 2013. Finding of No Significant Impact for the All Aboard Passenger Rail Project West Palm Beach to Miami, Florida. Available at: http://www.fra.dot.gov/Elib/Details/L04277.

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List of Acronyms and Abbreviations (continued)

SAV	Submerged Aquatic Vegetation
UMAM	Uniform Mitigation Assessment Method
USC	United States Code
USACE	US Army Corp of Engineers
USDOT	United States Department of Transportation
WRAP	Wetland Rapid Assessment Method
VMF	Vehicle Maintenance Facility

1.0 Executive Summary

1.1 Background, Project Location and Proposed Action

All Aboard Florida – Operations LLC (AAF) is currently developing a 235-mile intercity passenger railroad system that will connect Orlando, Florida and Miami, Florida, with intermediate stops in Fort Lauderdale and West Palm Beach, Florida (Project or Proposed Action). The proposed Project will fulfill several public policy objectives, by, among other things, reducing our state's dependence on fossil fuels, relieving transportation congestion in the region and improving air quality as a result. Furthermore, the Project will serve as a means to enhance job creation and economic development within South-Central Florida.

Pursuant to the National Environmental Policy Act (NEPA) of 1969 [42 United States Code (USC) 4321 et seq], and Council on Environmental Quality (CEQ) NEPA regulations [40 Code of Federal Regulation (CFR) 1500-1508], the Federal Railroad Administration (FRA) has initiated an evaluation of the potential environmental and related impacts of constructing and operating an intercity passenger rail service as proposed by AAF. As AAF intends to apply for a loan under FRA's Railroad Rehabilitation and Improvement Financing (RRIF) Program pursuant to 49 CFR Part 260, FRA must consider the potential environmental impacts resulting from the Project pursuant to NEPA. As described in more detail in the notice of intent to prepare an environmental impact statement (EIS) for the Project that was published by FRA in the Federal Register on April 15, 2013, FRA shall act as the lead Federal agency in conducting the environmental review and preparing, reviewing, revising and completing the environmental documentation related to the Proposed Action. The EIS shall be prepared to satisfy the requirements of NEPA.

AAF previously completed an Environmental Assessment and Section 4(f) Evaluation (AAF EA)[3] for intercity passenger rail service between Miami and West Palm Beach, Florida. FRA issued a Finding of No Significant Impact (AAF FONSI)[4] for the AAF EA in January 2013. To the extent that actions have not changed since the AAF EA, these would not be evaluated by FRA as part of the EIS.

1.2 Purpose

This Essential Fish Habitat (EFH) Assessment focuses on bridge locations where construction of the Project is proposed between Miami and Cocoa, Florida (Project Area), as there are no tidally influenced waters along the East-West Corridor. This EFH Assessment was prepared to evaluate potential impacts to EFH as a result of Project construction. The literature review identified four EFH types (estuarine planktonic, mangrove, sand/shell bottom and mud/sand bottom) in the vicinity of the proposed Project Areas. The literature review and personal communication with Brandon Howard of National Oceanic and Atmospheric Administration (NOAA) Fisheries[5] identified several species within the Snapper Grouper Complex in addition to white shrimp (*Litopenaeus setiferus*), pink shrimp (*Farfantepenaeus duorarum*) and brown shrimp (*F. aztecus)* and spiny lobster (*Panulirus argus*) that may utilize the habitats available in the proposed Project Area. The managed species identified during the literature review and through personal communication with NOAA Fisheries staff are listed in the Table ES-1, along with the managing agency and fisheries management plan for each species.

[3] All Aboard Florida – Operations LLC (AAF). 2012. Environmental Assessment and Section 4(f) Evaluation for the All Aboard Florida Passenger Rail Project West Palm Beach to Miami, Florida. Available at: http://www.fra.dot.gov/eLib/details/L04278.
[4] United States Department of Transportation (USDOT), Federal Railroad Administration (FRA). 2013. Finding of No Significant Impact for the All Aboard Passenger Rail Project West Palm Beach to Miami, Florida. Available at: http://www.fra.dot.gov/Elib/Details/L04277.
[5] Howard, Brandon. 2012/2013. NOAA Fisheries. Personal Communication September 2012 – May 2013.

Table ES-1. Managed Species with EFH in the Project Vicinity

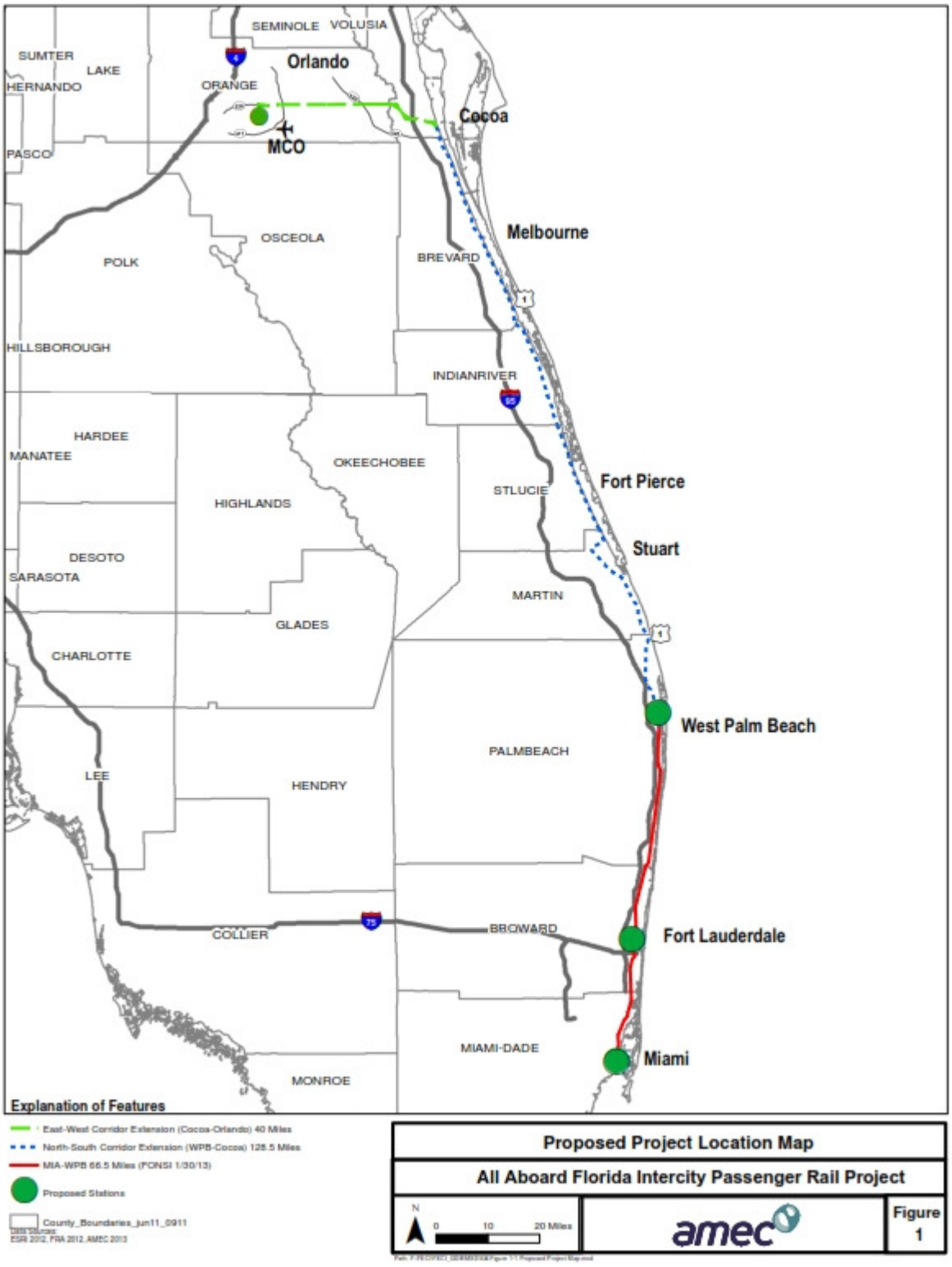
Species Name	Managing Agency	Fisheries Management Plan
Goliath grouper (*Epinephelus itajara*)	SAFMC	Snapper Grouper Complex
Grey snapper (*Lutjanus griseus*)	SAFMC	Snapper Grouper Complex
Mutton snapper (*Lutjanus analis*)	SAFMC	Snapper Grouper Complex
Spiny lobster (*Panulirus argus*)	SAFMC	Spiny Lobster
Pink shrimp (*Farfantepenaeus duorarum*)	SAFMC	Penaeid Shrimp
White shrimp (*Litopenaeus setiferus)*	SAFMC	Penaeid Shrimp
Brown shrimp (*Farfantepenaeus aztecus*)	SAFMC	Penaeid Shrimp

Notes: SAFMC = South Atlantic Fisheries Management Council

The proposed bridge construction may have direct short-term adverse effects on the water quality in the vicinity of the Project. During construction, sediment control best management practices (BMPs) including installation of turbidity curtains and silt fencing would be utilized to protect surface waters; therefore, long-term impacts to the managed species in the vicinity of the Project would be minimized.

Fifteen bridge projects over water bodies that contain EFH are proposed as part of the Project from Miami to Cocoa. The impacts to EFH, associated with the proposed Project, vary by Project Area. Overall direct permanent impacts to wetlands and surface waters associated with these bridge projects, including shading, is approximately 0.88 acres. Secondary impacts including noise and vibration during construction are anticipated to be minimal and temporary in nature. Based on the limited impacts, the potential impacts as a result of project construction on the managed species, affected life stages, and EFH are also expected to be minimal.

Figure 1. Proposed Project Alignment along the North-South Corridor and East-West Corridor from Miami to the Orlando International Airport



2.0 Introduction

Essential Fish Habitat (EFH) is defined as those waters and substrates necessary to support fish for spawning, breeding, feeding, or growth to maturity. The concept of EFH was established in 1996 with the reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act, which requires the cooperation of National Oceanic and Atmospheric Administration (NOAA) Fisheries [formerly known as the National Marine Fisheries Service (NMFS)], eight Regional Fishery Management Councils, Federal and State agencies, resource users, and others to protect, conserve, and enhance EFH. The South Atlantic Fishery Management Council (SAFMC) is responsible for the conservation and management of fish stocks within the federal 200-mile limit of the Atlantic Ocean off the coasts of North Carolina, South Carolina, Georgia and eastern Florida to Key West. SAFMC is responsible for the development of fishery management plans and amendments to ensure sustainable fisheries. Implementation of the regulations, including federal requirements for permits for some fisheries, is the responsibility of NOAA Fisheries. SAFMC also identifies Habitat Areas of Particular Concern (HAPC). These are areas within EFH that are ecologically important, sensitive to disturbance, or rare.

An EFH Assessment is a review of a proposed project and the project's potential impacts to EFH[6] and is required for this Project due to the presence of designated EFH within the proposed Project corridor. As set forth in NOAA Fisheries' rules, EFH Assessments must include: (1) a description of the Proposed Action; (2) an analysis of the effects, including cumulative effects, of the action on EFH, the managed species, and associated species by life history stage; (3) the Federal agencies' views regarding the effects of the action on EFH; and (4) proposed mitigation, if applicable.[6] If appropriate, the EFH Assessment should also include the results of an on-site inspection, the views of recognized experts on the habitat or species affected, a literature review, an analysis of alternatives to the Proposed Action, and any other relevant information.[6] This section describes the Proposed Action and presents the results of the on-site inspections. Subsequent sections of this document present the managed species potentially affected by the Proposed Action; the Federal agencies' views regarding the effects of the action on EFH; and mitigation.

2.1 Description of the Proposed Action

The proposed Project is composed of two corridors: (1) a north-south corridor of approximately 195 miles from Cocoa Beach, Florida to Miami, Florida (North-South Corridor), within the existing rail right-of-way (ROW) along the east coast of Florida (FEC Corridor) and (2) an east-west corridor of approximately 40 miles from Cocoa Beach, Florida, to the Orlando International Airport (MCO) where the terminal station will be located (East-West Corridor). The North-South Corridor will connect downtown West Palm Beach to downtown Miami with one stop in downtown Fort Lauderdale. The North-South Corridor improvements for the Project will take place entirely within the FEC Corridor. That existing rail ROW within the North-South Corridor is approximately 100 feet wide and has supported freight and/or passenger service on a continuous basis for more than 100 years. The FEC Corridor was originally built as a double-track railroad, but today it is mostly single track with several sidings. The roadbed for the second track in the corridor still exists today and would be used for the additional track improvements. Figure 1 provides a site location map of the FEC Corridor in which the majority of the Project is proposed.

Project improvements along the North-South Corridor include:

- Returning the existing railroad corridor to a dual-track system to allow for the addition of fast, dependable and efficient passenger service; and

[6] National Marine Fisheries Service (NMFS). 2008. National Marine Fisheries Service Habitat Conservation District Southeast Regional Office. 2008. Essential Fish Habitat: A Marine Fish Habitat Conservation Mandate for Federal Agencies. Available: http://sero.nmfs.noaa.gov/hcd/pdfs/efhdocs/sa_guide _2008. pdf. Accessed October 2012.

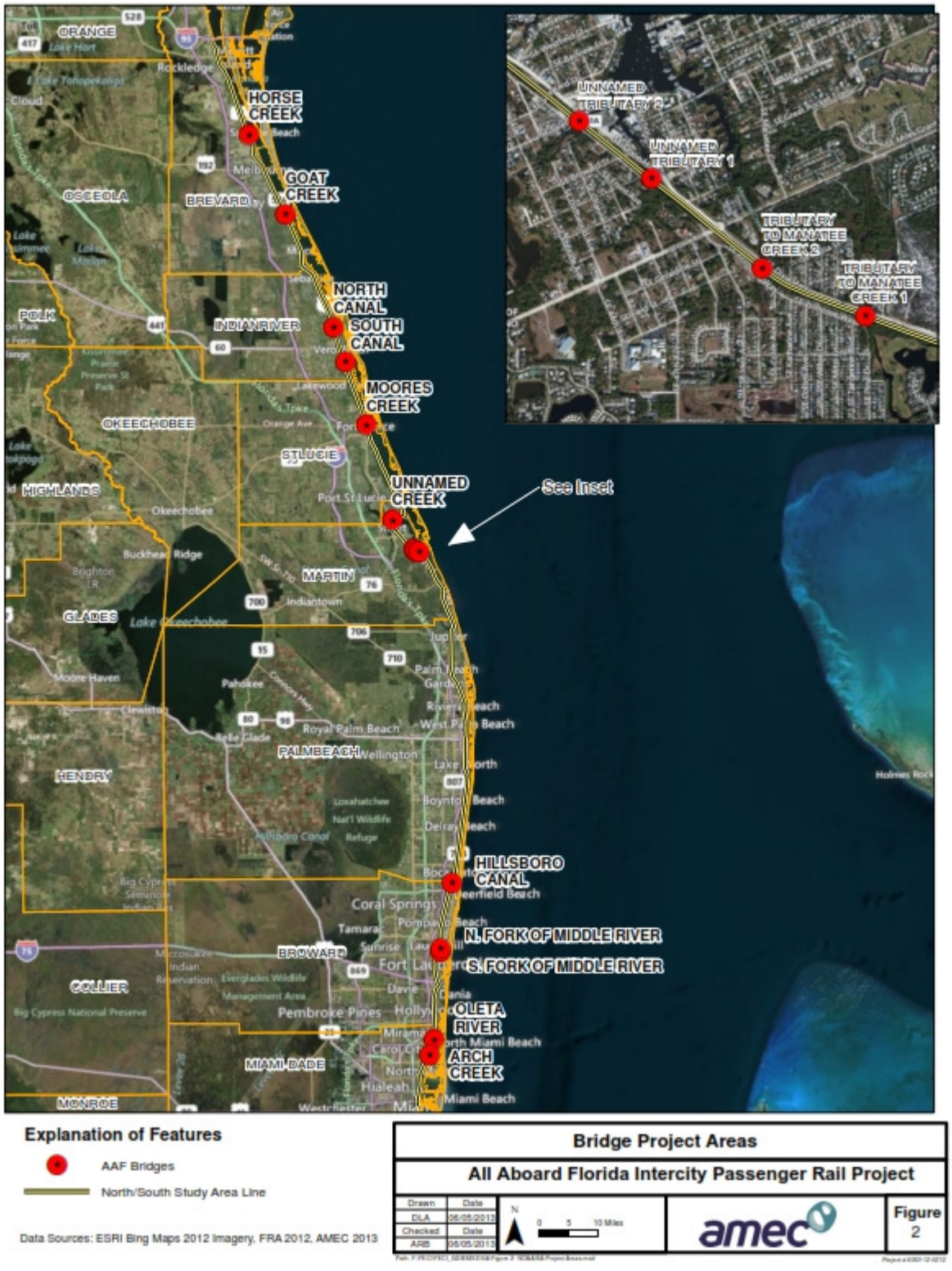
- Enhancement or replacement of aging timber constructed railroad bridges.

This EFH Assessment is evaluating the impacts to EFH associated with railroad bridge enhancement/replacement projects between Miami and Cocoa within the FEC Corridor (Figure 1). AAF is proposing enhancement/replacement to 34 bridges between Miami and Cocoa; however, only 19 of these bridges will require in-water work or a change in the footprint of the bridges. Four of the 19 bridges were determined to be upstream of salinity barriers. Bridges over water bodies with salinity barriers downstream are not included in this assessment, as the Project Areas are not accessible to marine species and do not include EFH. There are no proposed bridge structures over tidally influenced waters along the East-West Corridor; therefore, the remainder of this EFH will only focus on the 15 bridges along the North-South Corridor depicted in Figure 2 (Bridge Project Areas). Each Bridge Project Area is defined as the footprint of that bridge, as well as the area upstream and downstream within the limits of construction.

2.2 Method/Results of On-site Inspections

The proposed alignment for the Project from Miami to Cocoa will require in-water work for enhancement or replacement of 15 timber railroad bridges over water bodies containing EFH (Figure 2). Wetland delineations and snorkeling surveys were conducted at each of the 15 Bridge Project Areas to evaluate the type and quality of aquatic habitats and associated substrates [i.e., submerged aquatic vegetation (SAV) and oyster beds/shell bottom] for EFH determinations and to evaluate potential impacts to wetlands and other sensitive habitats. The results of these inspections were used to evaluate potential impacts to EFH and the managed species as a result of Project construction.

Figure 2. Bridge Project Areas with EFH



2.2.1 Wetland Delineation Methods

Potential wetlands in the Bridge Project Areas were identified and delineated in accordance with Florida Administrative Code (FAC), Chapter 62-340, the US Army Corp of Engineers (USACE) 1987 Wetland Delineation Manual[7] and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plains Region (version 2.0).[8] Field resources included the FDEP manual on wetland delineation.[9] The FDEP's method for determining a wetland boundary is as follows:

> "*The landward extent of wetlands shall be determined by the dominance of plant species, soils and other hydrologic evidence indicative of regular and periodic inundation or saturation. In all cases, attempts shall be made to locate the landward extent of wetlands visually by on-site inspection, or aerial photo interpretation in combination with ground truthing, without quantitative sampling*."

The above-referenced FDEP methodology utilized to identify and delineate wetlands includes all jurisdictional wetlands otherwise identified and described by the USACE 1987 Wetlands Delineation Manual and the regional supplement.[8]

2.2.2 Benthic Assessment Methods

Estuarine natural communities of Florida may be separated into mineral-based, faunal-based, and floral-based communities. Mineral-based communities, faunal-based communities (e.g. octocoral bed, sponge bed, coral reef, mollusk reef, and worm reef communities), floral-based communities (e.g. algal beds, seagrass beds, tidal marsh, and tidal swamp), and composite substrate communities all occur in sub-tidal, intertidal, and supra-tidal zones[10].

The purpose of the benthic survey was to characterize the bottom composition as well as evaluate the presence of rooted seagrass beds, oyster beds (live or dead), sponges, and other benthic colonizing organisms. AMEC performed visual in-water reconnaissance of the Bridge Project Areas. Benthic surveys were performed in accordance with the NOAA NMFS guidance for assessing small project sites less than or equal to 1 hectare.[11] Based on proposed Project size and location, AMEC field personnel performed a bottom survey that included a center line transect beneath the existing bridge structure as well as transects on both the east and west sides of the existing bridge structures. As part of the in-water seagrass survey protocol, if seagrasses were determined to be rooted within the Bridge Project Area, field personnel would delineate and quantify patch distribution.[12]

2.2.3 Results of Field Investigation

Table 1-1 summarizes the Proposed Action and the results of the field assessment at each of the 15 Bridge Project Areas over water bodies containing EFH.

[7] United States Army Corps of Engineers (USACE). 1987. Wetland Delineation Manual (FAC, Chapter 62-340).
[8] United States Army Corps of Engineers (USACE). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)
[9] Florida Department of Environmental Protection (FDEP). 2008. Delineation of the Landward Extent of Wetlands and Surface Waters (FDEP, Chapter 62.340, F.A.C)
[10] Florida Natural Areas Index (FNAI). 2010. Guide to the Natural Communities of Florida. Florida State University.
[11] National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2012. Recommendations for Sampling *Halophila johnsonii* at a Project Site. Website: http://sero.nmfs.noaa.gov/pr/docs/JSG%20Survey%20Guidelines.pdf. Accessed August 2012.
[12] Florida Fish and Wildlife Conservation Commission (FWC) 2011. Recommended Survey Protocols for Estuarine and Marine Submerged Aquatic Vegetation (SAV) related to Permitting Applications (Draft).

Table 1-1. Proposed Action and Results of Field Investigation

Bridge Project Area	Proposed Action	Field Investigation Results
Horse Creek (MP 187.37)	Installation of single-track railroad bridge on the west side of existing bridge	Freshwater creek with sand/shell bottom
Goat Creek (MP 202.59)	Removal of existing railroad bridge and installation of double-track railroad bridge	Freshwater creek (during site visit) with a mud/sand bottom overlain by ballast. White mangrove observed in Project Area and red mangroves observed downstream of Project Area.
North Canal (MP 223.70)	Installation of single-track railroad bridge on the west side of existing bridge	Freshwater canal (during site visit), with a soft sand bottom
South Canal (MP 230.03)	Installation of single-track railroad bridge on the east side of existing bridge	Freshwater canal (during site visit) with mud/sand bottom
Moores Creek (MP 241.27)	Installation of single-track railroad bridge on the west side of existing bridge	Brackish creek with a mud/sand bottom. Red mangrove observed within Project Area and black mangrove observed downstream of project site
Unnamed Creek (MP 259.95)	Removal of existing railroad bridge and installation of double-track railroad bridge	Brackish creek with sand/shell bottom. Red mangrove observed along shoreline
Unnamed Tributary 2 (MP 266.58)	Installation of single-track railroad bridge on the west side of existing bridge	Brackish/Tidal creek with soft sand bottom. Red mangroves were observed along shoreline
Unnamed Tributary 1 (MP 266.86)	Removal of existing railroad bridge and installation of double-track railroad bridge	Brackish/Tidal creek with mud/sand bottom. Red, black, and white mangrove were observed along the shoreline
Tributary to Manatee Creek 2 (MP 267.34)	Removal of existing railroad bridge and installation of double-track railroad bridge	Freshwater creek (during site visit) with a sand bottom
Tributary to Manatee Creek 1 (MP 267.70)	Removal of existing railroad bridge and installation of double-track railroad bridge	Freshwater (during site visit) with a soft sand bottom. Eelgrass was observed rooted within the creek.
Hillsboro River (MP 326.58)	Installation of single-track railroad bridge on the west side of existing bridge	Brackish creek with sand/shell bottom covered with non-commercial oysters. White mangroves observed along shoreline
North Fork of the Middle River (MP 337.91)	Removal of existing railroad bridge and installation of double-track railroad bridge	Brackish creek with sand/shell bottom covered with non-commercial oysters. Red and white mangroves observed along shoreline
South Fork of the Middle River (MP 338.52)	Removal of existing railroad bridge and installation of double-track railroad bridge	Brackish creek with sand/shell bottom covered with non-commercial oysters. Red and white mangroves observed along shoreline
Oleta River (MP 353.74)	Removal of existing railroad bridge and installation of double-track railroad bridge	Brackish/Tidal creek with sand/shell bottom covered with non-commercial oysters. Red, black, and white mangroves were observed along the shoreline
Arch Creek (MP 356.53)	Installation of single-track railroad bridge span on the west side of existing bridge	Brackish/Tidal creek with mud/sand bottom. Red and white mangrove were observed along the shoreline

Source: AMEC, 2013

Based on the field investigation the following habitats were identified: mangrove, estuarine planktonic, sand/shell bottom and mud/sand bottom. No seagrasses were identified within the Bridge Project Areas. Photographs of each Bridge Project Area are located in Appendix A and aerial photographs of each Bridge Project Area are located in Appendix B. Based on literature review and personal communication with NOAA Fisheries,[13] EFH for species within the Snapper-Grouper complex; spiny lobster, pink shrimp, white shrimp, and brown shrimp; were identified within the 15 Bridge Project Areas. The mangrove habitat identified at several of the Bridge Project Areas is classified as HAPC for species within the Snapper-Grouper complex.

[13] Howard, Brandon. 2012/2013. NOAA Fisheries. Personal Communication September 2012 – May 2013.

3.0 EFH and Managed Species

The proposed alignment for the Project from Miami to Cocoa will require in-water work for the enhancement or replacement of 15 railroad bridges over water bodies containing EFH, including 10 sites containing HAPC for Snapper-Grouper complex. A literature review was conducted and regulatory agency personnel were contacted to evaluate the EFH and managed species known to occur in the vicinity of the proposed crossing locations. The results of the literature review and an analysis of the effects, including cumulative effects, of the proposed Project on EFH, the managed species, and associated species by life history stage are presented in this section.

3.1 Essential Fish Habitat within the Project Area

The habitats identified in the Bridge Project Areas include: estuarine planktonic, mangrove, sand/shell bottom, and mud/sand bottom. These habitats fit into the following EFH types: mangroves fit into the estuarine scrub/shrub EFH; estuarine planktonic fit into the estuarine subtidal open water/water column EFH; and sand/shell and mud/sand bottoms fit into tidal creek EFH. Below is a brief description of each of these EFH types and their utilization by fish managed under SAFMC.

3.1.1 Estuarine Scrub/Shrub (Mangroves)

Estuarine Scrub/Shrub (Mangroves) wetlands are characterized by salt-tolerant woody vegetation less than 20 feet in height.[14] There are four species which comprise the "mangrove" forest ecosystem: red mangrove (*Rhizophora mangle),* black mangrove (*Avicennia germinans),* white mangrove (*Languncularia racemosa),* and buttonwood mangrove (*Conocarpus erectus).* Mangrove wetlands provide a variety of beneficial biological and physical functions including habitat for nursery, feeding, and refuge for both recreationally and commercially important fisheries and their prey resources.[15] Based upon the classification scheme proposed by Gilmore and Snedaker,[16] the mangrove forests present within the Bridge Project Areas are riverine mangrove forests. Riverine mangrove forests occur in riverine areas that are tidally influenced. Riverine mangrove forests are considered the most productive mangrove forests. High primary productivity is attributed to lower salinities and nutrient loading from freshwater runoff. Goat Creek, Moores Creek, Unnamed Creek, Unnamed Tributary 2, Unnamed Tributary 1, Hillsboro River, North Fork of the Middle River, South Fork of the Middle River, Oleta River, and Arch Creek Bridge Project Areas include riverine mangrove forests.

3.1.2 Estuarine Subtidal Open Water/Water Column (Estuarine Planktonic)

Water column habitats are constantly changing in time and space; therefore, there are numerous potential distinct water column habitats for a broad array of species and life-stages.[15] Physical parameters such as temperature, salinity, density, nutrients, light, etc. often define the specific habitats in the water column.[15] All of the Bridge Project Areas: Horse Creek, Goat Creek, North Canal, South Canal, Moores Creek, Unnamed Creek, Unnamed Tributaries 1 and 2, Tributaries to Manatee Creek 1 and 2, Hillsboro River, North Fork of the Middle River, South Fork of the Middle River, Oleta River, and Arch Creek include estuarine subtidal open water EFH.

[14] Tiner, R. W. 1993. A Field Guide to Coastal Wetland Plants of the Southeastern United States. Amherst, Massachusetts: University of Massachusetts Press.
[15] South Atlantic Fisheries Management Council (SAFMC). 1998. Habitat Plan for the South Atlantic Region: Essential Fish Habitat Requirements for Fishery Management Plans of the South Atlantic Fishery Management Council. Available: http://www.safmc.net/ecosystem/EcosystemManagement/HabitatProtection/SAFMCHabitatPlan/ tabid/80/Default.aspx#EFHAm. Accessed October 2012.
[16] Gilmore, R.G. and S.C. Snedaker. 1993. Chapter 5: Mangrove forests in W.H. Martin, S.G. Boyce, and A.C. Echternacht, eds. Biodiversity of the southeastern United States: lowland terrestrial communities. John Wiley & Sons, Inc., Publishers, New York.

3.1.3 Tidal Creeks (Mud/Sand and Sand/Shell Bottom)

Unconsolidated bottom substrate of tidal creeks may be made up of mud, sand, or shell or any combination of the three. Different commercially, recreationally, or ecologically significant species may utilize the bottom substrate of tidal creek during their life cycle. Penaeid shrimp are known to utilize inshore estuarine areas including tidal creeks for nursery areas.[17] White shrimp and brown shrimp tend to prefer mud/sand bottom habitat when in inshore waters; while pink shrimp tend to prefer sand/shell bottom habitat.[15] All of the Bridge Project Areas: Horse Creek, Goat Creek, North Canal, South Canal, Moores Creek, Unnamed Creek, Unnamed Tributaries 1 and 2, Tributaries to Manatee Creek 1 and 2, Hillsboro River, North Fork of the Middle River, South Fork of the Middle River, Oleta River, and Arch Creek include tidal creek EFH.

3.2 EFH Managed Species that May Occur in the Project Area

The NOAA EFH Mapper[18] was also used to generate a list of species with designated EFH within the vicinity of the proposed Project. The NOAA EFH mapper indicated that EFH for the snapper/grouper complex, spiny lobster, and shrimp is present at one or more of the bridge locations. Habitat was evaluated during the September 2012 site assessment. AMEC scientists used Appendix 6: Summary of EFH Requirements for Species Managed by the SAFMC in the NMFS document *Essential Fish Habitat: A Marine Fish Habitat Conservation Mandate for Federal Agencies- South Atlantic Region*[19] to identify the species that may utilize habitat within the Bridge Project Areas. The list of the managed species that may utilize habitat within the Bridge Project Areas is presented in Table 2-1. Additional species in the snapper-grouper complex may also utilize habitat in the Bridge Project Areas.

[17] South Atlantic Fisheries Management Council (SAFMC). 2011. Users Guide to Essential Fish Habitat Designation. Available: http://www.safmc.net/LinkClick. aspx? fileticket= S5hRz7dAT w0 %3D&tabid=710. Accessed March 2013.
[18] NOAA. 2013. EFH Mapper. Website: http://www.habitat.noaa.gov/protection/efh/habitatmapper.html. Accessed March 7, 2013.
[19] National Marine Fisheries Service (NMFS). 2008. National Marine Fisheries Service Habitat Conservation District Southeast Regional Office. 2008. Essential Fish Habitat: A Marine Fish Habitat Conservation Mandate for Federal Agencies. Available: http://sero.nmfs.noaa.gov/hcd/pdfs/efhdocs/sa_guide _2008. pdf. Accessed October 2012.

Table 2-1. Species with EFH in the Project Vicinity (page 1 of 3)

Bridge Project Area	Habitat	Fish Species	Life Stages
Horse Creek (MP 187.37)	Sand/Shell Bottom; Planktonic	spiny lobster	larvae (planktonic)
		pink shrimp	postlarvae/juvenile, subadults (sand/shell bottom)
Goat Creek (MP 202.59)	Mangrove; Mud/Sand Bottom; Planktonic	goliath grouper	juvenile (mangrove)
		grey snapper	postlarvae/juvenile (mangrove; mud bottom); adult (mangrove)
		mutton snapper	juvenile (mangrove; mud/sand bottom)
		spiny lobster	larvae (planktonic)
		brown shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
		white shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
North Canal (MP 223.70)	Sand Bottom; Planktonic	mutton snapper	juvenile (mud/sand bottom)
		spiny lobster	larvae (planktonic)
		brown shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
		white shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
South Canal (MP 230.03)	Mud/Sand Bottom; Planktonic	grey snapper	postlarvae/juvenile (mud bottom)
		mutton snapper	juvenile (mud/sand bottom)
		spiny lobster	larvae (planktonic)
		brown shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
		white shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
Moores Creek (MP 241.27)	Mangrove; Mud/Sand Bottom; Planktonic	goliath grouper	juvenile (mangrove)
		grey snapper	postlarvae/juvenile (mangrove; mud bottom); adult (mangrove)
		mutton snapper	juvenile (mangrove; mud/sand bottom)
		spiny lobster	larvae (planktonic)
		brown shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
		white shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
Unnamed Creek (MP 259.95)	Mangrove; Sand/Shell bottom; Planktonic	goliath grouper	juvenile (mangrove)
		grey snapper	postlarvae/juvenile, adult (mangrove)
		mutton snapper	juvenile (mangrove)
		spiny lobster	larvae (planktonic)
		pink shrimp	post larval/juvenile, subadults (sand/shell bottom)
Unnamed Tributary 2 (MP 266.58)	Mangrove; Sand Bottom; Planktonic	goliath grouper	juvenile (mangrove)
		grey snapper	postlarvae/juvenile, adult (mangrove)
		mutton snapper	juvenile (mangrove; mud/sand bottom)
		spiny lobster	larvae (planktonic)
		brown shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
		white shrimp	postlarvae/juvenile; subadults (mud/sand bottom)

Table 2-1. Species with EFH in the Project Vicinity (page 2 of 3)

Bridge Project Area	Habitat	Fish Species	Life Stages
Unnamed Tributary 1 (MP 266.86)	Mangrove; Mud/Sand Bottom; Planktonic	goliath grouper	juvenile (mangrove)
		grey snapper	postlarvae/juvenile (mangrove; mud bottom); adult (mangrove)
		mutton snapper	juvenile (mangrove; mud/sand bottom)
		spiny lobster	larvae (planktonic)
		brown shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
		white shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
Tributary to Manatee Creek 2 (MP 267.34)	Sand Bottom; Planktonic	mutton snapper	juvenile (mud/sand bottom)
		spiny lobster	larvae (planktonic)
		brown shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
		white shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
Tributary to Manatee Creek 1 (MP 267.70)	Sand Bottom; Planktonic	mutton snapper	juvenile (mud/sand bottom)
		spiny lobster	larvae (planktonic)
		brown shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
		white shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
Hillsboro River (MP 326.58)	Mangrove; Sand/Shell bottom; Planktonic	goliath grouper	juvenile (mangrove)
		grey snapper	postlarvae/juvenile, adult (mangrove)
		mutton snapper	juvenile (mangrove)
		spiny lobster	larvae (planktonic)
		pink shrimp	post larval/juvenile, subadults (sand/shell bottom)
North Fork of the Middle River (MP 337.91)	Mangrove; Sand/Shell bottom; Planktonic	goliath grouper	juvenile (mangrove)
		grey snapper	postlarvae/juvenile, adult (mangrove)
		mutton snapper	juvenile (mangrove)
		spiny lobster	larvae (planktonic)
		pink shrimp	post larval/juvenile, subadults (sand/shell bottom)
South Fork of the Middle River (MP 338.52)	Mangrove; Sand/Shell bottom; Planktonic	goliath grouper	juvenile (mangrove)
		grey snapper	postlarvae/juvenile, adult (mangrove)
		mutton snapper	juvenile (mangrove)
		spiny lobster	larvae (planktonic)
		pink shrimp	post larval/juvenile, subadults (sand/shell bottom)
Oleta River (MP 353.74)	Mangrove; Sand/Shell bottom; Planktonic	goliath grouper	juvenile (mangrove)
		grey snapper	postlarvae/juvenile, adult (mangrove)
		mutton snapper	juvenile (mangrove)
		spiny lobster	larvae (planktonic)
		pink shrimp	post larval/juvenile, subadults (sand/shell bottom)

Table 2-1. Species with EFH in the Project Vicinity (page 3 of 3)

Bridge Project Area	Habitat	Fish Species	Life Stages
Arch Creek (MP 356.53)	Mangrove; Mud/Sand Bottom; Planktonic	goliath grouper	juvenile (mangrove)
		grey snapper	postlarvae/juvenile (mangrove; mud bottom); adult (mangrove)
		mutton snapper	juvenile (mangrove; mud/sand bottom)
		spiny lobster	larvae (planktonic)
		brown shrimp	postlarvae/juvenile; subadults (mud/sand bottom)
		white shrimp	postlarvae/juvenile; subadults (mud/sand bottom)

Sources: AMEC, 2013; NOAA, 2008[19]; Personal Communication Brandon Howard, 2012-2013[13]

Note: Red drum, a species formerly managed by SAFMC, is also likely to occur in the vicinity of the proposed Project. According to NOAA Fisheries, EFH for red drum is no longer recognized by SAFMC (Howard, 2012-2013 personal communication[13]).

3.2.1 Grouper Snapper Complex

The snapper grouper complex includes sea basses and groupers (*Serranidae*), wreckfish (*Polyprionidae*), snappers (*Lutjanidae*), porgies (*Sparidae*), grunts (*Haemulidae*), jacks (*Carangidae*), tilefishes (*Malacanthidae*), triggerfishes (*Balistidae*), wrasses (*Labridae*), and spadefishes (*Eppiphidae*). The species in the snapper grouper complex utilize both pelagic and benthic habitats during their life cycle. Estuarine dependant species in the snapper grouper complex include gag grouper, lane snapper, and gray snapper. Juveniles of some species, such as mutton snapper (*Lutjanus analis*), gray snapper, dog snapper (*L. jocu*), lane snapper, yellowtail snapper (*Ocyurus chrysurus*), goliath grouper (*Epinephelus itajara*), red grouper (*E. morio*), gag, yellowfin grouper (*Mycteroperca venenosa*), Atlantic spadefish (*Chaetodipterus faber*), and hogfish (*Lachnolaimus maximus*) may occur in inshore seagrass beds, mangrove estuaries, lagoons, and bay systems.[20]

EFH for snapper grouper complex species includes coral reefs, live/hard bottom, SAV, artificial reefs and medium to high profile outcroppings on and around the shelf break zone from shore to at least 600 feet.[21] EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for larval survival and growth. In addition, the Gulf Stream is an EFH because it provides a mechanism to disperse larvae of the snapper grouper complex species.[21]

EFH for specific life stages of estuarine dependent and nearshore snapper grouper complex species includes habitats such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (salt marshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom inshore of the 100-foot contour.[21]

Estuarine mangrove wetlands, sand/shell bottom, and sand/mud bottom are present at one or more of the Project Areas. Estuarine mangrove wetlands are HAPC for the Snapper-Grouper complex. Several species within the snapper-grouper complex have the potential to occur in the vicinity of the proposed Project; however, based on guidance from NOAA Fisheries,[13] this EFH assessment will focus on the following species: gray snapper, mutton snapper, and goliath grouper.

[20] South Atlantic Fisheries Management Council (SAFMC). 1998. Habitat Plan for the South Atlantic Region: Essential Fish Habitat Requirements for Fishery Management Plans of the South Atlantic Fishery Management Council. Available:http://www.safmc.net/ecosystem/EcosystemManagement/HabitatProtection/SAFMCHabitatPlan/tabid/80/Default.aspx#EFHAm. Accessed October 2012.

[21] South Atlantic Fisheries Management Council (SAFMC). 1998. Final Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic Region. Available: http://www.safmc.net/ecosystem/EcosystemManagement/ Habitat Protection/SAFMCHabitatPlan/tabid/80/Default.aspx#EFHAm. Accessed October 2012.

3.2.1.1 Gray Snapper

Population Abundance and Distribution: Gray snappers are widely distributed in the western Atlantic from Florida through Brazil, including Bermuda, the Caribbean, and the northern Gulf of Mexico. Juveniles have been reported from as far north as Massachusetts.[22] Most are caught in US waters off Florida.[23] The abundance of gray snapper on the Atlantic and Gulf coasts of Florida is unknown, but appears to have remained mostly stable over the last few decades.[23] In US waters, three distinct populations have been found: the northwestern Gulf of Mexico, the north central/eastern Gulf of Mexico, and the east coast of Florida.[23]

Habitat Requirements: Gray snapper occupy a variety of habitats during their life cycle.[22] Adults are found near irregular, complex habitats, such as coral reefs, shipwrecks, rocky outcroppings and ledges, and other natural live bottom areas.[22] Spawning occurs offshore, and eggs and larvae are transported into estuarine, shallow seagrass and mangrove nursery areas by favorable currents. Larvae, juveniles, and smaller adults are found inshore in seagrass beds and around mangrove thickets, pilings, seawalls, and jetties.[22]

Life History: Spawning occurs from April to November with a peak during the summer months, and is influenced by the lunar cycle. Gray snapper spawn in aggregations during the times surrounding the full moon. Individual snappers may spawn multiple times during the course of the reproductive season. The species is a broadcast spawner of demersal eggs from which hatch sparsely pigmented larvae approximately 20 hours post-fertilization. The yolk sac is absorbed within the first 45 hours, after which the larvae must actively feed amongst the plankton. The post-larval gray snapper typically settle into suitable estuarine habitats. The pre-juvenile and juvenile snapper feed by day until they achieve a size of approximately 80 millimeters (total length) around which time they move into shallow rocky areas and the coastal reefs where they are commonly found as adults.[24]

Population Dynamics: The bulk of gray snapper landings in the US south Atlantic (North Carolina to the Florida Keys) occur in Florida. Combined landings of gray snapper from head boats (private recreational and charter boats) and the commercial fisheries of Florida's east coast averaged 493,895 kilograms annually between 1986 and 1997. Average annual landings from the south Florida area (Ft. Pierce through the Dry Tortugas = 412,279 kilograms) were five times greater than those from north Florida (Fernandina Beach through Sebastian = 81,616 kilograms). Gray snapper are highly valued by anglers for their fighting ability at all sizes. Recreational landings averaged 60,685 kilograms for north Florida compared with 290,266 kilograms for south Florida annually between 1986 and 1997. Commercial landings averaged 20,931 kilograms for north Florida and 122,013 kilograms for south Florida for the years 1986 through 1997.[22]

3.2.1.2 Mutton Snapper

Population Abundance and Distribution: Mutton snappers are found in the Gulf of Mexico and the western Atlantic from Massachusetts to Brazil; but are most common in the tropical waters of Florida, the Bahamas, and the Caribbean Sea.[25] Juveniles and small adults are found in shallow coastal waters over coral reefs, in protected bays with grass beds or mud bottoms, in tidal creeks surrounded by mangrove, and in canals. Larger adults are found in deeper waters on the continental shelf out to 91 foot (28 meter) depths.[26]

[22] Burton, M.L. 2001. Age, growth, and mortality of gray snapper, *Lutjanus griseus*, from the east coast of Florida. Fish. Bull.99:254-265.
[23] Blue Ocean Institute (BOI). 2012. Mangrove Snapper Full Species Report. Available at: http:/ /blueocean.org/documents/2012/06/snapper-mangrove-full-species-report.pdf. Accessed October 2012.
[24] Florida Museum of Natural History (FLMNH). 2009. Florida Museum of Natural History Ichthyology Department: Gray Snapper. Available: http://www.flmnh.ufl.edu/fish /gallery/Descript/ GraySnapper/Graysnapper.html. Accessed October 2012.
[25] Florida Museum of Natural History (FLMNH). 2012. Mutton Snapper Biological Profile. Available at: http://www.flmnh.ufl.edu/fish/gallery/descript/muttonsnapper/muttonsnapper.html. Accessed October 2012.
[26] Watanabe, W.O. 2001. Species Profile: Mutton Snapper. Southern Region Aquaculture Center Publication No. 725.

Habitat Requirements: Mutton snapper are found in various habitats. The juveniles are abundant in shallow waters such as tidal mangrove creeks, canals, and shallow protected bays, utilizing turtle grass as bottom cover. Solitary adults can be found among rocks and reefs, while juveniles occur over sandy or seagrass bottoms. Once an adult, mutton snapper becomes established in an area, they tend to remain there; small aggregations of mutton snapper may form during the day, disbanding at night.[25]

Life History: This snapper spawns throughout its range, though primarily in the northeastern Caribbean. Spawning occurs during the month of February in the Caribbean region while in other areas spawning occurs during summer.[25] Large spawning aggregations of mutton snapper occur seasonally off the coasts of Cuba, the Turks and Caicos, and the US Virgin Islands.[26] In the continental US, the last known spawning aggregation of mutton snapper is located in the Riley's Hump near the Dry Tortugas area off Key West, Florida. May and June are the principal spawning months for mutton snapper populations in this aggregation, which is heavily fished by commercial and recreational anglers.[26] Mutton snapper exhibit high site-fidelity, spawning at the same site and the same lunar calendar days, year after year.[25] Little is known about the life history of mutton snapper from juvenile to adult stages, including patterns of movement and migration.[26] All snappers are oviparous; they release pelagic eggs that move freely with the water currents. The number of eggs is dependent upon the size of the female, and after spawning, the adult fish move offshore to deeper waters. At lengths of less than 10 millimeters, the larvae tend to be planktonic. There is little known about the development of the larvae. They eventually settle on suitable habitat that offers some protection from predators.[25] Natural distributions of juveniles and adults suggest that the young recruit into shallow inshore waters, gradually moving into deeper offshore areas with maturity. Recruitment of juveniles (less than 7 centimeters fork length) to seagrass beds in Florida and Cuba has been reported to peak during August and September.[26]

Population Dynamics: Combined annual head boat landings of Mutton Snapper in the southeastern US averaged 45,980 kilograms annually between 1982 and 1996. Combined annual commercial landings of Mutton Snapper in the southeastern US averaged 133,974 kilograms annually between 1982 and 1996.[22]

3.2.1.3 Goliath Grouper

Population Abundance and Distribution: The goliath grouper occurs in the western Atlantic Ocean from Florida south to Brazil, including the Gulf of Mexico and the Caribbean Sea. It is also found in the eastern Atlantic Ocean, from Senegal to Congo although rare in the Canary Islands. The species is also present in the eastern Pacific Ocean from the Gulf of California to Peru.[27]

Habitat Requirements: Occurring in shallow, inshore waters to depths of 150 feet (46 meters), the goliath grouper prefers areas of rock, coral, and mud bottoms. Juveniles inhabit mangroves and brackish estuaries, especially near oyster bars.[27] They settle in shallow mangrove habitat, first in mangrove leaf litter, and then along mangrove shorelines. The juvenile stage lasts 5 or 6 years in this mangrove habitat, after which fish egress to shallow reefs, eventually joining adult populations offshore. Their distribution in mangroves depends on local water quality, particularly dissolved oxygen content (greater than 4 parts per million) and mid-range salinities (greater than 10 parts per thousand).[28] The goliath grouper is notable as one of the few groupers found in brackish waters. This fish is solitary by nature, with the adults occupying limited home ranges. It is territorial near areas of refuge such as caves, wrecks, and ledges, displaying an open mouth and quivering body to intruders.[27]

[27] Florida Museum of Natural History (FLMNH). 2012. Goliath Grouper Biological Profile. Available at: http://www.flmnh.ufl.edu/fish/Gallery/Descript/GoliathGrouper/GoliathGrouper.html. Accessed October 2012.
[28] Florida State University (FSU). 2012. Coleman and Koenig Research Laboratory. Available at: http://www.bio.fsu.edu /coleman_lab/goliath_grouper.php. Accessed October 8, 2012.

Life History: Many groupers are protogynous hermaphrodites, a condition in which individuals first mature as females only later to become males. Spawning occurs during the summer months of August and September throughout the goliath grouper's range and is strongly influenced by the lunar cycle. Spawning goliath grouper form impressive offshore aggregations of up to 100 or more individuals. Ship wrecks, rock ledges, and isolated patch reefs are preferred spawning habitat. In the 1980s these aggregations reached a low of less than 10 individuals per site as fishing pressure greatly impacted this species. Since receiving legislative protection, the spawning aggregations of goliath grouper have risen to 20 to 40 individuals per location. The females release eggs while the males release sperm into the open offshore waters. After fertilization, the eggs are pelagic, dispersed by the water currents. Upon hatching, the larvae are kite-shaped, with the second dorsal fin spine and pelvic fin spines greatly elongated. These pelagic larvae transform into benthic juveniles at lengths of one inch (2.5 centimeters), around 25 or 26 days after hatching.[27]

Population Dynamics: The large size, slow growth, low reproductive rate, and spawning behavior have made the goliath grouper especially susceptible to overfishing. The goliath grouper is totally protected from harvest and is recognized as a "Critically Endangered" species by the International Union for Conservation of Nature (IUCN). Furthermore, the IUCN concludes that the species has been "observed, estimated, inferred or suspected" of a reduction of at least 80% over the last 10 years or three generations. In US waters, take of this species has been prohibited since 1990, and the species has been protected in the Caribbean since 1993. Historical exploitation of goliath grouper annual spawning aggregation sites greatly reduced the number of reproductive adults. As goliath grouper are slow growing and require several years to reach sexual maturity, recovery for this species is expected to be slow.[27]

3.2.2 Spiny Lobster

Spiny lobster EFH includes nearshore shelf/oceanic waters; shallow subtidal bottom; seagrass habitat; unconsolidated bottom (soft sediments); coral and live/hard bottom habitat; sponges; algal communities; and mangrove habitat (prop roots). EFH for spiny lobster applies to coastal waters to the landward most influence of the tide from the Virginia/North Carolina border to the Dry Tortugas in the Florida Keys.[29]

Estuarine planktonic habitat was identified as one of the EFH requirements for larval Spiny Lobster.[30] Estuarine planktonic habitat is present within all of the Project Areas.

Population Abundance and Distribution: The spiny lobster inhabits the coastal waters and shallow Continental Shelf waters from North Carolina south to Brazil, including Bermuda and the Gulf of Mexico. A few specimens have been collected in the Gulf of Guinea, West Africa.[31] They live just below the water surface to depths of 1,650 feet.[32]

Habitat Requirements: A broad range of marine habitats are used during their life cycle.[31] Larval spiny lobsters float in the water column.[32] As they grow, they swim to nearshore habitats and settle in dense vegetation, especially among macroalgae.[32] Early benthic larvae and juveniles apparently

[29] South Atlantic Fisheries Management Council (SAFMC). 2011. Users Guide to Essential Fish Habitat Designation. Available: http://www.safmc.net/LinkClick. aspx? fileticket= S5hRz7dAT w0 %3D&tabid=710. Accessed March 2013.
[30] National Marine Fisheries Service (NMFS). 2008. National Marine Fisheries Service Habitat Conservation District Southeast Regional Office. 2008. Essential Fish Habitat: A Marine Fish Habitat Conservation Mandate for Federal Agencies. Available: http://sero.nmfs.noaa.gov/hcd/pdfs/efhdocs/sa_guide _2008. pdf. Accessed October 2012.
[31] Marx, J.M., and W.F. Herrnkind. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida)--spiny lobster. US Fish Wildl. Serv. Biol. Rep. 82(11.61). US Army Corps of Engineers, TR EL-82-4. 21 pp.
[32] National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2012. Fish Watch: Caribbean Spiny Lobster. Available at: http://www.fishwatch.gov/seafood_profiles/species/lobster/ species_pages/caribbean_spiny_lobster.htm. Accessed October 11, 2012.

concentrate in macroalgae beds along rocky shorelines and may be interspersed among large expanses of seagrass that typify known nursery areas like Florida Bay.[31] They live here until they reach about 0.6 to 0.8 inches, then find shelter in crevices provided by large sponges, octocorals (soft corals), and solution holes until they are about 1 1/2 inches long. When they reach 2 to 3.15 inches, Caribbean spiny lobsters begin to travel from their nearshore nursery habitat to coral reefs and other offshore habitats. Adult spiny lobsters move along shore and offshore seasonally, migrating in single-file lines to deeper water to escape cold and turbid waters.[32] Shelters for adults include large sponges, coral heads, mangrove roots, grass-bed undercuts, solution holes, rocky outcroppings or ledges, and even clumps of sea urchins. Although adult males and females sometimes inhabit bays, lagoons, estuaries, and shallow banks, none are known to spawn there. Requirements of offshore spawning are high shelter quality, suitable water conditions (stable temperature and salinity, low surge and turbidity), and adequate larval transport by oceanic currents.[31]

Life History: Most spiny lobster in Florida waters reproduce during late spring and early summer. Yearly variations in peak spawning time depend largely on water temperature. In Florida, there is no direct evidence that lobsters spawn more than once a year, but repeat spawning by some individuals is suspected in Bermuda waters. The life history of the spiny lobster consists of five major phases, having the following distinctive behaviors and habitat use: (1) oceanic planktonic phyllosome larvae, (2) swimming postlarvae pueruli (singular = puerulus), (3) early benthic "banded" juveniles, (4) later juveniles (20 to 65 millimeters carapace length), and (5) adults. Distribution of larvae is otherwise regulated by ocean currents and other factors that influence water circulation patterns. The spiny lobster larva metamorphoses into a puerulus, a brief (several weeks), nonfeeding, oceanic phase. Large numbers of pueruli arrive along the southeast Florida coast and southern shores of the Florida Keys throughout the year, principally during the new and first - quarter lunar phases. Pueruli settle rapidly when they encounter suitable inshore substrate.[31]

Population Dynamics: In Florida, the amount of spiny lobster capable of reproducing (spawning biomass) has increased over time, especially from 2002 to 2005. Lobsters spend a long time in the larval stage traveling with the currents. This leads scientists to suspect that young lobsters that survive to adulthood (recruits) in the US come from many other areas. Recent genetic studies have shown almost all recruits in US waters are from the Caribbean. Therefore, the spawning biomass in the greater Caribbean area is more relevant to the population status than the spawning biomass in Florida. Scientists were not able to determine the current status for the spiny lobster stock in the Caribbean because the data from the latest assessment was uncertain.[32]

3.2.3 Penaeid Shrimp

The three species of penaeid shrimp under SAFMC management are white shrimp, pink shrimp and brown shrimp. EFH for penaeid shrimp includes inshore estuarine nursery areas, offshore marine habitats used for spawning and growth to maturity, and all interconnecting water bodies. Inshore nursery areas include tidal freshwater (palustrine), estuarine, and marine emergent wetlands (e.g., intertidal marshes); tidal palustrine forested areas; mangroves; tidal freshwater, estuarine, and marine SAV (e.g., seagrass); and subtidal and intertidal non-vegetated flats. The EFH is designated from North Carolina through the Florida Keys.[33]

Estuarine mangrove wetlands, sand/shell bottom, and sand/mud bottom are present in one or more of the Project Areas. Therefore, estuarine EFH for brown shrimp, white shrimp and pink shrimp associated with their postlarvae/juvenile and subadult life stages is present in one or more of the

[33] South Atlantic Fisheries Management Council (SAFMC). 1998. Final Comprehensive Amendment Addressing Essential Fish Habitat in Fishery Management Plans of the South Atlantic Region. Available: http://www.safmc.net/ecosystem/EcosystemManagement/ Habitat Protection/SAFMCHabitatPlan/tabid/80/Default.aspx#EFHAm. Accessed October 2012.

Project Areas.[34] Table 2-2 describes the estuarine EFH of these species. Species not included in Table 2-2 do not have lifestages that occur within the Project Area of effect.

Table 2-2. Estuarine EFH of Penaeid Shrimp

Species	Life Stage	Ecosystem	EFH
Brown Shrimp	Postlarvae/juvenile/subadult	estuarine	Sand/mud bottom
White shrimp	Postlarvae/juvenile/subadult	estuarine	Sand/mud bottom
Pink shrimp	Postlarvae/juvenile/subadult	estuarine	Sand/shell substrate

Source: NMFS, 2008[34]

Population Abundance and Distribution: White shrimp range from Fire Island, New York to St. Lucie Inlet on the Atlantic Coast of Florida. On the Atlantic Coast, brown shrimp occur from Martha's Vineyard, Massachusetts to the Florida Keys. Pink shrimp occur from southern Chesapeake Bay to the Florida Keys and around the coast of the Gulf of Mexico to Yucatan south of Cabo Catoche.[35]

Habitat Requirements: White shrimp appear to prefer muddy or peaty bottoms rich in organic matter and decaying vegetation when in inshore waters. Offshore, white shrimp are most abundant on soft muddy bottoms. Brown shrimp appear to prefer a similar bottom type, and as adults, may also be found in areas where the bottom consists of mud, sand, and shell. Pink shrimp are most often found on hard sand and calcareous shell bottom.[35]

Penaeid shrimp have a life cycle which requires a variety of habitats. The high salinity, oceanic waters serve as habitat for large mature shrimp, which will spawn offshore. Brown and pink shrimp move to relatively deep continental shelf water, and white shrimp tend to remain nearshore in shallower water. Offshore water also serves as habitat for larval and postlarval shrimp. These shrimp are planktonic and feed on zooplankton in the water column. There is some evidence that postlarval brown shrimp may overwinter in nearshore bottom sediments.[36] Postlarval shrimp move inshore to nursery areas in estuaries beginning in April and early May. In the South Atlantic, these areas are generally dominated by the marsh grass *Spartina alterniflora*. Smaller pink shrimp remain in the estuary during winter. They bury themselves deeply in the substrate when cold weather comes and are somewhat protected from winter mortalities. Shrimp that survive the winter grow rapidly in late winter and early spring before migrating to the ocean.[37]

Spawning is correlated with bottom water temperatures and has been reported to occur at bottom temperatures of between 17 degrees Celsius and 29 degrees Celsius. Brown shrimp spawn in relatively deep water. Pink shrimp spawn at depths between 3.7 and 15.8 meters.[35]

Life History: White shrimp begin spawning in April in Florida and Georgia and late April or May in South Carolina. Spawning may continue into September or October. In North Carolina, roe-bearing pink shrimp females are found as early as May, and by June, most pink shrimp are ripe.[35]

All three species have eleven larval stages (5 nauplier, 3 protozoan and 3 mysid) before developing into postlarvae. Duration of the larval period is dependent on temperature, food, and habitat.

[34] National Marine Fisheries Service (NMFS). 2008. National Marine Fisheries Service Habitat Conservation District Southeast Regional Office. 2008. Essential Fish Habitat: A Marine Fish Habitat Conservation Mandate for Federal Agencies. Available: http://sero.nmfs.noaa.gov/hcd/pdfs/efhdocs/sa_guide _2008. pdf. Accessed October 2012.
[35] South Atlantic Fisheries Management Council (SAFMC). 1998. Habitat Plan for the South Atlantic Region: Essential Fish Habitat Requirements for Fishery Management Plans of the South Atlantic Fishery Management Council. Available: http://www.safmc.net/ecosystem/ EcosystemManagement/HabitatProtection/SAFMCHabitatPlan/tabid/80/Default.aspx#EFHAm. Accessed October 2012.
[36] National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2012. National Marine Fisheries Service. Penaeid Shrimp EFH and Habitat Requirements. Available: http://www.nmfs.noaa.gov/habitat/habitatprotection/ profile/ southatlantic/penaidshrimp_efhenvreq.htm. Accessed October 2012.
[37] National Oceanic and Atmospheric Administration (NOAA) Fisheries. 2012. National Marine Fisheries Service. Fishwatch – Pink shrimp. Available: http://www.nmfs.noaa.gov/ fishwatch/species/pink_shrimp.htm. Accessed October 2012

Records suggest larval periods of 10 to 12 days for white shrimp, 11 to 17 days for brown shrimp, and 15 to 25 days for pink shrimp. Postlarval shrimp sizes range from approximately 2.9 to 12 millimeters total length, with pink and white shrimp sizes overlapping and brown shrimp usually being larger.[35]

The mechanism by which postlarvae are carried from distant spawning areas to estuaries is not well known. White and pink shrimp enter the estuaries at about the same time, usually beginning in April and early May in the southern part of their range and in June and August in North Carolina sounds, where white shrimp are uncommon. Large white shrimp begin emigrating out of the estuary to the commercial fishing areas in August and continue through December. Pink and white shrimp that survive the winter grow rapidly in late winter and early spring before migrating to the ocean.[35]

Population Dynamics: The pink shrimp population of the South Atlantic is low (but likely due to environmental factors rather than fishing pressure). Overall annual harvest in the South Atlantic is dominated by white and brown shrimp species. Annual landings of the three penaeid species vary considerably from year to year. These fluctuations have been attributed to environmental influences.[37]

4.0 Impacts to EFH

Habitats within the Bridge Project Areas have been identified as EFH and HAPC. The Bridge Project Areas provide EFH, during some portion of their life cycle, for at least seven fishery species managed by the SAFMC: goliath grouper, gray snapper, mutton snapper, spiny lobster, pink shrimp, white shrimp and brown shrimp. Table 3-1 presents the potentially affected lifestages for each of the managed species known to occur in the Project vicinity based on the results of the literature review for each species.

Table 3-1. Managed Species and Affected Lifestages

Species Name	Potentially Affected Lifestages
Goliath grouper (*Epinephelus itajara*)	juvenile
Grey snapper (*Lutjanus griseus*)	postlarvae/juvenile, adult
Mutton snapper (*Lutjanus analis*)	Juvenile
Spiny lobster (*Panulirus argus*)	larvae
Pink shrimp (*Farfantepenaeus duorarum*)	postlarvae/juvenile, subadult
Brown shrimp (*Farfantepenaeus aztecus*)	postlarvae/juvenile, subadult
White shrimp (*Litopenaeus setiferus)*	postlarvae/juvenile, subadult

Source: NOAA, 2008[34]

This section discusses the direct, indirect, temporary, and cumulative impacts to EFH and HAPC associated with the fifteen Bridge Project Areas and potential implications to their associated fisheries communities. Direct, indirect, and temporary impacts are expected to be generally similar for all fisheries; therefore, the presentation of impacts is for all species.

4.1 Construction Methods

At each Bridge Project Area (with the exception of Arch Creek), piles will be driven to load bearing capacity for E80 live loads plus the dead load. Piles will be driven with a steel pile driving template placed to prevent movement of the pile group. Multiple piles are connected by a cast in place pile bent cap or end bent at the abutments. The piling driver equipment will be placed on the abutment or on a barge in larger systems (Hillsboro River, North Fork of the Middle River, and South Fork of the Middle River).

The superstructure will consist of Standard Precast Prestressed Concrete Bridge Slabs. The bridge slabs will sit atop the bent cap. A crane will place the bridge slabs on the abutment. To form the end bents and backwall, a small area upslope will be excavated to install the forms. After installation is complete, the area will be backfilled and compacted. Rip–rap will be placed around the abutment for slope protection.

The deck slab with curbs, constructed of reinforced concrete, will be placed onto the superstructure. A ballast deck with concrete ties for the track will be installed on the deck.

Materials for the bridge upgrades will be brought onsite via existing roads or rail. The bridge construction will require access for a crane at a location on top of the abutment. Plans indicate a proposed construction zone for access purposes around the bridge. Cranes will not access the construction area from the existing active track.

Silt fence and floating turbidity barriers will be installed and maintained during construction in accordance with performance standards for erosion and sediment control and stormwater treatment set forth in section 62-40.432, FAC. Construction drawings for each site are located in Appendix C.

4.2 Direct Impacts

Essential fish habitats and HAPCs that potentially could be affected by the proposed Project are Estuarine Intertidal Scrub-shrub (Mangroves), Estuarine Subtidal Open Water/Water Column (Estuarine Planktonic) and Tidal Creeks (Mud/sand and Sand/Shell Bottom). Within each of the Bridge Project Areas, EFH is equivalent to wetland and/or surface water habitats. The wetlands and/or surface waters within the Bridge Project Areas were identified as jurisdictional wetlands and/or waters. Boundaries were field verified by the USACE. Brandon Howard from NOAA Fisheries accompanied USACE during the site visit to verify the wetland boundaries and EFH habitats.

Construction of the proposed Project could involve unavoidable impacts to EFH and HAPC. Direct impacts associated with the proposed Project would include placement of rip-rap/fill for the bridge approaches, placement of structures at the locations of bridge pilings, and excavation at locations of existing timber pilings to be replaced. The impact of piling placement will be limited to the total footprint of pilings placed in EFH, totaling approximately 760 square feet (0.02 acre), across the 15 bridge locations. The impacts of the rip-rap/fill at the location of the abutments has been calculated as the total area of rip-rap/fill placed in surface waters and totals approximately 5,000 square feet (0.11 acre).The placement of pilings would have a variable effect on the managed species. Pilings could ultimately result in a beneficial effect to species/life stages that prefer such structures as habitat, such as adult goliath grouper, gray snapper, and mutton snapper. However, permanent impact of the removal of mangrove wetlands could adversely affect species/life stages that prefer mangrove habitat, such as juvenile goliath grouper, post larval/juvenile grey snapper, and juvenile mutton snapper.

Impacts to wetlands (mangroves) were calculated as the aerial extent of mangroves to be permanently removed by the proposed Project. Proposed avoidance, minimization, and mitigation measures are discussed in Section 4.0

4.3 Indirect Impacts

Because an active railroad bridge is currently located at all of the Bridge Project Areas, it was determined that indirect impacts would be minimal. Best management practices (BMPs) including silt fencing and turbidity curtains will be utilized during construction to avoid indirect impacts to water quality as well as shoreline erosion. During continued operation and maintenance of the bridge and associated railroad, BMPs in accordance with those outlined by standards for erosion and sediment control and stormwater treatment set forth in section 62-40.432, FAC will be implemented.

4.4 Temporary Impacts

Temporary construction-related impacts are anticipated to be limited to the area immediately adjacent to and under each of the proposed Bridge Project Areas. Temporary impacts resulting from construction activities would potentially occur from temporary disturbance, increased sediment loads, and increased turbidity in the water column. These impacts will be minimized by implementation of BMPs including installation of silt fencing and turbidity curtains during construction. Additional temporary impact would potentially occur through the disruption/burial of aquatic habitats at the location of the bridge abutments and piles. Most of the species of concern are mobile and can actively avoid construction activities, although some benthic fauna could potentially be impacted at the site of the piles. Due to the small footprint of in-water work at each bridge, mortality levels are anticipated to be negligible. Temporary impacts were quantified by estimating the area of proposed excavation for timber piling removal.

Pile driving (percussive or vibratory) has the potential to have temporary impacts on fish and other aquatic organisms during construction of a bridge.[38] Potential impacts to eggs, larvae, and adults of invertebrates and fishes associated with pile driving are noise vibration, sediment deposition, and crushing. Factors that affect the physical interaction of sound with fish include the size of the fish relative to the wavelength of sound, the mass of the fish, its anatomical variation, and the location of the fish in the water column relative to the sound source.[39] Fish have been divided into two broad groups based on hearing sensitivity, 'hearing specialists' and 'hearing generalists'. 'Hearing specialists' show high sensitivity to sound with levels as low as 60 decibels (dB) re 1 microPascal at 1 meter across a broad frequency range. The hearing sensitivity of 'hearing generalists' is lower than that of 'hearing specialists'. 'Hearing generalists' rely on the detection of particle displacement for sensing sound. The highly variable auditory sensitivity of fish means that it is impossible to generalize on the impact of impulse signals from one species to another.[39]

Invertebrates also vary in their sensitivity to sound. Sand shrimp exhibited a significant reduction in growth and reproduction rates, and an increase in aggression and mortality when exposed to noise levels of 30 dB in the 25 to 400 hertz bandwidth in aquaria.[39]

Noise from pile driving during construction could potentially affect federally managed species; however, the use of bubble curtains during pile driving will help to dampen noise by about 5 to 22 dB depending on the pile type and other conditions (Personal Communication NOAA Fisheries[40]). NOAA Fisheries has recommended that bubble curtains be used when impacts could occur. It is anticipated that the air bubble curtains will be used during pile driving to minimize the potential effects on federally managed species.

4.5 Cumulative Impacts

Cumulative impacts result from the total effect of the proposed Project when added to other past, present, and reasonably foreseeable future projects or actions (40 CFR 1508.7 and 50 CFR 402.02). For purposes of this analysis, the cumulative impact study area is defined as the Bridge Project Areas. The proposed Project is being considered within the context of other development projects within the watersheds of the proposed Bridge Project Areas. An active rail bridge currently exists at each Bridge Project Area. As discussed in Section 1.0 (Introduction), the purpose and need for these bridges is to support the Project from Miami to Orlando. The objective of the proposed Project is in response to the societal desire to expand passenger rail service in Florida as well as, the regulatory requirements to establish and maintain a safe railway. Past actions have resulted in a landscape that is residential and commercial land uses surrounding the Bridge Project Areas. In addition, past growth in the vicinity of the Project Areas has resulted in additional stormwater discharge which has contributed to a degradation of water quality within these systems.

The proposed Bridge Project Areas will not have stations associated with them; therefore, it is anticipated that the proposed Project would not increase the potential for any long term growth-induced development at the proposed Bridge Project Areas.

Any other development projects that would affect jurisdictional wetlands or water quality would be subject to the same permitting and mitigation requirements as the proposed Project. The level of cumulative impacts for EFH within the Bridge Project Areas is expected to be very low. The total permanent impacts to wetlands and surface waters at the 15 Bridge Project Areas is approximately

[38] Popper, A.N. 2005. What do we know about pile driving and fish? In: Irwin, C.L., Garrett, P. and McDermott, K.P. (eds.). Proceedings of the 2005 International Conference on Ecology and Transportation, Center for Transportation and the Environment, North Carolina State University, Raleigh, North Carolina.
[39] Kent, C.S. and R. McCauley. 2006. Review of "Environmental Assessment of the Batholiths Marine Seismic Survey, Inland Waterways and Near-Offshore, Central Coast of British Columbia". Center for Marine Science and Technology. Curtin University. October 2006.
[40] Howard, Brandon. 2012/2013. NOAA Fisheries. Personal Communication September 2012 – May 2013.

0.88 acres. It is not anticipated that the Proposed Action would cumulatively influence or impact any managed fish species or EFH evaluated in this report.

5.0 Avoidance, Minimization and Proposed Mitigation

The three EFH types in the vicinity of the Bridge Project Areas are Estuarine Intertidal Scrub-shrub (Mangroves), Estuarine Subtidal Open Water/Water Column (Estuarine Planktonic) and Tidal Creeks (Mud/sand and Sand/Shell Bottom). The effects to these EFH types would be the placement of pilings, placement of rip-rap/fill at the location of abutments, removal of existing timber pilings, and shading resulting from bridge construction. The adverse impact of piling placement will be limited to the total footprint of pilings placed in EFH, totaling approximately 760 square feet (0.02 acre), across the 15 bridge locations. The adverse impacts of the rip-rap/fill at the location of the abutments have been calculated as the total area of rip-rap/fill to be placed in surface waters and totals approximately 5,000 square feet (0.11 acre). Approximately 0.73 acre of the substrate will be shaded. Shading impacts were calculated as the footprint of the new bridges at each Bridge Project Area. It should be noted, though, that no seagrasses were observed within the Bridge Project Areas. Therefore, shading impacts will not impact seagrasses. Approximately 940 square feet (0.02 acre) of wetland (primarily mangroves) will be permanently removed, and approximately 4,000 square feet (0.09 acre) of mangroves will be trimmed according to FDEP Mangrove Trimming Guidelines, which are designed to avoid defoliation, removal, or destruction of the mangrove tree itself. The details of these impacts at each Bridge Project Area are summarized in Table 4-1. It is expected that the pilings might actually serve as an attractant to some fish species in the area and may enhance the habitat in several of these systems.

To mitigate for these impacts, work required for construction of the bridges would be conducted in a manner to reduce erosion and sedimentation through implementation of BMPs (such as the use of silt fences and turbidity curtains) in accordance with an approved Erosion and Sedimentation Control Plan to prevent further impacts to EFH. The placement of fill and rip-rap in wetlands resulting from bridge construction are considered permanent impacts to jurisdictional wetlands. As a result, an appropriate Clean Water Act Section 404 permit would be obtained from the USACE prior to construction, and mitigation would be implemented as required by wetland permit conditions.

Wetlands (mangroves) were evaluated through the Uniform Mitigation Assessment Method (UMAM) (Chapter 62-345, FAC), Wetland Rapid Assessment Method (WRAP)/Estuarine Wetland Rapid Assessment Method (EWRAP), or WATER depending on the method used at each of the mitigation banks. These assessment methods serve as standardized method to assess wetland structure, function, and health. UMAM, WRAP/EWRAP, or WATER calculations have been prepared for sites where mitigation credits will be purchased from banks. Details of the wetland evaluation for Bridge Project Areas including wetlands (mangroves) are contained in Appendix D. The anticipated functional losses and proposed mitigation for each bridge are summarized in Table 4-1.

Mitigation credits will be purchased at the following mitigation banks:

- Lake X Ranch Mitigation Bank (for impacts at Goat Creek)
- Bluefield Ranch Mitigation Bank (for impacts at Unnamed Creek)
- Bear Point Mitigation Bank (for impacts at Unnamed Tributary 1 and 2 and Tributary to Manatee Creek 1)
- Florida Power and Light (FPL) Everglades Mitigation Bank (for impacts at North Fork of the Middle River, South Fork of the Middle River and Oleta River).

Table 4-1. Anticipated Impacts, Wetland Assessment and Proposed Mitigation for each Bridge Project Area

Site	Surface Water Impact (pilings)		Surface Water Impacts (rip-rap/fill)		Surface Water Impact (shading)		Temporary Surface Water Impact (timber piling removal)		Wetland Impact (mangrove removal)		Mangrove Trimming		Functional Loss			Mitigation Credits to be Purchased
	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	UMAM	WRAP/ EWRAP	WATER	
Horse Creek (MP 187.37)	0.0004	18.84	0.00005	2.00	0.0174	756.82	-	-	-	-	-	-	-	-	-	-
Goat Creek (MP 202.59)	0.0015	66.66	0.0149	649.65	0.0640	2788.02	0.0017	75.20	0.0008	34.91	-	-	0.5	-	-	0.0005
North Canal (MP 223.7)	0.0008	33.33	0.0003	11.27	0.0260	1132.84	-	-	-	-	-	-	-	-	-	-
South Canal (MP 230.03)	0.0010	44.44	0.0076	332.43	0.0434	1890.48	-	-	-	-	-	-	-	-	-	-
Moores Creek (MP 241.27)	0.0004	18.84	0.0020	87.35	0.0218	948.50	-	-	-	-	0.0016	68.11	-	-	-	-
Unnamed Creek (MP 259.95)	0.0015	66.66	0.0017	75.32	0.0536	2335.35	0.0013	55.02	0.0018	79.30	0.0151	657.74	0.43	-	-	0.0009
Unnamed Tributary 1 (MP 266.86)	0.0015	66.66	0.0099	429.39	0.0663	2886.93	0.0006	27.51	0.0052*	226.81*	0.0214	933.02	-	0.57	-	0.0029
Unnamed Tributary 2 (MP 266.58)	0.0002	9.42	0.0088	382.57	0.0124	539.64	-	-	0.0008	36.61	0.0065	282.63	-	0.5	-	0.0005
Tributary to Manatee Creek 1 (MP 267.70)	-	-	0.0307	1337.88	0.0219	954.99	0.0002	7.84	0.0051*	220.33*	-	-		0.53	-	0.0027
Tributary to Manatee Creek 2 (MP 267.34)	-	-	0.0094	409.97	0.0162	707.66	0.0002	7.86	-	-	-	-	-	-	-	-
Hillsboro River (MP 326.58)	0.0018	77.77	0.0016	68.90	0.0688	2995.81	-	-	-	-	0.0015	66.29	-	-	-	-
North Fork of the Middle River (MP 337.91)	0.0036	155.44	0.0003	13.36	0.1230	5358.72	0.0025	110.04	0.0050	218.53	-	-	-	-	0.57	0.0029
South Fork of the Middle River (MP 338.52)	0.0036	155.44	0.0151	658.36	0.1342	5847.81	0.0029	125.76	0.0011	48.34	0.0046	199.99	-	-	0.57	0.0006
Oleta River (MP 353.74)	0.0010	44.44	0.0047	205.92	0.0529	2302.50	0.0005	23.52	0.0017	75.37	0.0293	1275.67	-	-	0.57	0.0011
Arch Creek (MP 356.53)	-	-	-	-	0.0114	495.02	-	-	-	-	0.0148	642.86	-	-	-	-
Total	**0.0174**	**757.94**	**0.1071**	**4664.37**	**0.7333**	**31941.09**	**0.0099**	**432.75**	**0.0216**	**940.20**	**0.0947**	**4126.51**	**0.93**	**1.60**	**1.71**	**0.0121**

Source: AMEC, 2013
Notes: *= non-mangrove wetland impacts

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Appendix A
Photograph Log

Horse Creek

Photograph 1. Existing rail bridge over Horse Creek (Brevard County), with concrete pedestrian access; view to south.

Photograph 2. Horse Creek rail bridge and west side right-of-way; view to north.

Photograph 3. Residential land use; view to northeast from rail bridge.

Photograph 4. Representative view of undeveloped land in vicinity of rail bridge; view to southeast.

Photograph 5. Dock observed in Horse Creek near residence; view to east from rail bridge.

Goat Creek

Photograph 1. View from south bank looking north along east side of the bridge.

Photograph 2. View showing proximity of white mangrove in project area.

North Canal

Photograph 1. Typical view of North Canal Bridge facing south.

Photograph 2. Typical view of North Canal Bridge.

Photograph 3. Typical view of North Canal, view to east.

South Canal

Photograph 1. Gravel and grass right-of-way to north of the South Canal railroad bridge and pedestrian bridge, view to north.

Photograph 2. Sedimentation beneath the South Canal Bridge, with Elephant grass and Brazilian pepper dominant vegetation; view to north.

Photograph 3. Vegetation observed at base of bridge, including Brazilian pepper.

Moore's Creek

Photograph 1. View from north bank looking south along west side of the bridge.

Photograph 2. View showing red s in the assessment area, approximately 18 feet west of the existing rail bridge.

Unnamed Creek

Photograph 1. Seven rows of multiple wood pilings in the water to help support the bridge.

Photograph 2. Red mangrove propagules were observed growing under existing bridge during the site visit.

Unnamed Tributary 1 (MP 266.86)

Photograph 1. The bridge at MP 266.86 crosses a creek about 20 feet wide surrounded by red mangrove wetlands.

Photograph 2. Representative photograph of the coastal marsh in the footprint of the proposed new bridge.

Unnamed Tributary 2 (MP 266.58)

Photograph 1. The railroad bridge at MP 266.58 has a row of 3 pilings in the water and ballast on the shoreline.

Photograph 2. Manatee Plaza Marina is located just north of the Project Area at MP 266.58.

Tributary to Manatee Creek 1 (MP 267.70)

Photograph 1. The bridge has two rows of five pilings in the water and ballast on the shoreline.

Photograph 2. Eel grass observed in stream.

Tributary to Manatee Creek 2 (MP 267.34)

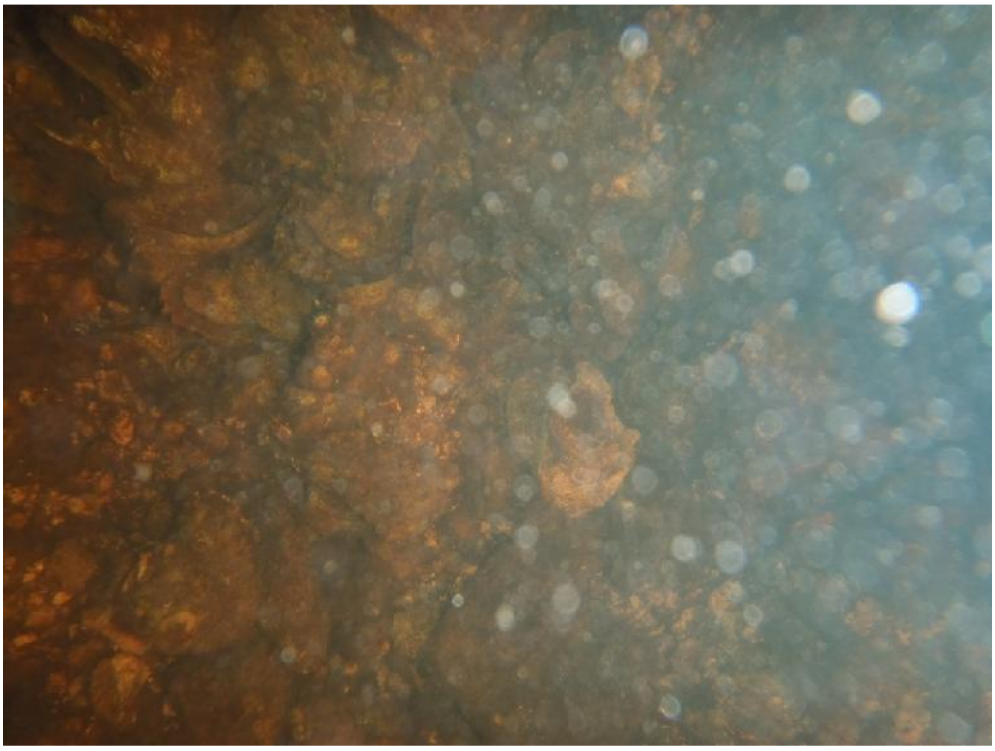
Photograph 1. The bridge crosses the Tributary to Manatee Creek 2 with two sets of four pilings. The shore is covered with ballast and riprap.

Photograph 2. Assessment Area beneath existing bridge structure.

Hillsboro River

Photograph 1. Facing south from the north bank.

Photograph 2. Rip-rap beneath newly constructed automobile bridge.



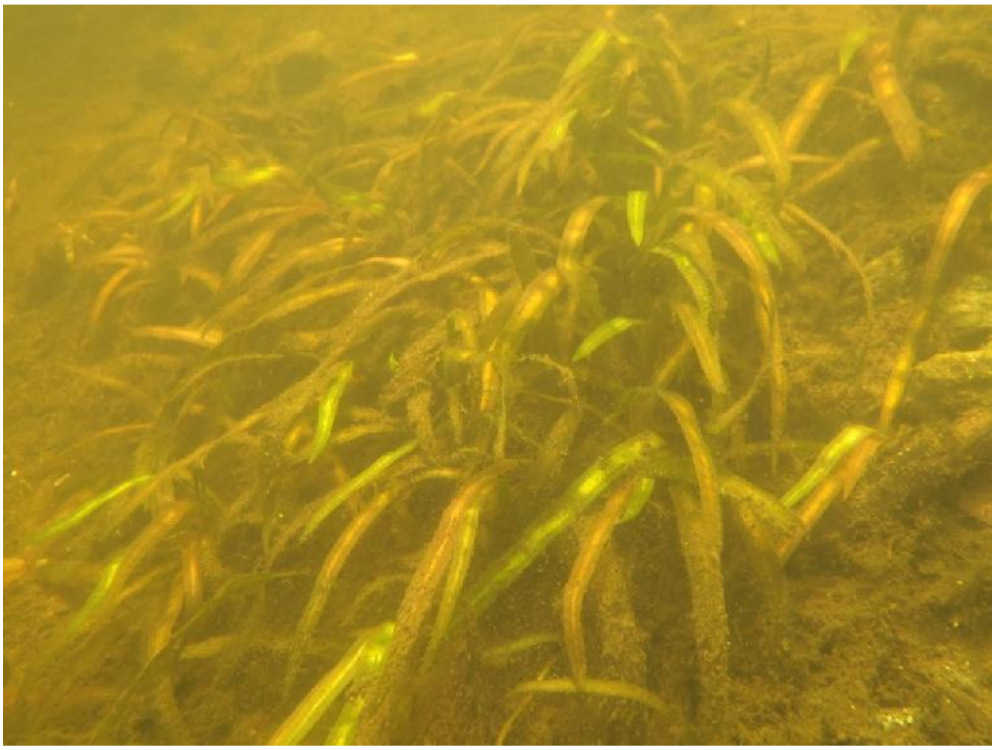
Photograph 3. Oyster shell covered bottom within assessment area.

Photograph 4. *Hygrophila* sp. observed within the assessment area.

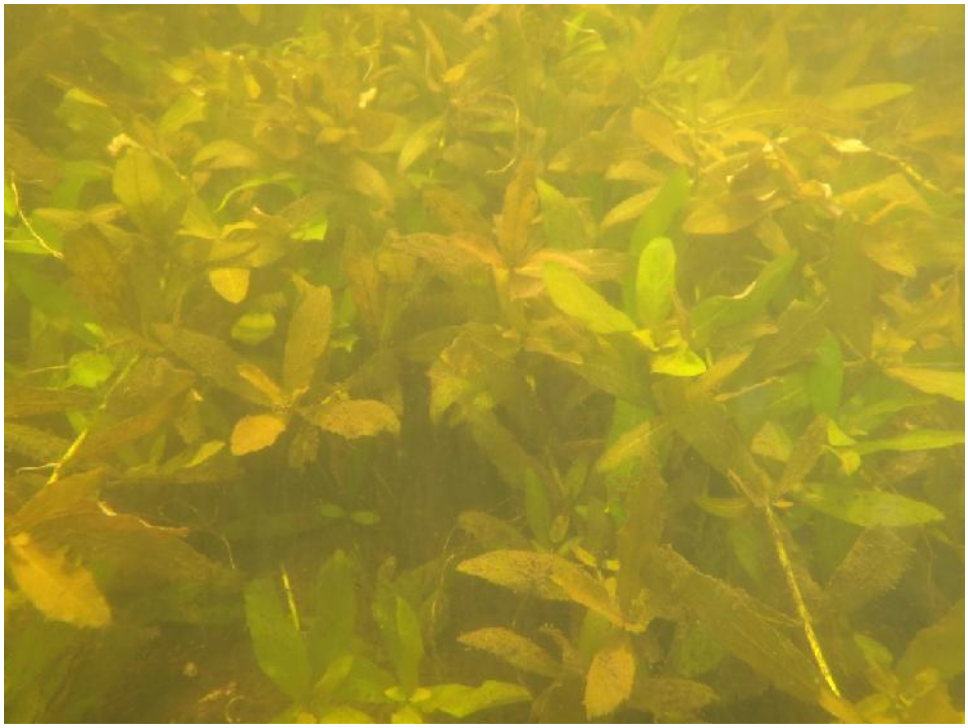
North Fork of the Middle River

Photograph 1. Facing south at mangroves growing into the former west bridge.

Photograph 2. Oyster shell covered bottom within assessment area.



Photograph 3. Algae covered Eel Grass (*Vallisneria americana*) within assessment area.



Photograph 4. *Hygrophila* sp. bed within the assessment area

South Fork of the Middle River

Photograph 1. Facing north from the southern end of the former bridge.

Photograph 2. Facing northeast from the existing in-service bridge.

Photograph 3. Facing north through the center of the existing bridge structures.

Photograph 4. Small oyster beds within the assessment area.

Oleta River

Photograph 1. Facing north illustrating existing timber constructed railroad bridge.

Photograph 2. Red mangroves growing within the assessment area.

Photograph 3. Red mangroves growing beneath existing railroad bridge.

Arch Creek

Photograph 1. Facing north illustrating existing railroad bridge.

Photograph 2. View from above illustrating footprint of former railroad bridge.

Photograph 3. Red mangroves growing within the assessment area

Photograph 4. Red mangrove propagules growing beneath the existing bridge structure.

Appendix B
Aerial Photographs

Explanation of Features

Project Area (0.28 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

Horse Creek Site Map

Bridge Over Horse Creek at Milepost 187.37 Along AAF Rail Corridor

Drawn	Date
NMG	11/26/2012
Checked	Date
ARB	11/26/2012

N

0 50 100 ft

amec

Figure 1

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\Horse Creek\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (0.51 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

Goat Creek Site Map

Bridge Over Goat Creek at Milepost 202.59 Along AAF Rail Corridor

Drawn	Date
NMG	11/26/2012
Checked	Date
ARB	11/26/2012

N

0 25 50 Ft

amec

Figure 1

Path: F:\FEC\FEC1_GDB\MXD\Permitting\ACOE\Goat Creek\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (0.71 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

North Canal Site Map

Bridge Over North Canal at Milepost 223.70 Along AAF Rail Corridor

Drawn	Date
DLA	08/21/2012
Checked	Date
ARB	08/21/2012

N

0 50 100 ft

amec

Figure 1

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\NORTH CANAL\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (0.69 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

South Canal Site Map

Bridge Over South Canal at Milepost 230.03 Along AAF Rail Corridor

Drawn	Date
DLA	08/21/2012
Checked	Date
ARB	08/21/2012

N

0 50 100 ft

amec

Figure 1

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\SOUTH CANAL\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (0.48 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

Moores Creek Site Map

Bridge Over Moores Creek at Milepost 241.27 Along AAF Rail Corridor

Drawn	Date
DLA	08/21/2012
Checked	Date
ARB	08/21/2012

N

0 50 100 ft

amec

Figure 1

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\MOORES\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (0.68 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

Tributary to Unnamed Creek Site Map

Bridge Over Unnamed Creek at Milepost 259.95 Along AAF Rail Corridor

Drawn	Date
DLA	08/21/2012
Checked	Date
ARB	08/21/2012

N

0 50 100 ft

amec

Figure 1

Path: F:\FECI_GDB\MXD\Permitting\ACOE\UNNAMED CREEK\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (0.74 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

Unnamed Tributary 2 Site Map

Bridge Over Unnamed Tributary at Milepost 266.58 Along AAF Rail Corridor

Drawn	Date
DLA	08/21/2012
Checked	Date
ARB	08/21/2012

N

0 50 100 ft

amec

Figure 1

Path: F:\FECI_GDB\MXD\Permitting\ACOE\UNNAMED TRIBUTARY 2\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (0.68 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

Unnamed Tributary 1 Site Map

Bridge Over Unnamed Tributary at Milepost 266.86 Along AAF Rail Corridor

Drawn	Date
DLA	08/21/2012
Checked	Date
ARB	08/21/2012

N

0 50 100 ft

amec

Figure 1

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\UNNAMED TRIBUTARY\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (0.53 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

Tributary to Manatee Creek 2 Site Map

Bridge Over Tributary to Manatee Creek at Milepost 267.34 Along AAF Rail Corridor

Drawn	Date
DLA	08/21/2012
Checked	Date
ARB	08/21/2012

N

0 50 100 ft

amec

Figure 1

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\TRIBUTARY TO MANATEE CREEK 2\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (.0.56 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

Tributary to Manatee Creek 1 Site Map

Bridge Over Tributary to Manatee Creek at Milepost 267.70 Along AAF Rail Corridor

Drawn	Date
DLA	08/21/2012
Checked	Date
ARB	08/21/2012

N

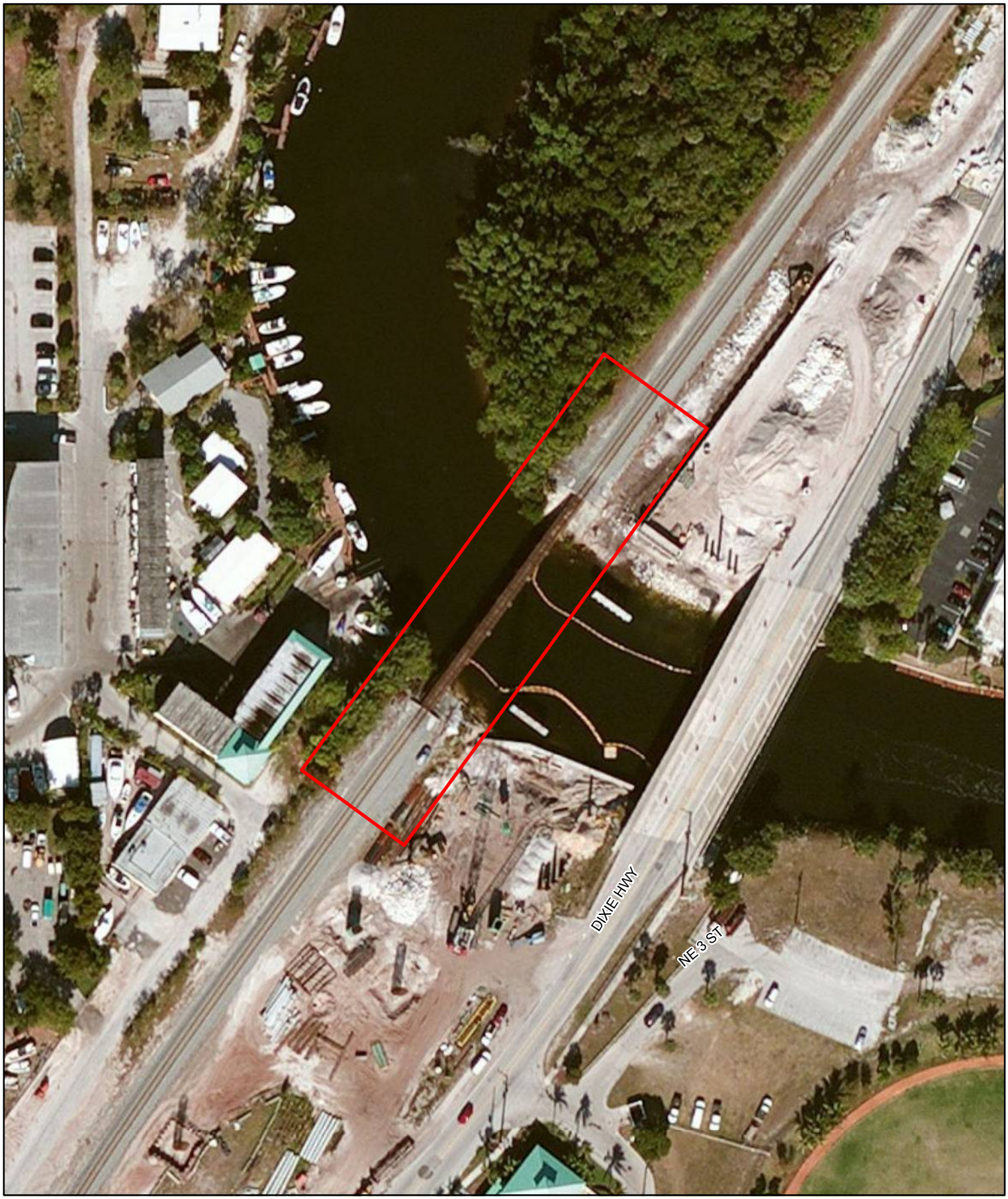
0 50 100 ft

amec

Figure 1

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\TRIBUTARY TO MANATEE CREEK 1\Figure 2 Aerial Map.mxd

Project # 6063-12-0212



Explanation of Features

Project Area (.93 ac.)

Hillsboro Canal Aerial Map

Bridge Over Hillsboro Canal at Milepost 326.58 Along AAF Rail Corridor

Drawn	Date
DLA	11/01/2012
Checked	Date
ARB	11/01/2012

N

0 50 100 ft

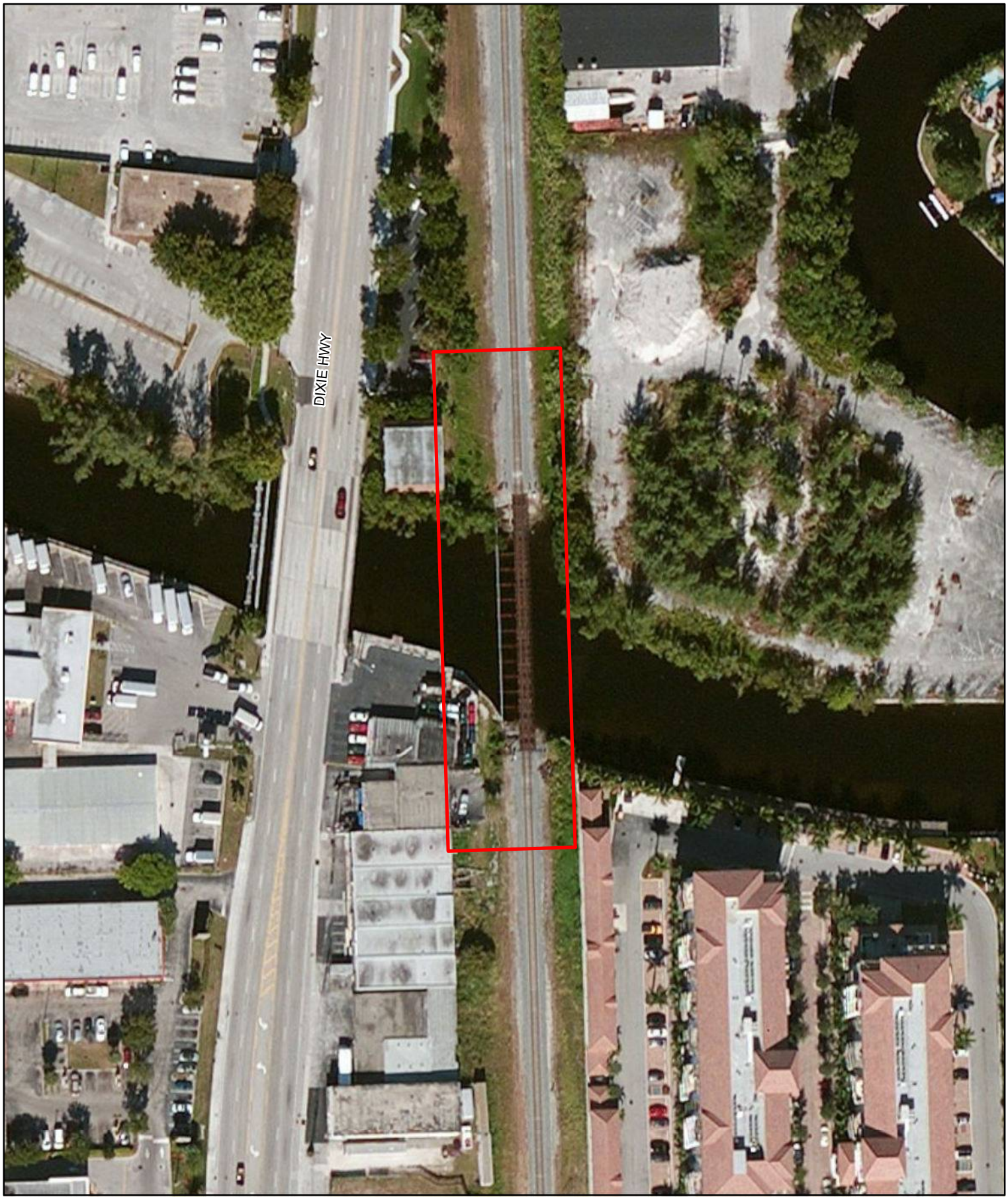
amec

Figure 1

Data Sources: ESRI Bing Maps 2012 Imagery, AMEC 2012

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\HILLSBORO CANAL\Figure 2 Aerial Map.mxd

Project # 6063-12-0212



Explanation of Features

Project Area (.90 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

North Fork of Middle River Bridge Site Map

Bridge Over North Fork of Middle River at Milepost 337.91 Along AAF Rail Corridor

Drawn	Date
DLA	10/23/2012
Checked	Date
ARB	08/21/2012

N

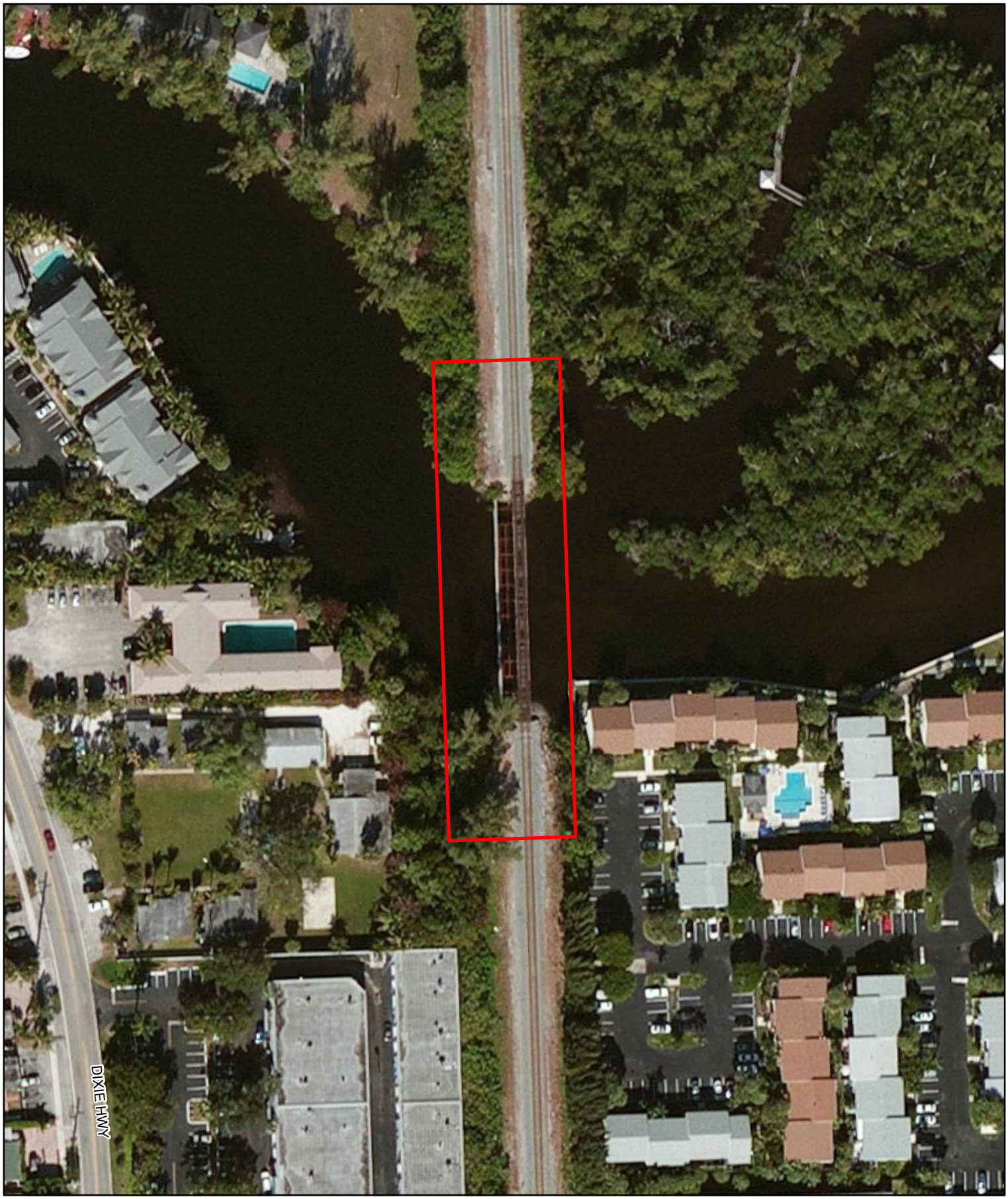
0 50 100 ft

amec

Figure 1

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\NORTH FORK\Figure 2 Aerial Map.mxd

Project # 6063-12-0212



Explanation of Features

Project Area (.86 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AMEC 2012

South Fork of Middle River Bridge Site Map

Bridge Over South Fork of Middle River at Milepost 338.52 Along AAF Rail Corridor

Drawn	Date
DLA	10/23/2012
Checked	Date
ARB	08/21/2012

N

0 50 100 ft

amec

Figure 1

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\SOUTH FORK\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (.64 ac.)

Data Sources: ESRI Bing Maps 2012 Imagery , AAF 2012

Oleta River Bridge Site Map

Bridge Over Oleta River at Milepost 353.74 Along AAF Rail Corridor

Drawn	Date
DLA	10/23/2012
Checked	Date
ARB	08/21/2012

N

0 50 100 ft

amec

Figure 1

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\OLETA_RIVER\Figure 2 Aerial Map.mxd

Project # 6063-12-0212

Explanation of Features

Project Area (.56 ac.)

Arch Creek Bridge Site Map

Bridge Over Arch Creek at Milepost 356.53 Along AAF Rail Corridor

Drawn	Date
DLA	10/30/2012
Checked	Date
ARB	10/30/2012

N

0 50 100 ft

amec

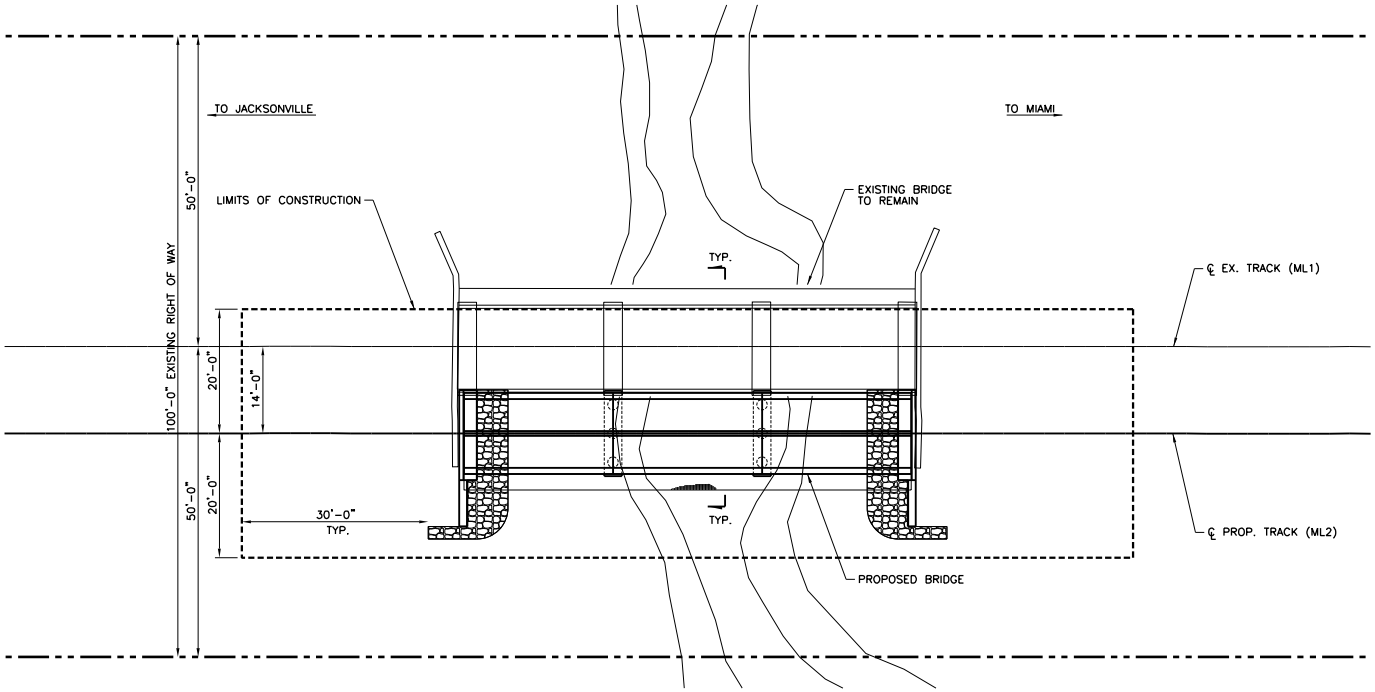
Figure 1

Data Sources: ESRI Bing Maps 2012 Imagery , AAF 2012

Path: F:\FEC\FECI_GDB\MXD\Permitting\ACOE\ARCH CREEK\Figure 2 Aerial Map.mxd

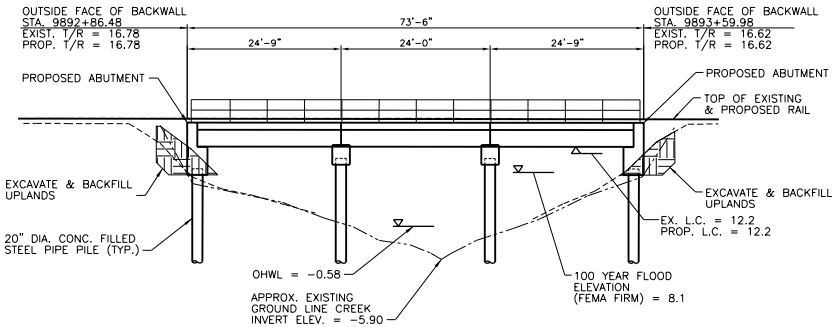
Project # 6063-12-0212

Appendix C
Construction Drawings



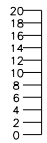
PLAN

SCALE 0 10 20 30 FEET



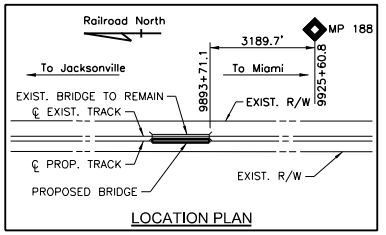
ELEVATION

SCALE 0 10 20 30 FEET



DATUM: NAVD 88

EXISTING BRIDGE NOT SHOWN FOR CLARITY



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 187.37 (1)	GENERAL PLAN
MP 187.37 (2)	ENVIRONMENTAL PLAN
MP 187.37 (3)	TYPICAL SECTION
MP 187.37 (4)	EXISTING PLAN

NOT FOR CONSTRUCTION PERMITTING PURPOSES ONLY

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-8500
C.A. 7503

DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

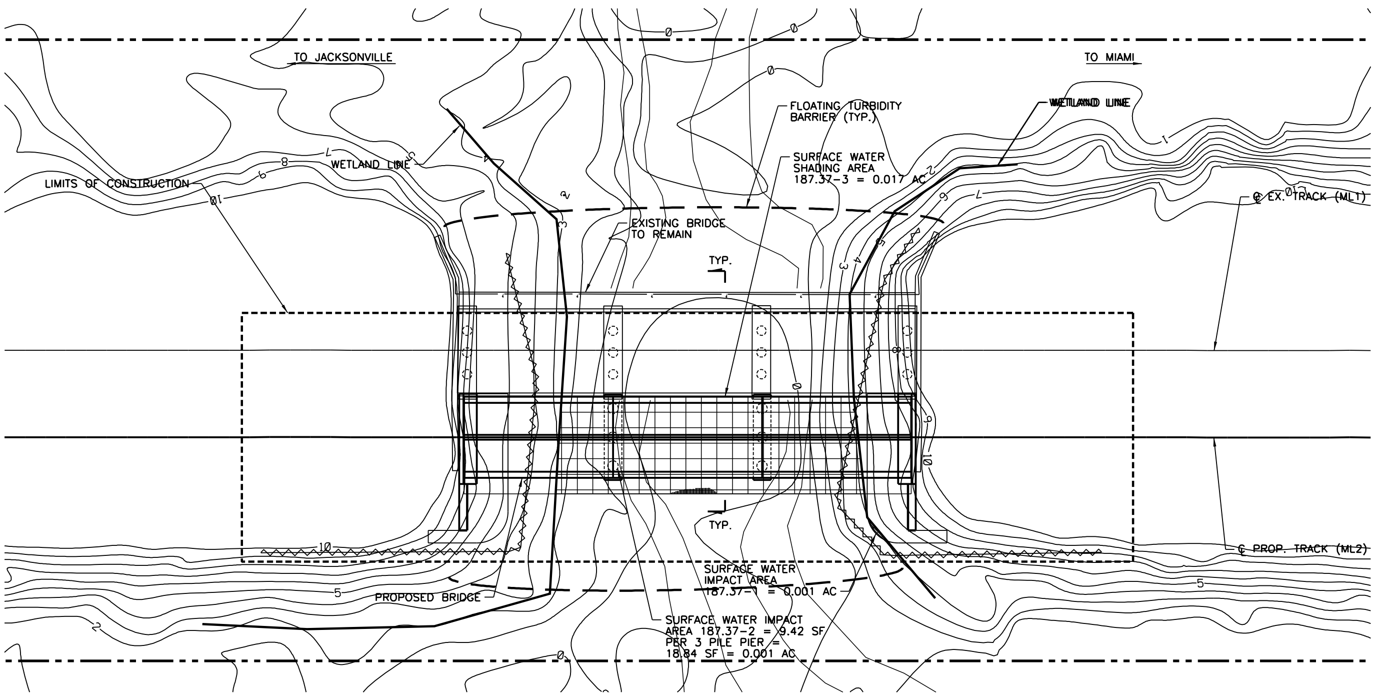
PROJ NO: 304120040_014
SCALE: AS NOTED
DATE: 3/20/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
HORSE CREEK BRIDGE 187.37 GENERAL PLAN AND ELEVATION

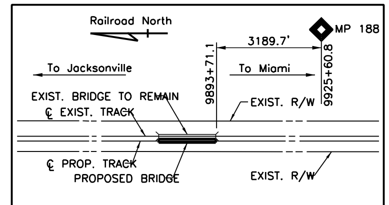
SHEET NO.
MP 187.37 (1)

SHEET 1 OF 4

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



PLAN



LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (284.30 SF)
- BEDDING STONE (284.30 SF)
- FILL BELOW MHWL (000.00 SF)
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

0 10 20 30
SCALE FEET

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER IMPACTS (UNVEGETATED)	SHADING – NEW TRACK	0.017	756.82
	FILL / RIPRAP INSTALL	0.001	20.84
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	N/A	0.000	000.00

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	98.65
SURFACE WATER / WETLAND	0.045	1950.28	000.00

TranSystems
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-6500
FAX: 904-245-6510

CONSULTANTS:

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS: MARK	DATE	DESCRIPTION

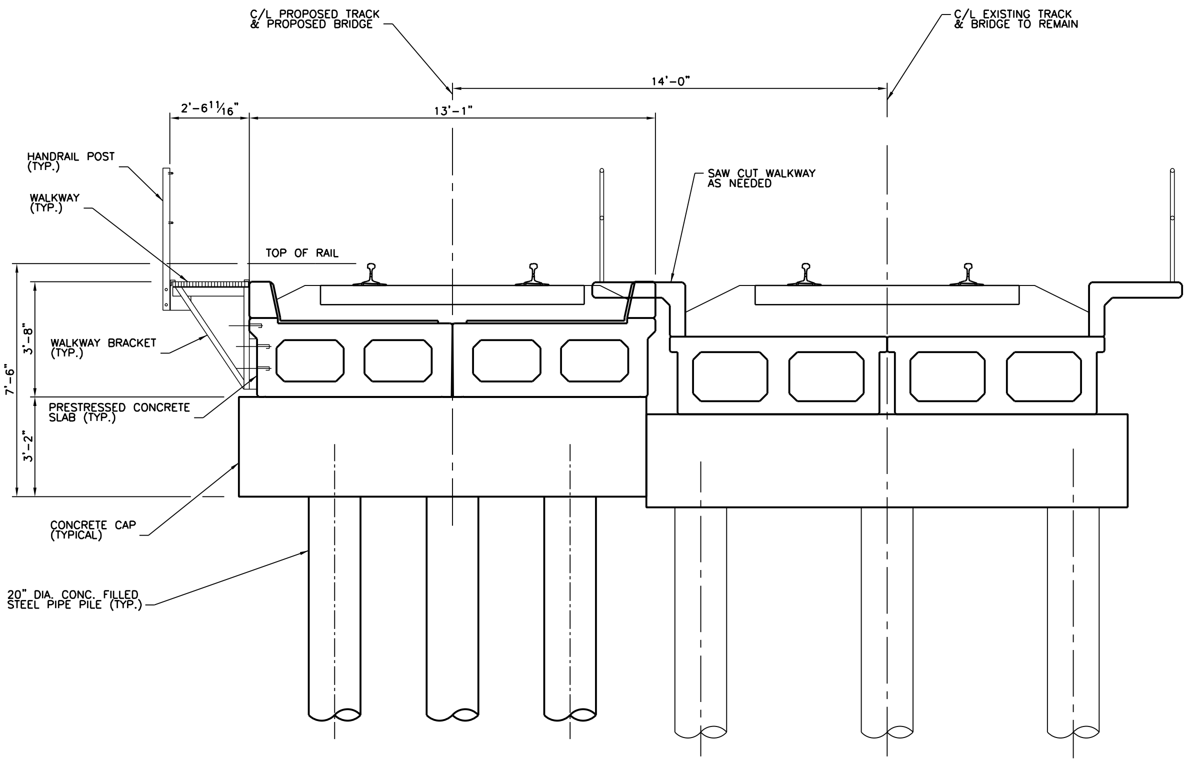
PROJ NO: 304120040_014
SCALE: AS NOTED
DATE: 3/20/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
HORSE CREEK BRIDGE 187.37 ENVIRONMENTAL PLAN

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

SHEET NO.
MP 187.37 (2)
SHEET 2 OF 4

DJSmith 3/20/2013 • 6:17:31 PM • G:\JA1220040\Bridges\014\014-C-PP02.dgn



TYPICAL SECTION BRIDGE 187.37

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-6500
C.A. 7503

DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO
PASSENGER SERVICE
FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_014
SCALE: AS NOTED
DATE: 3/20/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

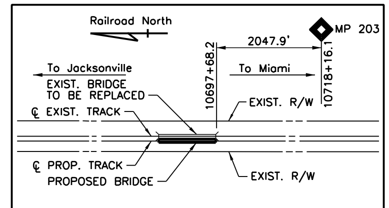
SHEET TITLE:
HORSE CREEK
BRIDGE 187.37
TYPICAL
SECTION

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

SHEET NO.
MP 187.37 (3)
SHEET 3 OF 4

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

DJSmith
3/20/2013 • 6:17:34 PM



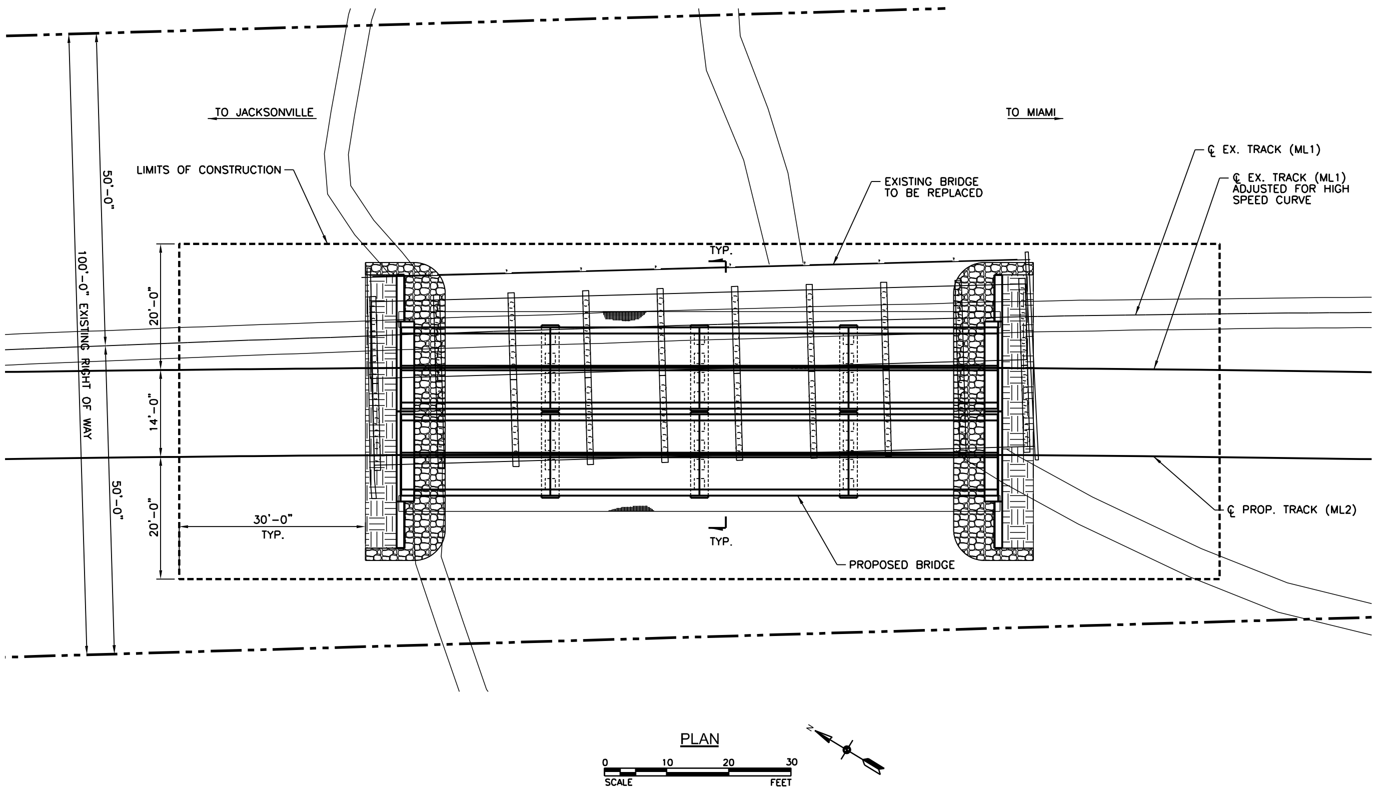
LOCATION PLAN

LEGEND

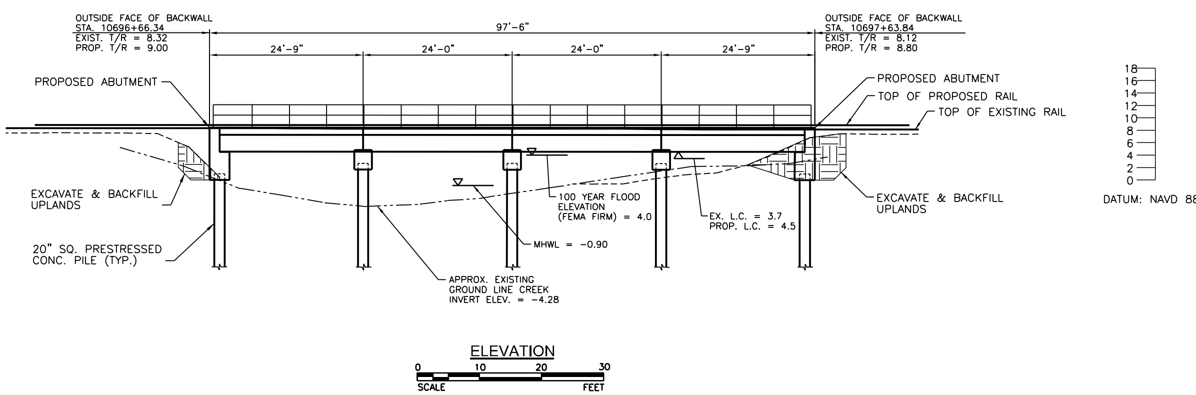
- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.


TO JACKSONVILLE
TO MIAMI
LIMITS OF CONSTRUCTION
EXISTING BRIDGE TO BE REPLACED
℄ EX. TRACK (ML1)
℄ EX. TRACK (ML1) ADJUSTED FOR HIGH SPEED CURVE
50'-0"
100'-0" EXISTING RIGHT OF WAY
50'-0"
20'-0"
14'-0"
20'-0"
TYP.
30'-0" TYP.
TYP.
PROPOSED BRIDGE
℄ PROP. TRACK (ML2)
SCALE 0 10 20 30 FEET

PLAN


OUTSIDE FACE OF BACKWALL
STA. 10696+66.34
EXIST. T/R = 8.32
PROP. T/R = 9.00
97'-6"
OUTSIDE FACE OF BACKWALL
STA. 10697+63.84
EXIST. T/R = 8.12
PROP. T/R = 8.80
24'-9"
24'-0"
24'-0"
24'-9"
PROPOSED ABUTMENT
PROPOSED ABUTMENT
TOP OF PROPOSED RAIL
TOP OF EXISTING RAIL
EXCAVATE & BACKFILL UPLANDS
EXCAVATE & BACKFILL UPLANDS
20" SQ. PRESTRESSED CONC. PILE (TYP.)
100 YEAR FLOOD ELEVATION (FEMA FIRM) = 4.0
MHWL = -0.90
EX. L.C. = 3.7
PROP. L.C. = 4.5
APPROX. EXISTING GROUND LINE CREEK INVERT ELEV. = -4.28
18 16 14 12 10 8 6 4 2 0
DATUM: NAVD 88
SCALE 0 10 20 30 FEET

ELEVATION

EXISTING BRIDGE NOT SHOWN FOR CLARITY

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 202.59 (1)	GENERAL PLAN
MP 202.59 (2)	ENVIRONMENTAL PLAN
MP 202.59 (3)	TYPICAL SECTION
MP 202.59 (4)	EXISTING PLAN

TranSystems
TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-6500
C.A. 7503

DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:		
MARK	DATE	DESCRIPTION

PROJ NO: 304120040_026
SCALE: AS NOTED
DATE: 2/10/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

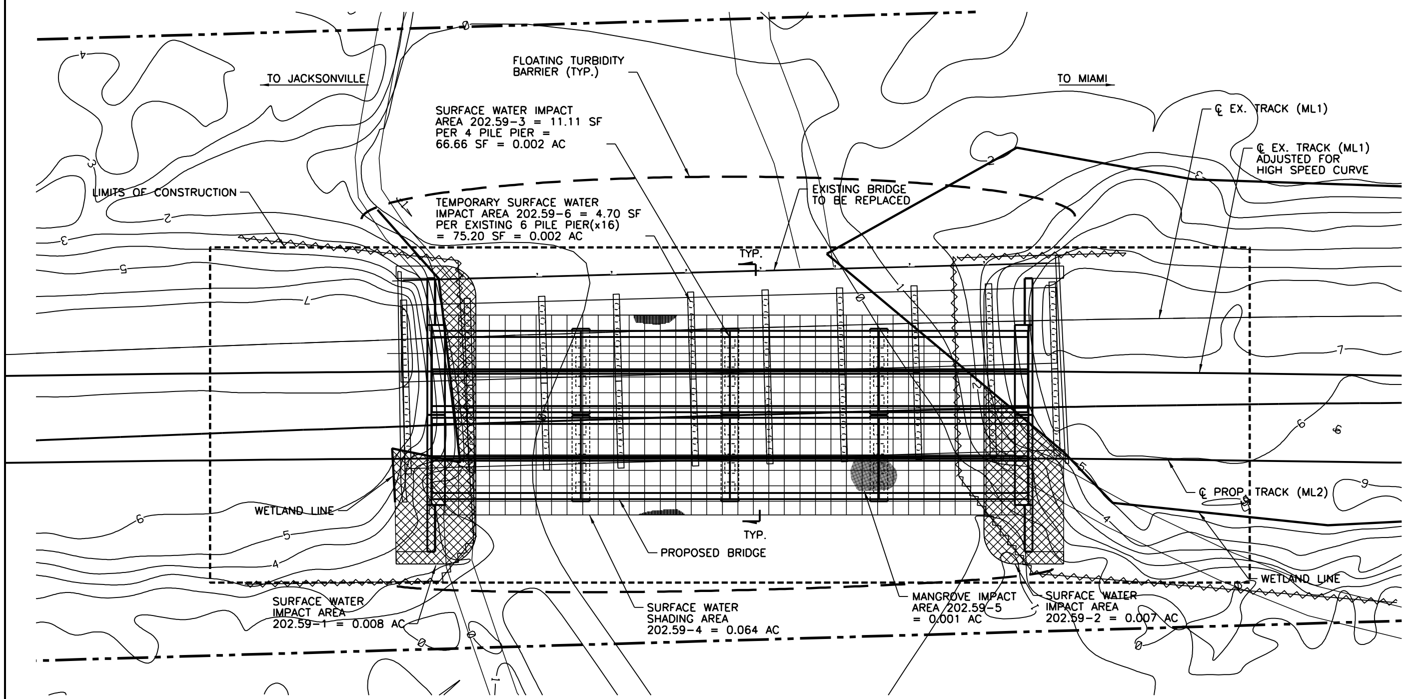
SHEET TITLE:
GOAT CREEK BRIDGE 202.59 GENERAL PLAN AND ELEVATION

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

SHEET NO.
MP 202.59 (1)
SHEET 1 OF 4

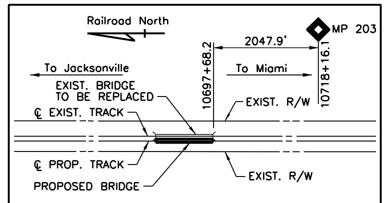
IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

DJSmith 2/10/2013 • 2:46:18 PM



PLAN

SCALE 0 10 20 30 FEET



LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (568.58 SF)
- BEDDING STONE (568.58 SF)
- FILL BELOW MHWL (000.00 SF)
- POTENTIAL MANGROVE TRIMMING*
- MANGROVE IMPACTS
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

* THESE AREAS MAY REQUIRE MANGROVE TRIMMING FOR SITE ACCESS AS NEEDED. ALL TRIMMING WILL BE PERFORMED IN ACCORDANCE WITH FDEP GUIDELINES FOR MANGROVE TRIMMING, THEREFORE THESE ARE CONSIDERED TEMPORARY IMPACTS.

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
MANGROVE TRIMMING	LATERAL BRANCHES	0.000	000.00
MANGROVE IMPACTS	REMOVAL/FILL–RIPRAP INSTALL	0.001	34.91
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER	SHADING – NEW TRACK	0.064	2788.02
IMPACTS (UNVEGETATED)	FILL / RIPRAP INSTALL	0.016	716.31
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	EXISTING PILE REMOVAL	0.002	75.20

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	148.60
SURFACE WATER / WETLAND	0.121	5289.76	000.00

TranSystems
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-6500
FAX: 904-245-6510

CONSULTANTS:

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS: MARK	DATE	DESCRIPTION

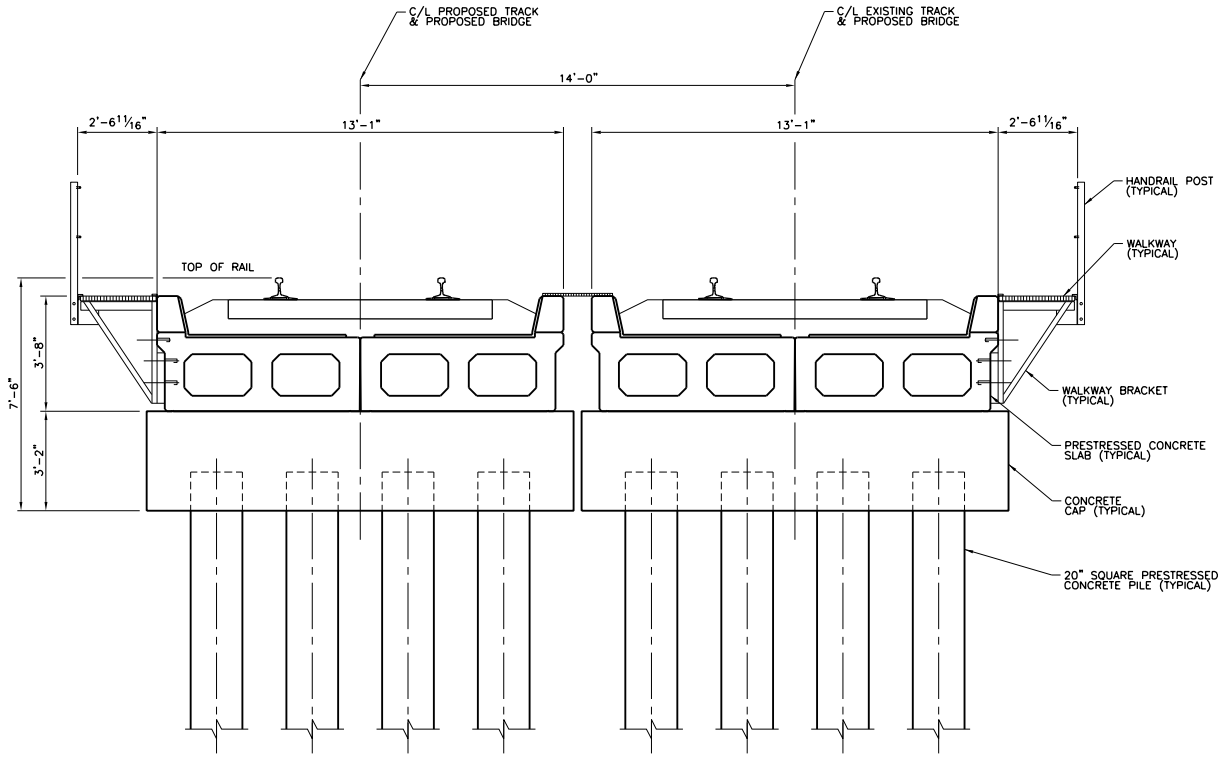
PROJ NO: 304120040_026
SCALE: AS NOTED
DATE: 2/10/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
GOAT CREEK BRIDGE 202.59 ENVIRONMENTAL PLAN

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

SHEET NO.
MP 202.59 (2)
SHEET 2 OF 4

DJSmith 2/10/2013 • 2:46:23 PM • G:\JA12\0040\Bridges\026\026-C-PP02.dgn



TYPICAL SECTION BRIDGE 202.59

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-8500
C.A. 7503

DANIEL F. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO
PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_026
SCALE: AS NOTED
DATE: 2/10/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

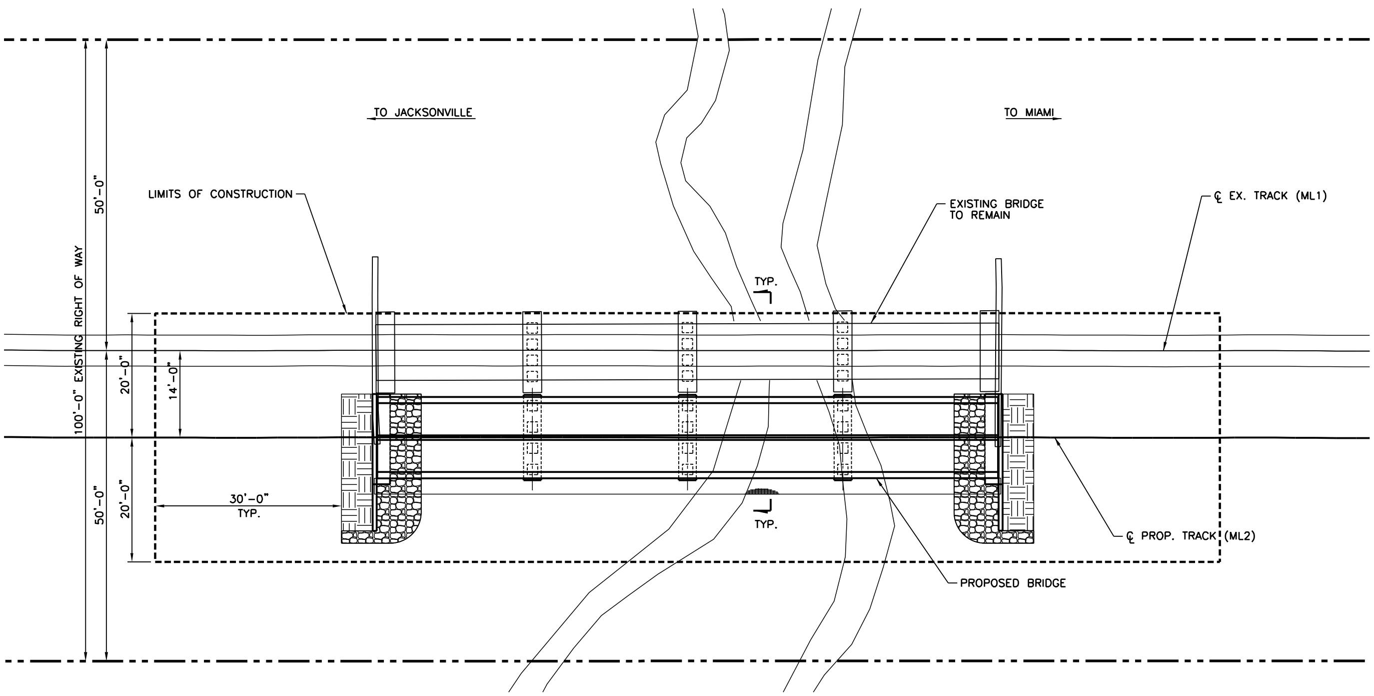
SHEET TITLE:
GOAT CREEK
BRIDGE 202.59
TYPICAL
SECTION

SHEET NO.
MP202.59 (3)
SHEET 3 OF 4

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

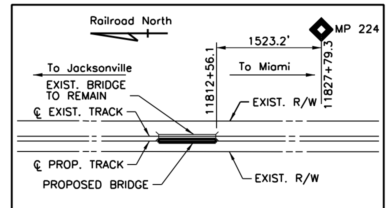
IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

DJSmith
2/10/2013 - 2:46:28 PM - G:\ATX\DWG\Bridge\120910\C-7501.dgn



PLAN

SCALE 0 10 20 30 FEET



LOCATION PLAN

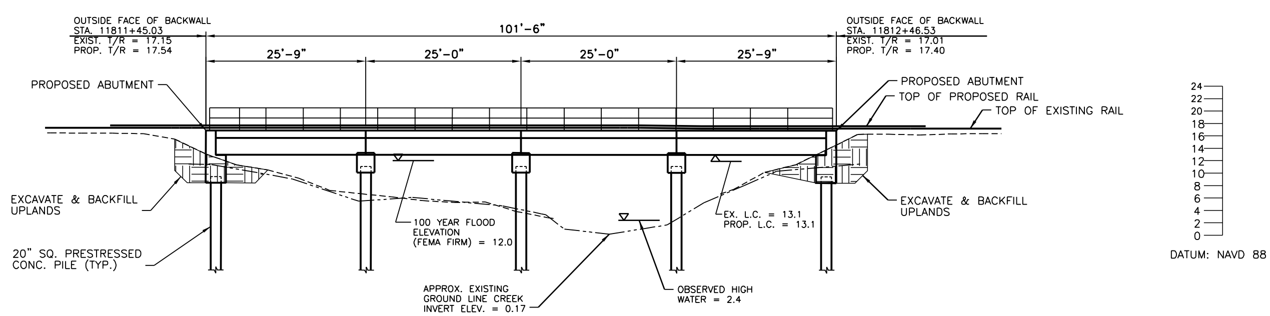
LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS	
SHEET	DESCRIPTION
MP 223.70 (1)	GENERAL PLAN
MP 223.70 (2)	ENVIRONMENTAL PLAN
MP 223.70 (3)	TYPICAL SECTION
MP 223.70 (4)	EXISTING PLAN


OUTSIDE FACE OF BACKWALL
STA. 11811+45.03
EXIST. T/R = 17.15
PROP. T/R = 17.54
101'-6"
OUTSIDE FACE OF BACKWALL
STA. 11812+46.53
EXIST. T/R = 17.01
PROP. T/R = 17.40
25'-9"
25'-0"
25'-0"
25'-9"
PROPOSED ABUTMENT
PROPOSED ABUTMENT
TOP OF PROPOSED RAIL
TOP OF EXISTING RAIL
EXCAVATE & BACKFILL UPLANDS
EXCAVATE & BACKFILL UPLANDS
20" SQ. PRESTRESSED CONC. PILE (TYP.)
100 YEAR FLOOD ELEVATION (FEMA FIRM) = 12.0
EX. L.C. = 13.1
PROP. L.C. = 13.1
APPROX. EXISTING GROUND LINE CREEK INVERT ELEV. = 0.17
OBSERVED HIGH WATER = 2.4
24
22
20
18
16
14
12
10
8
6
4
2
0
DATUM: NAVD 88

ELEVATION

SCALE 0 10 20 30 FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

TranSystems
TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-6500
C.A. 7503

DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS: | MARK | DATE | DESCRIPTION

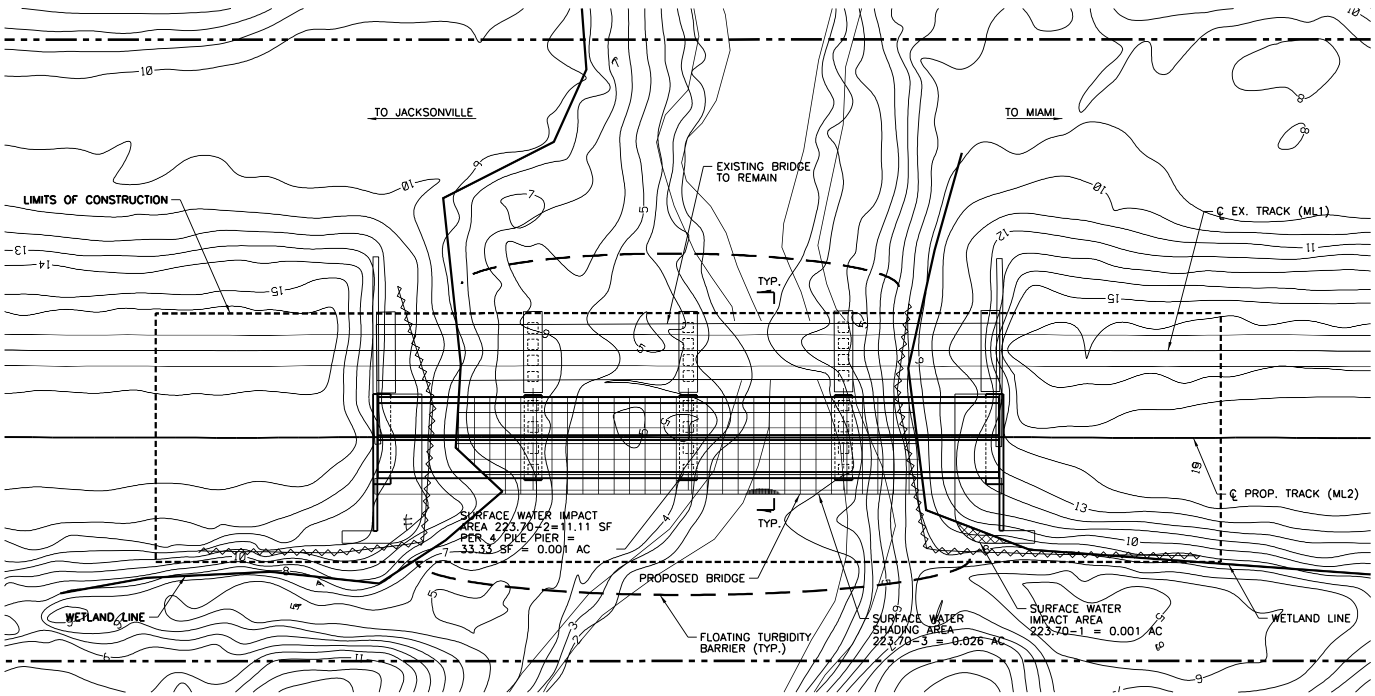
PROJ NO: 304120040_033
SCALE: AS NOTED
DATE: 4/25/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
NORTH CANAL BRIDGE 223.70 GENERAL PLAN AND ELEVATION

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

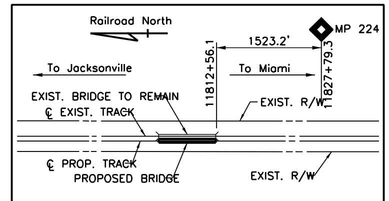
SHEET NO.
MP 223.70 (1)
SHEET 1 OF 4

mwallon 4/25/2013 2:48:44 PM G:\JA120040\Bridge\033\033-C-PP01.dgn



PLAN

0 10 20 30
SCALE FEET



LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (293.04 SF)
- BEDDING STONE (293.04 SF)
- FILL BELOW MHWL (000.00 SF)
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER IMPACTS (UNVEGETATED)	SHADING – NEW TRACK	0.026	1132.84
	FILL / RIPRAP INSTALL	0.001	44.60
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	N/A	0.000	000.00

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	106.95
SURFACE WATER / WETLAND	0.070	3048.68	000.00

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CONSULTANTS:

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FLORIDA

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REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_033
SCALE: AS NOTED
DATE: 4/25/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
NORTH CANAL BRIDGE 223.70
ENVIRONMENTAL

SHEET NO.
MP 223.70 (2)
SHEET 2 OF 4

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

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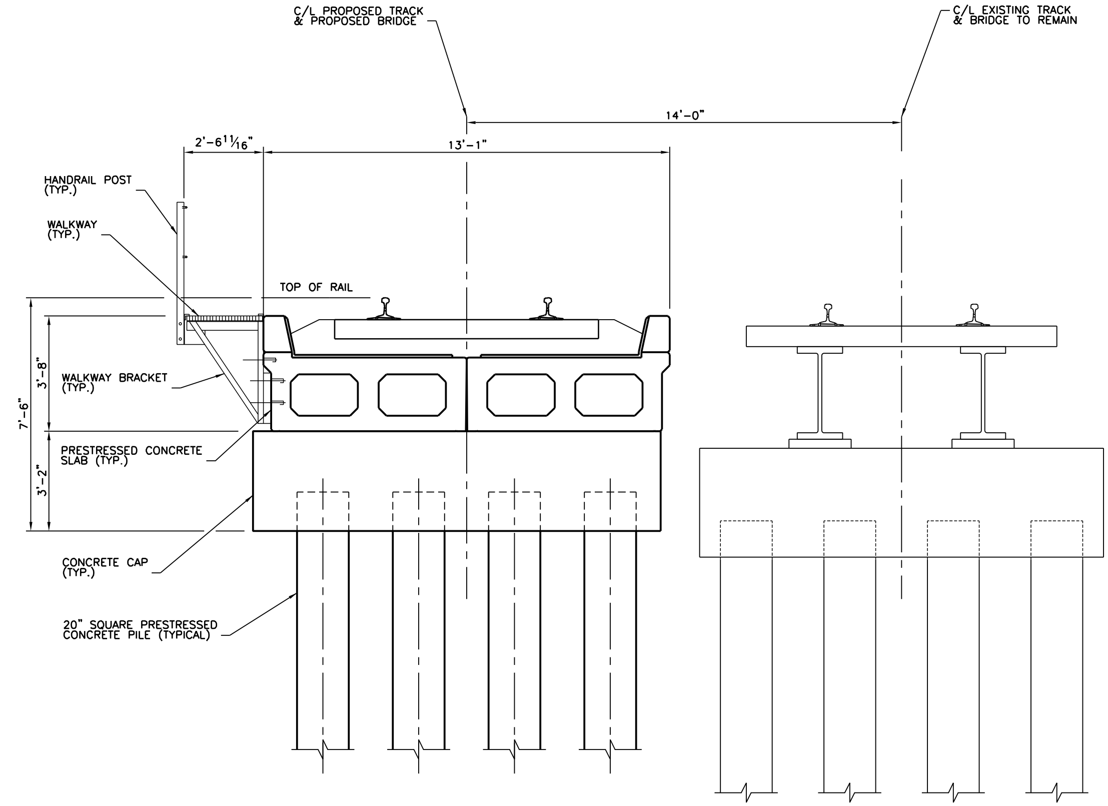

TYPICAL SECTION BRIDGE 223.70

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PASSENGER SERVICE
FLORIDA

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REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_033
SCALE: AS NOTED
DATE: 4/25/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
NORTH CANAL
BRIDGE 223.70
TYPICAL
SECTION

SHEET NO.
MP223.70 (3)
SHEET 3 OF 4

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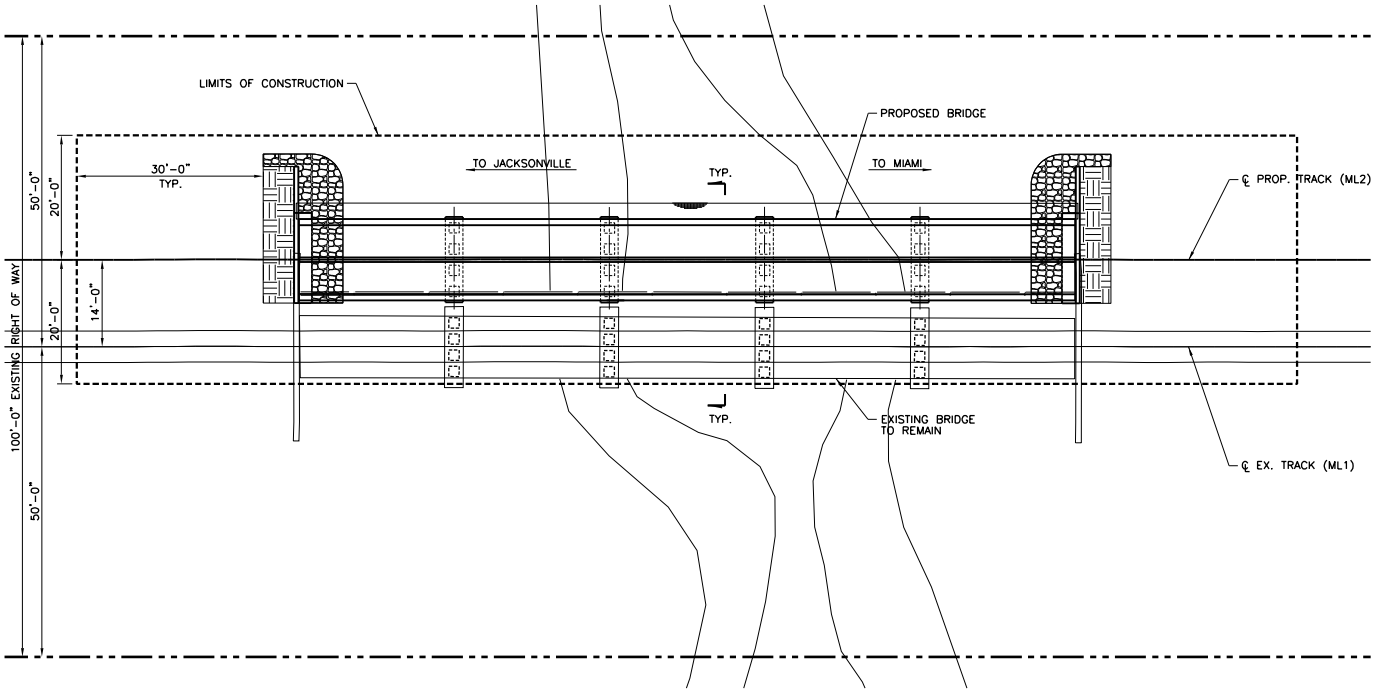
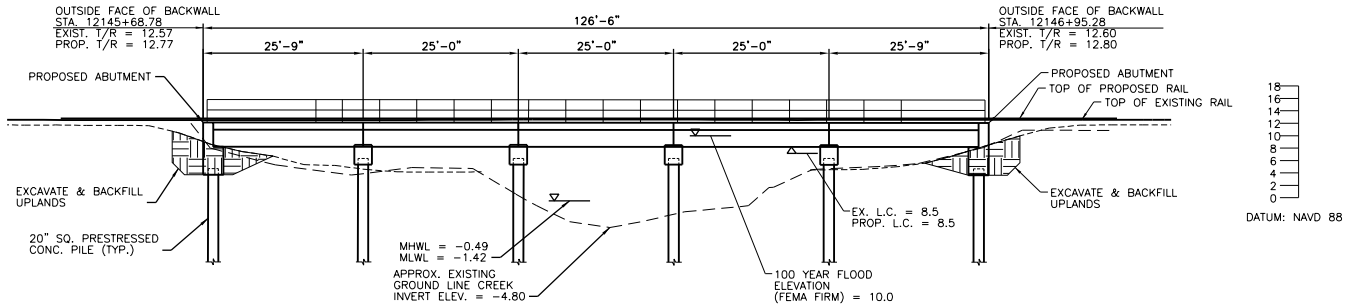


PLAN

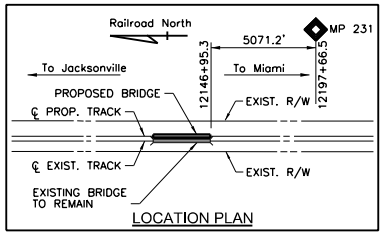
SCALE 0 10 20 30 FEET



ELEVATION

SCALE 0 10 20 30 FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 230.03 (1)	GENERAL PLAN
MP 230.03 (2)	ENVIRONMENTAL PLAN
MP 230.03 (3)	TYPICAL SECTION
MP 230.03 (4)	EXISTING PLAN

NOT FOR CONSTRUCTION PERMITTING PURPOSES ONLY

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FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_040
SCALE: AS NOTED
DATE: 2/10/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
SOUTH CANAL BRIDGE 230.03 GENERAL PLAN AND ELEVATION

SHEET NO.
MP 230.03 (1)
SHEET 1 OF 4

DJSmith
2/10/2013 - 2:27:45 PM - G:\JAX\200\MB\Bridge\MOM\C-2901.dgn

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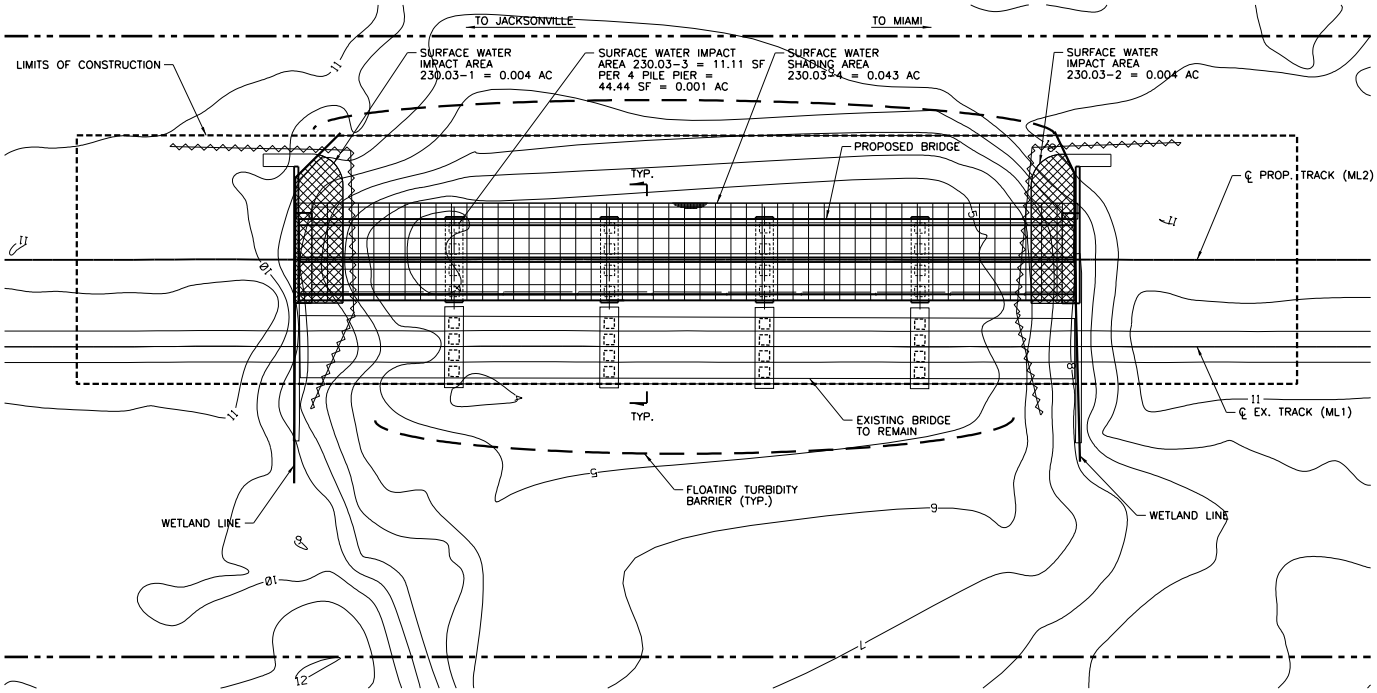
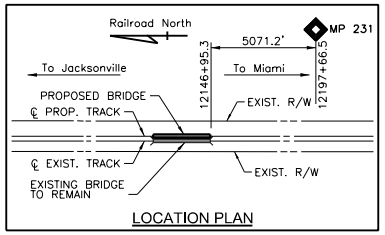


PLAN

SCALE 0 10 20 30 FEET



LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (293.00 SF)
- BEDDING STONE (293.00 SF)
- FILL BELOW MHWL (000.00 SF)
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER IMPACTS (UNVEGETATED)	SHADING – NEW TRACK	0.043	1890.48
	FILL / RIPRAP INSTALL	0.009	376.87
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	N/A	0.000	000.00

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	84.06
SURFACE WATER / WETLAND	0.115	4994.38	000.00

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FL PE 42463

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PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

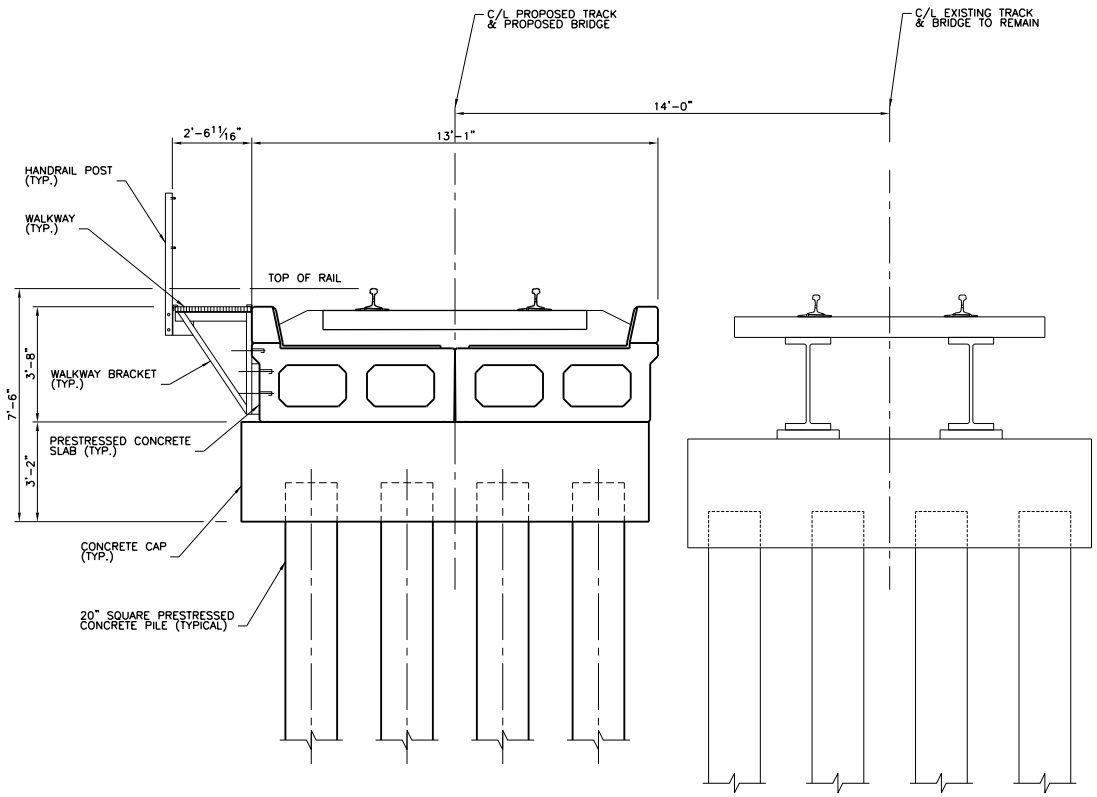
PROJ NO: 304120040_040
SCALE: AS NOTED
DATE: 2/10/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
SOUTH CANAL BRIDGE 230.03 ENVIRONMENTAL PLAN

SHEET NO.
MP 230.03 (2)

SHEET 2 OF 4

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



TYPICAL SECTION BRIDGE 230.03

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4500 SALISBURY ROAD
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PHONE: 904-245-8500
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FLORIDA

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REVISIONS:			
MARK	DATE	DESCRIPTION	

PROJ NO:	304120040_040
SCALE:	AS NOTED
DATE:	2/10/2013
DESIGNED BY:	MYC
DRAWN BY:	DJS
CHECKED BY:	DEB

SHEET TITLE:
SOUTH CANAL
BRIDGE 230.03
TYPICAL
SECTION

SHEET NO.
MP230.03 (3)
SHEET 3 OF 4

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PERMITTING PURPOSES ONLY

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

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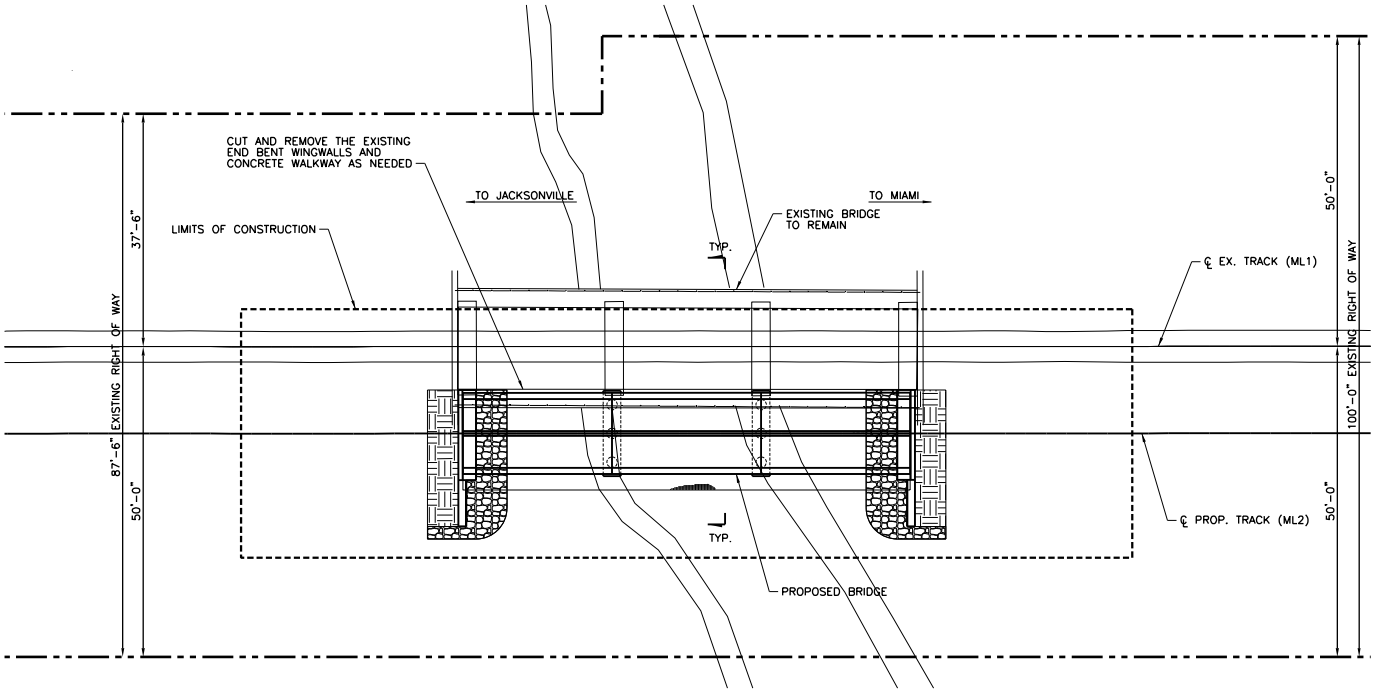
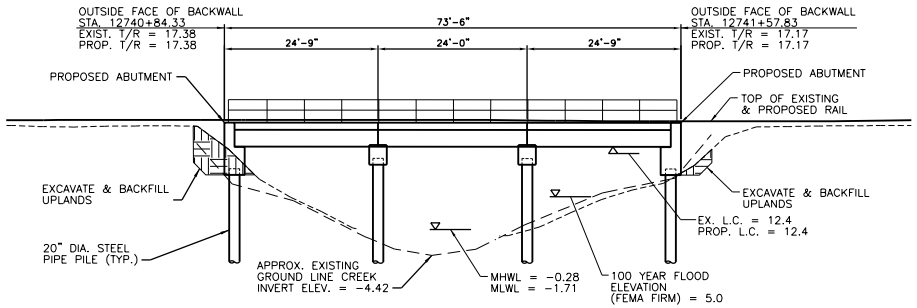


PLAN

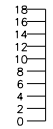
0 10 20 30
SCALE FEET



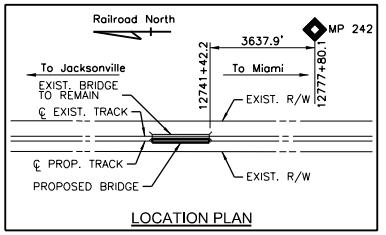
ELEVATION

0 10 20 30
SCALE FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY



DATUM: NAVD 88



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 241.27 (1)	GENERAL PLAN
MP 241.27 (2)	ENVIRONMENTAL PLAN
MP 241.27 (3)	TYPICAL SECTION
MP 241.27 (4)	EXISTING PLAN

NOT FOR CONSTRUCTION PERMITTING PURPOSES ONLY

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
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REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_046
SCALE: AS NOTED
DATE: 2/10/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
MOORES CREEK BRIDGE 241.27 GENERAL PLAN AND ELEVATION

SHEET NO.
MP 241.27 (1)
SHEET 1 OF 4

DJSmith
2/10/2013 - 2:23:39 PM - G:\JAT\300\MB\Bridge\MOMC-GP01.dgn

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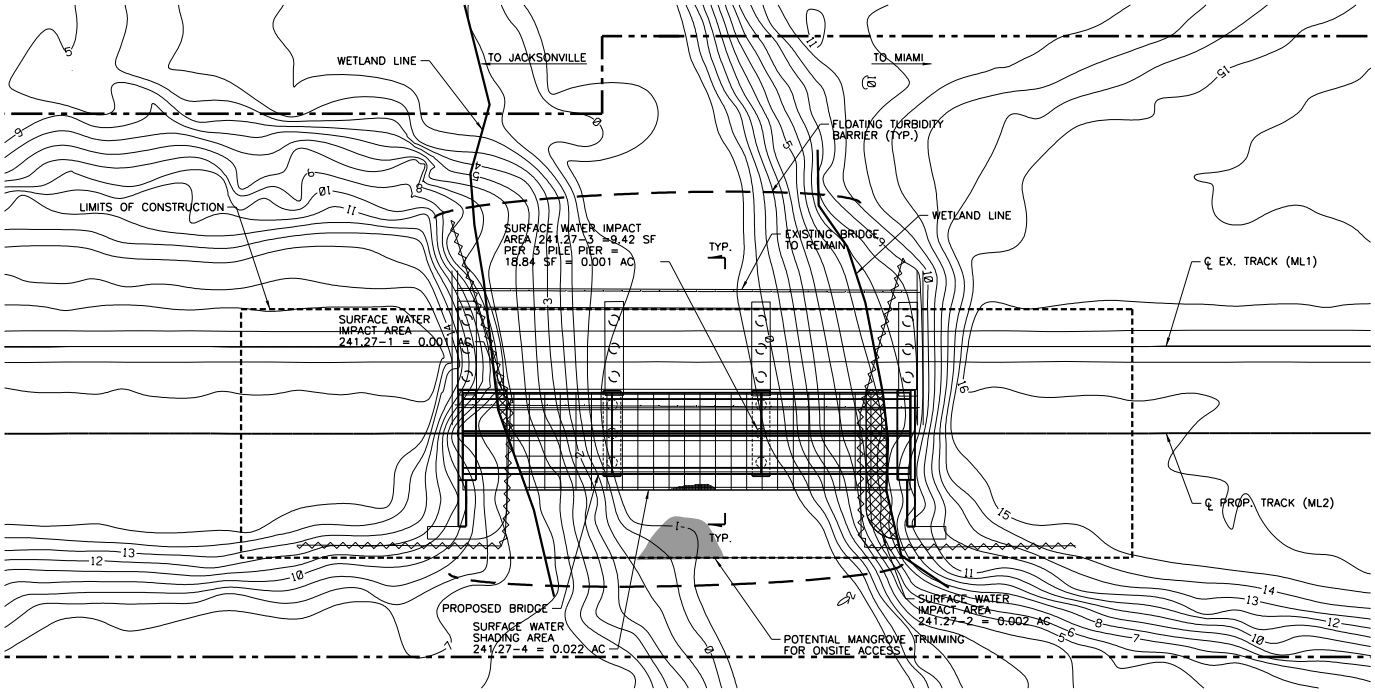
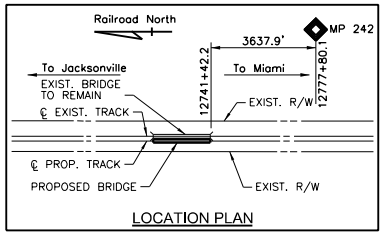


PLAN

SCALE 0 10 20 30 FEET



LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (284.33 SF)
- BEDDING STONE (284.33 SF)
- FILL BELOW MHWL (000.00 SF)
- POTENTIAL MANGROVE TRIMMING*
- MANGROVE IMPACTS
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

* THESE AREAS MAY REQUIRE MANGROVE TRIMMING FOR SITE ACCESS AS NEEDED. ALL TRIMMING WILL BE PERFORMED IN ACCORDANCE WITH FDEP GUIDELINES FOR MANGROVE TRIMMING, THEREFORE THESE ARE CONSIDERED TEMPORARY IMPACTS.

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
MANGROVE TRIMMING	LATERAL BRANCHES	0.002	68.11
MANGROVE IMPACTS	REMOVAL/FILL-RIPRAP INSTALL	0.000	000.00
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER IMPACTS (UNVEGETATED)	SHADING - NEW TRACK	0.022	948.50
	FILL / RIPRAP INSTALL	0.002	106.19
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	N/A	0.000	000.00

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	93.57
SURFACE WATER / WETLAND	0.055	2405.92	000.00

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MARK	DATE	DESCRIPTION

PROJ NO: 304120040_046
SCALE: AS NOTED
DATE: 2/10/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
MOORES CREEK BRIDGE 241.27 ENVIRONMENTAL PLAN

SHEET NO.
MP 241.27 (2)

SHEET 2 OF 4

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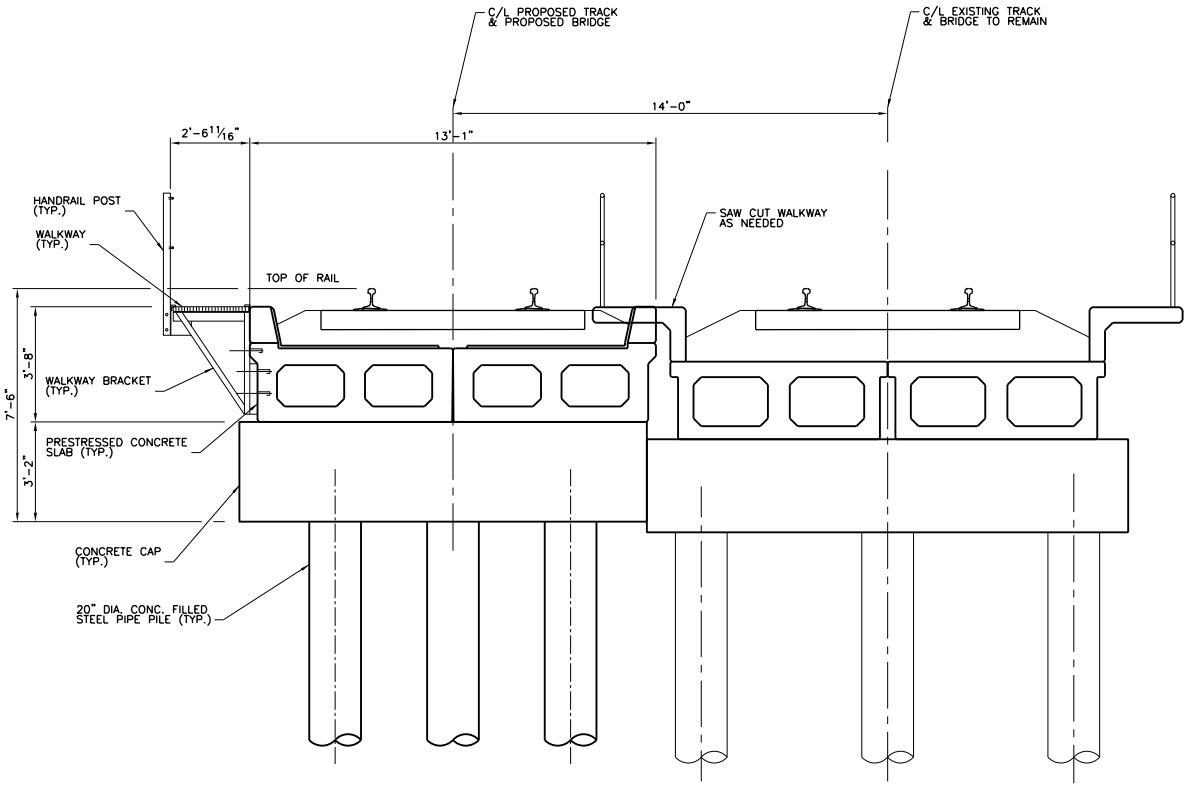

TYPICAL SECTION BRIDGE 241.27

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REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_046
SCALE: AS NOTED
DATE: 2/10/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
MOORES CREEK
BRIDGE 241.27

TYPICAL SECTION

SHEET NO.
MP241.27 (3)

SHEET 3 OF 4

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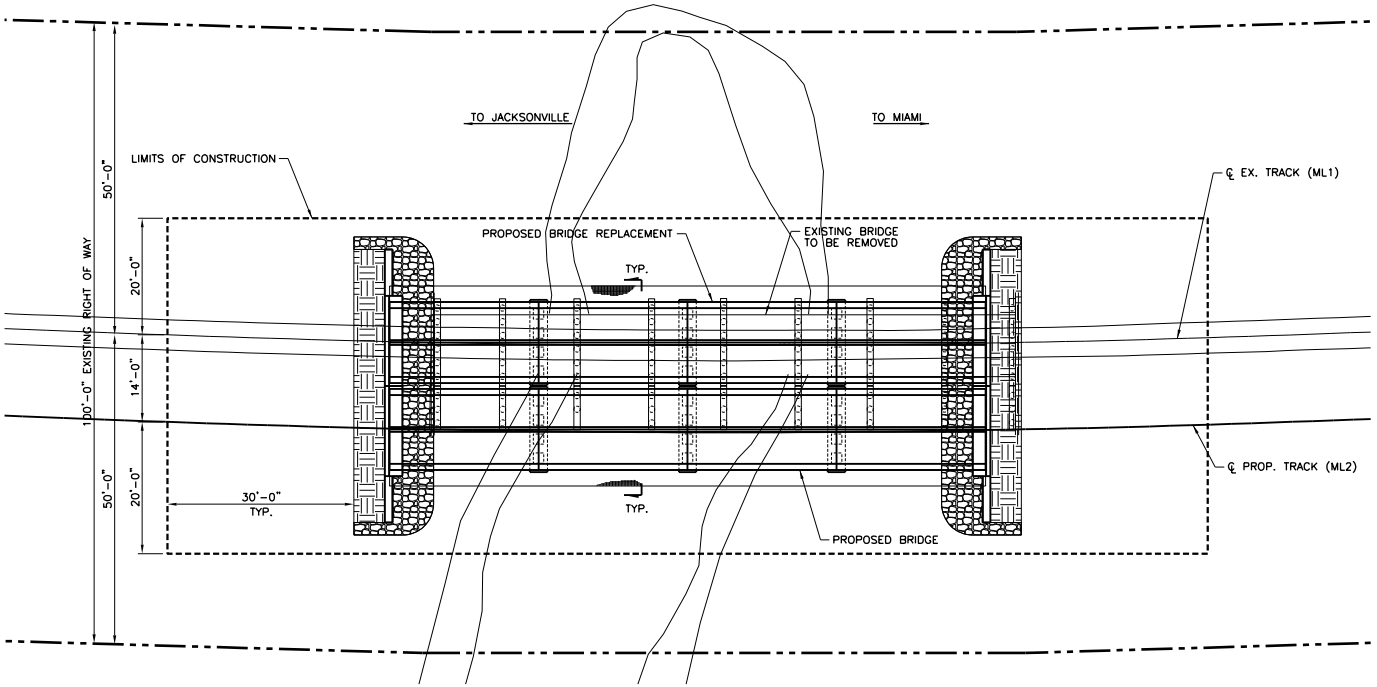
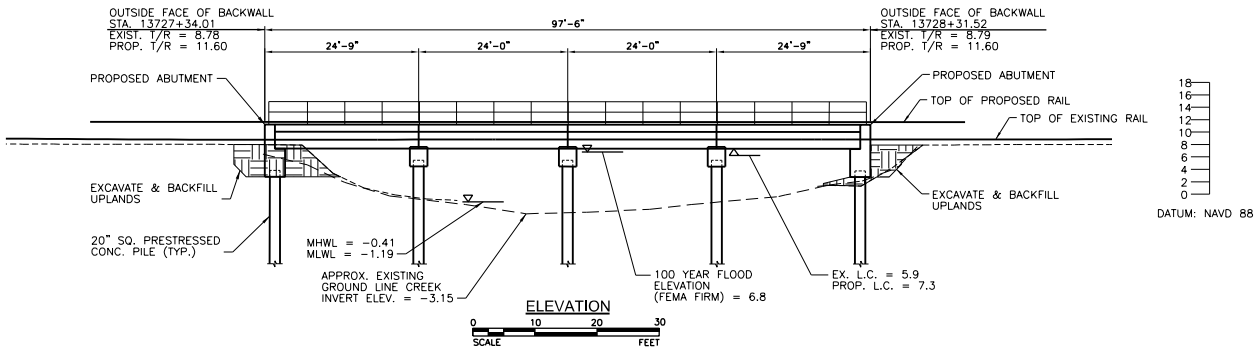
PERMITTING PURPOSES ONLY

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



PLAN

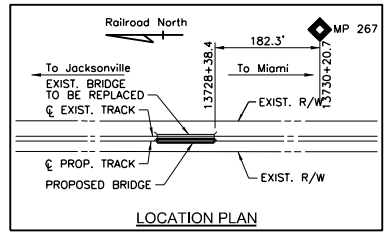
SCALE 0 10 20 30 FEET



ELEVATION

SCALE 0 10 20 30 FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 259.95 (1)	GENERAL PLAN
MP 259.95 (2)	ENVIRONMENTAL PLAN
MP 259.95 (3)	TYPICAL SECTION
MP 259.95 (4)	EXISTING PLAN

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REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO:	304120040_058
SCALE:	AS NOTED
DATE:	2/10/2013
DESIGNED BY:	MYC
DRAWN BY:	DJS
CHECKED BY:	DEB

SHEET TITLE:

UNNAMED CREEK BRIDGE 259.95 GENERAL PLAN AND ELEVATION

SHEET NO.

MP 259.95 (1)

SHEET 1 OF 4

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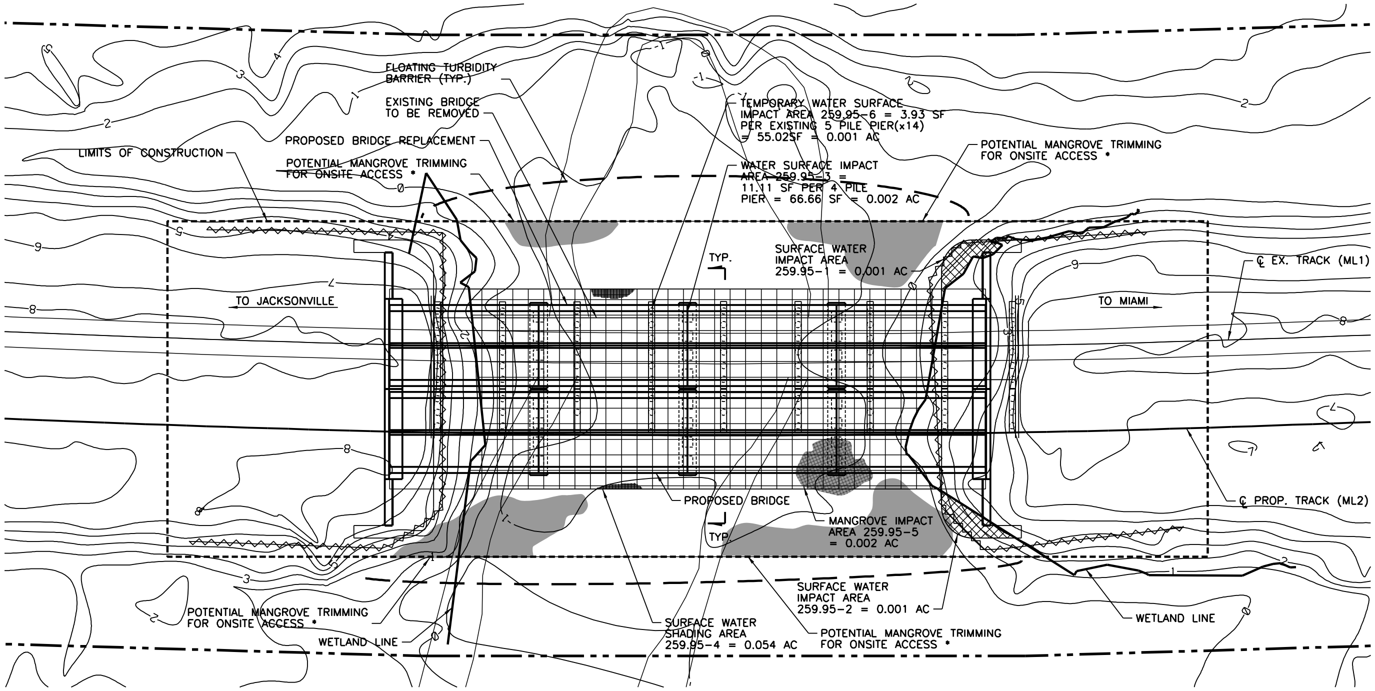
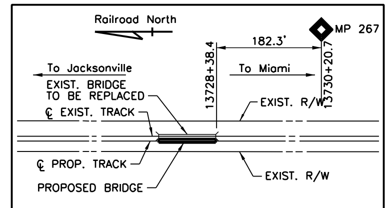
2/10/2013 - 2:16:13 PM - G:\ATE\DOM\Bridge\259\05\C-2901.dgn

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING


FLOATING TURBIDITY BARRIER (TYP.)
EXISTING BRIDGE TO BE REMOVED
PROPOSED BRIDGE REPLACEMENT
LIMITS OF CONSTRUCTION
POTENTIAL MANGROVE TRIMMING FOR ONSITE ACCESS *
TEMPORARY WATER SURFACE IMPACT AREA 259.95-6 = 3.93 SF PER EXISTING 5 PILE PIER(x14) = 55.02SF = 0.001 AC
WATER SURFACE IMPACT AREA 259.95-3 = 11.11 SF PER 4 PILE PIER = 66.66 SF = 0.002 AC
POTENTIAL MANGROVE TRIMMING FOR ONSITE ACCESS *
TYP.
SURFACE WATER IMPACT AREA 259.95-1 = 0.001 AC
℄ EX. TRACK (ML1)
TO JACKSONVILLE
TO MIAMI
PROPOSED BRIDGE
TYP.
MANGROVE IMPACT AREA 259.95-5 = 0.002 AC
℄ PROP. TRACK (ML2)
SURFACE WATER IMPACT AREA 259.95-2 = 0.001 AC
POTENTIAL MANGROVE TRIMMING FOR ONSITE ACCESS *
WETLAND LINE
SURFACE WATER SHADING AREA 259.95-4 = 0.054 AC
POTENTIAL MANGROVE TRIMMING FOR ONSITE ACCESS *
WETLAND LINE

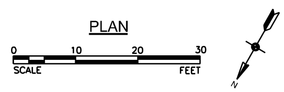


LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

PLAN



LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (568.67 SF)
- BEDDING STONE (568.67 SF)
- FILL BELOW MHWL (000.00 SF)
- POTENTIAL MANGROVE TRIMMING*
- MANGROVE IMPACTS
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

* THESE AREAS MAY REQUIRE MANGROVE TRIMMING FOR SITE ACCESS AS NEEDED. ALL TRIMMING WILL BE PERFORMED IN ACCORDANCE WITH FDEP GUIDELINES FOR MANGROVE TRIMMING, THEREFORE THESE ARE CONSIDERED TEMPORARY IMPACTS.

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
MANGROVE TRIMMING	LATERAL BRANCHES	0.015	657.74
MANGROVE IMPACTS	REMOVAL/FILL–RIPRAP INSTALL	0.002	79.30
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER	SHADING – NEW TRACK	0.054	2335.35
IMPACTS (UNVEGETATED)	FILL / RIPRAP INSTALL	0.003	141.98
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	N/A	0.001	55.02

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	125.05
SURFACE WATER / WETLAND	0.096	4203.30	000.00

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TranSystems CORPORATION
4500 SALISBURY ROAD
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DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:		
MARK	DATE	DESCRIPTION

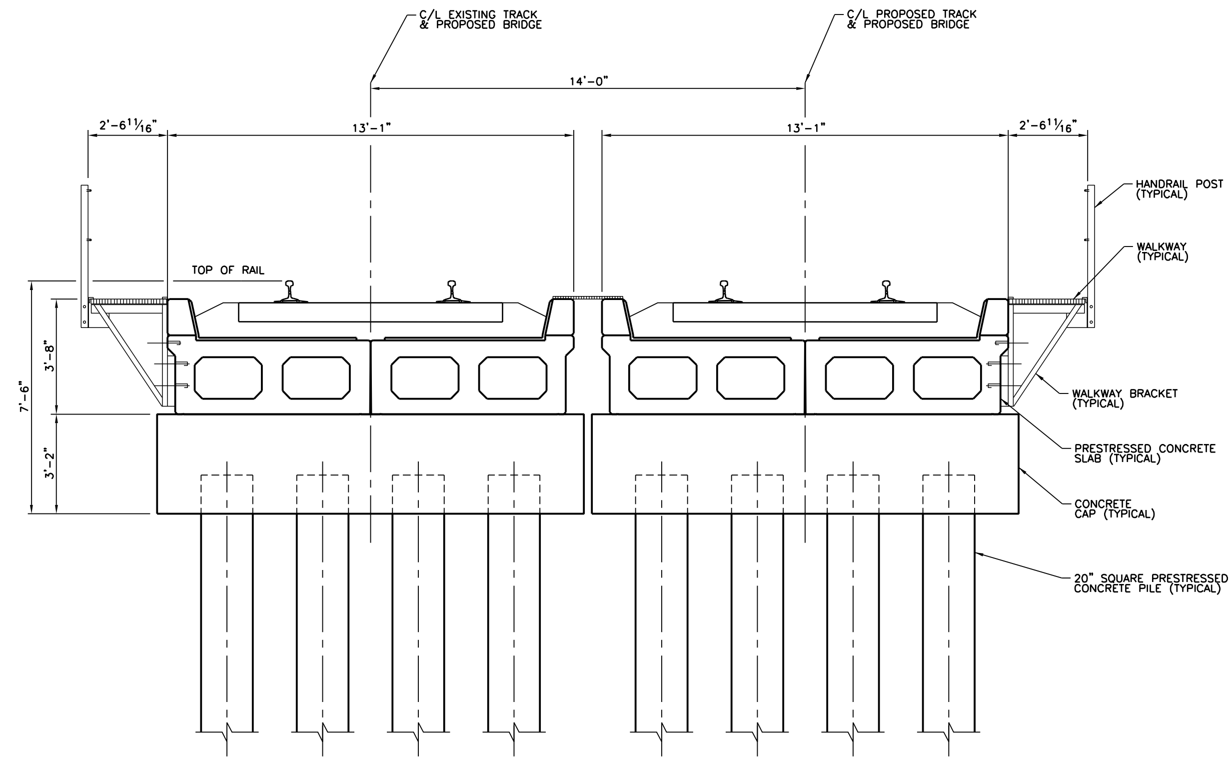
PROJ NO: 304120040_058
SCALE: AS NOTED
DATE: 2/10/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
UNNAMED CREEK BRIDGE 259.95 ENVIRONMENTAL PLAN

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

SHEET NO.
MP 259.95 (2)
SHEET 2 OF 4

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



TYPICAL SECTION BRIDGE 259.95

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-6500
C.A. 7503

DANIEL E. BAKER
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AAF MIAMI TO ORLANDO
PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:		
MARK	DATE	DESCRIPTION

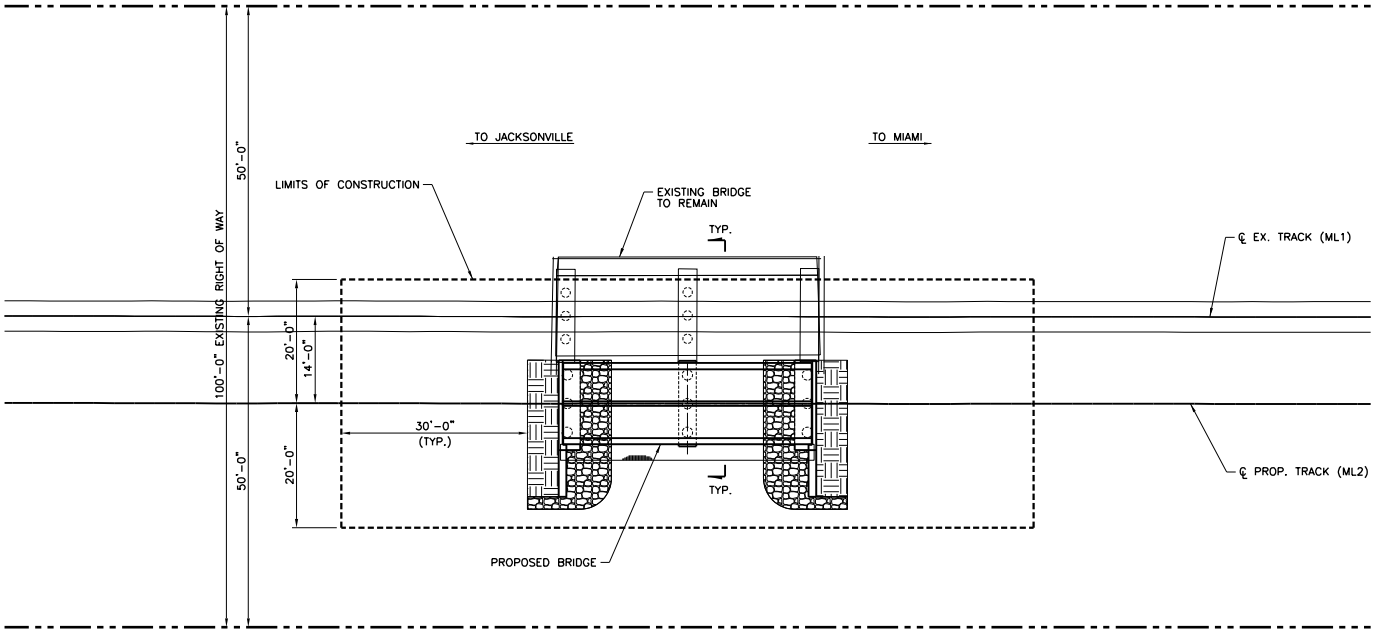
PROJ NO: 304120040_058
SCALE: AS NOTED
DATE: 2/10/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: RAP

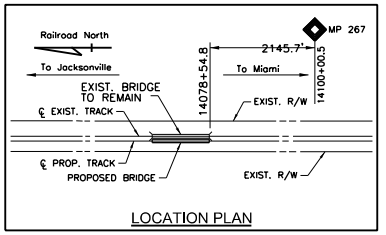
SHEET TITLE:
UNNAMED CREEK BRIDGE 259.95 TYPICAL SECTION

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

SHEET NO.
MP259.95 (3)
SHEET 3 OF 4

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING





LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

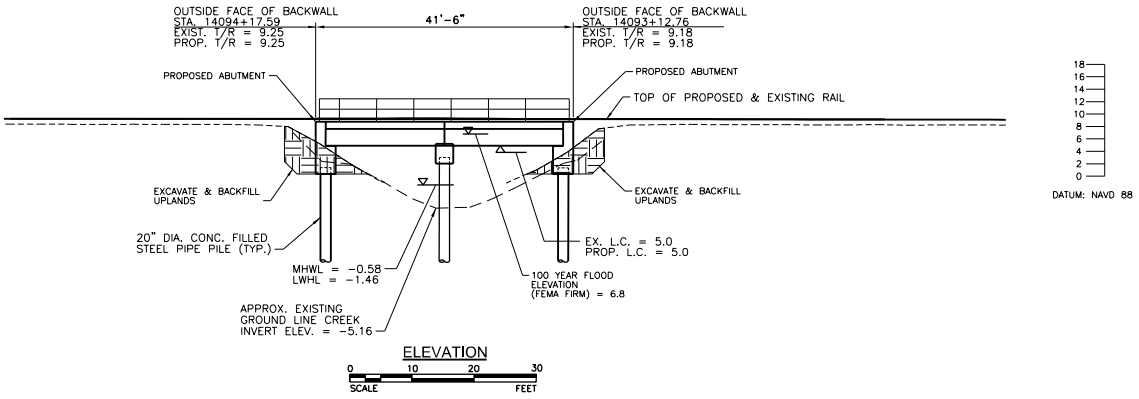
1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 266.58 (1)	GENERAL PLAN
MP 266.58 (2)	ENVIRONMENTAL PLAN
MP 266.58 (3)	TYPICAL SECTION
MP 266.58 (4)	EXISTING PLAN

PLAN

0 10 20 30
SCALE FEET



ELEVATION

0 10 20 30
SCALE FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY

NOT FOR CONSTRUCTION PERMITTING PURPOSES ONLY

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
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PHONE: 904-245-6500
C.A. 7503

DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO
PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO:	304120040_063
SCALE:	AS NOTED
DATE:	2/9/2013
DESIGNED BY:	MYC
DRAWN BY:	DJS
CHECKED BY:	DEB

SHEET TITLE:

UNNAMED TRIB. BRIDGE 266.58 GENERAL PLAN AND ELEVATION

SHEET NO.
MP 266.58 (1)

SHEET 1 OF 4

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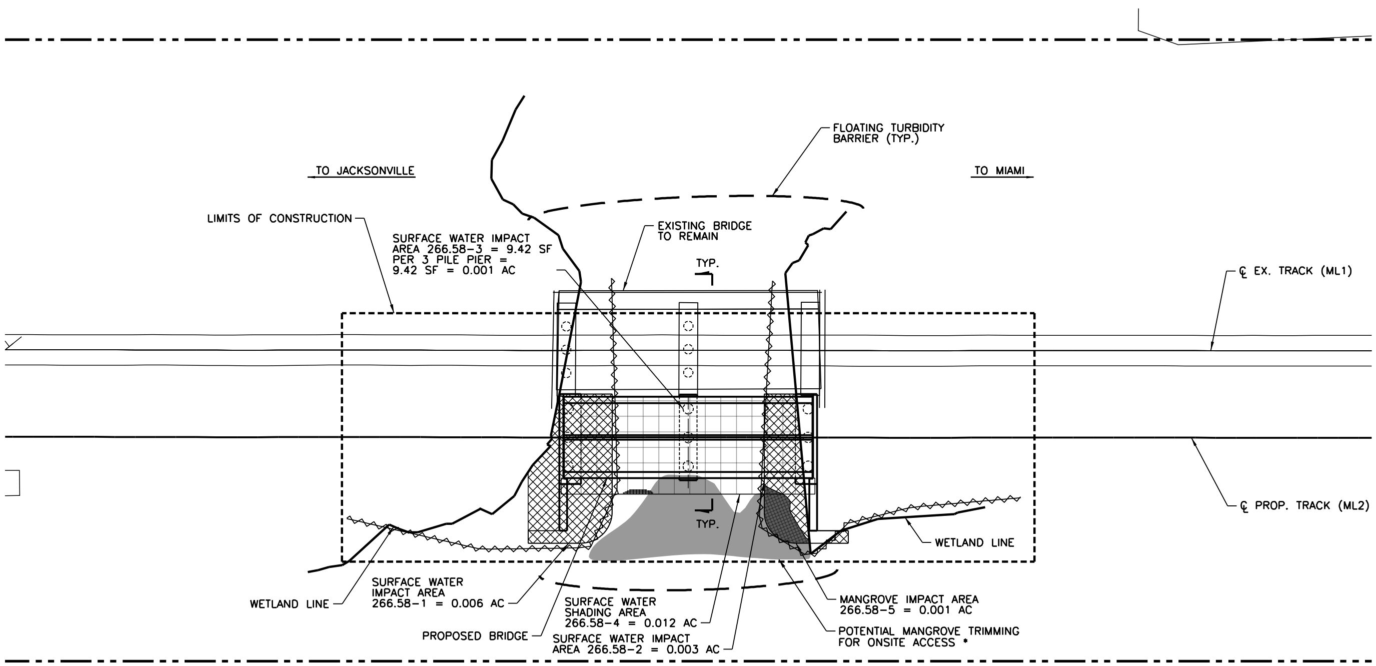
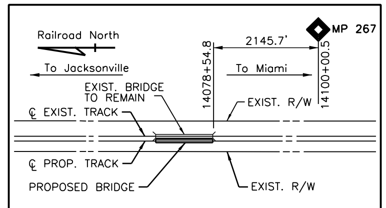
IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



PLAN

SCALE 0 10 20 30 FEET



LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (296.88 SF)
- BEDDING STONE (296.88 SF)
- FILL BELOW MHWL (000.00 SF)
- POTENTIAL MANGROVE TRIMMING*
- MANGROVE IMPACTS
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

* THESE AREAS MAY REQUIRE MANGROVE TRIMMING FOR SITE ACCESS AS NEEDED. ALL TRIMMING WILL BE PERFORMED IN ACCORDANCE WITH FDEP GUIDELINES FOR MANGROVE TRIMMING, THEREFORE THESE ARE CONSIDERED TEMPORARY IMPACTS.

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
MANGROVE TRIMMING	LATERAL BRANCHES	0.007	282.63
MANGROVE IMPACTS	REMOVAL/FILL–RIPRAP INSTALL	0.001	36.61
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER	SHADING – NEW TRACK	0.012	539.64
IMPACTS (UNVEGETATED)	FILL / RIPRAP INSTALL	0.009	392.99
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	N/A	0.000	000.00

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	83.45
SURFACE WATER / WETLAND	0.047	2061.87	000.00

TRANSYSTEMS CORPORATION
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FL PE 42463

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FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_063
SCALE: AS NOTED
DATE: 2/9/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
UNNAMED TRIB. BRIDGE 266.58 ENVIRONMENTAL PLAN

NOT FOR CONSTRUCTION
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SHEET NO.
MP 266.58 (2)
SHEET 2 OF 4

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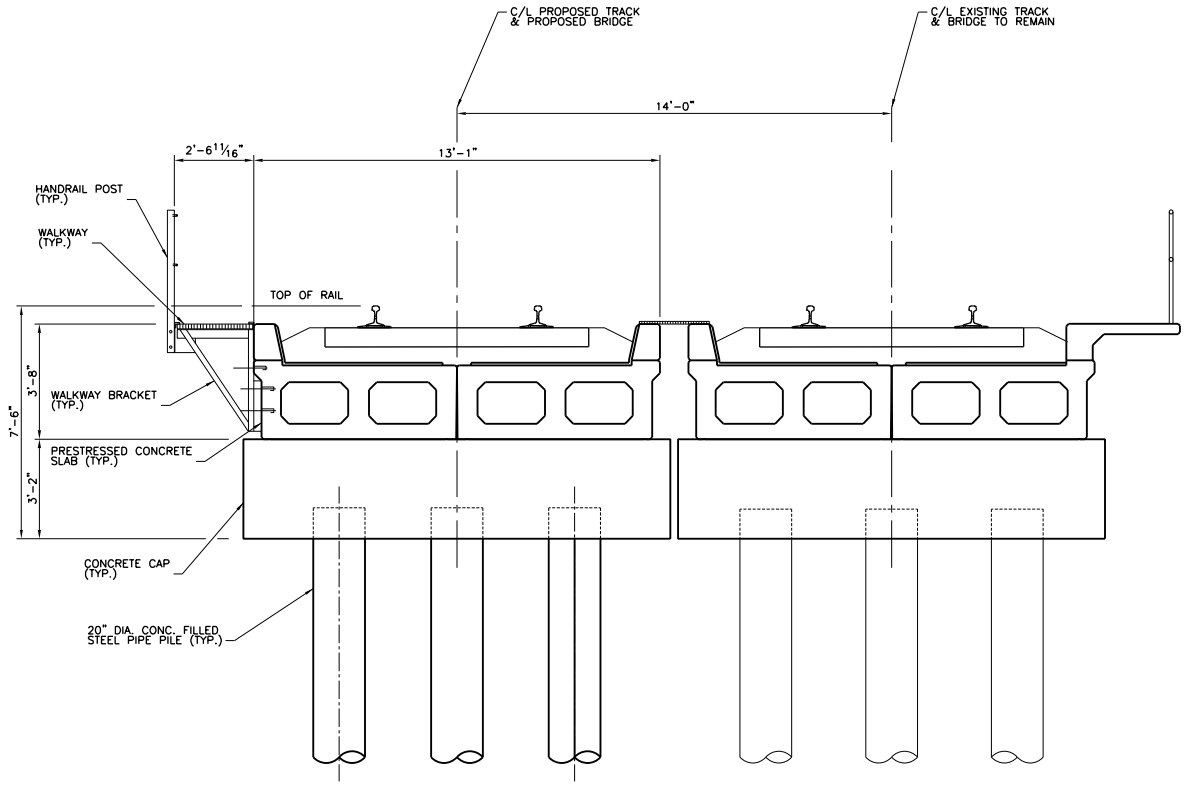
IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



TYPICAL SECTION BRIDGE 266.58

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-8500
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MARK	DATE	DESCRIPTION	

PROJ NO:	304120040_063
SCALE:	AS NOTED
DATE:	2/9/2013
DESIGNED BY:	MYC
DRAWN BY:	DJS
CHECKED BY:	DEB

SHEET TITLE:
UNNAMED
TRIBUTARY
BRIDGE 266.58
TYPICAL SECTION

SHEET NO.
MP266.58 (3)
SHEET 3 OF 4

NOT FOR CONSTRUCTION
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IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

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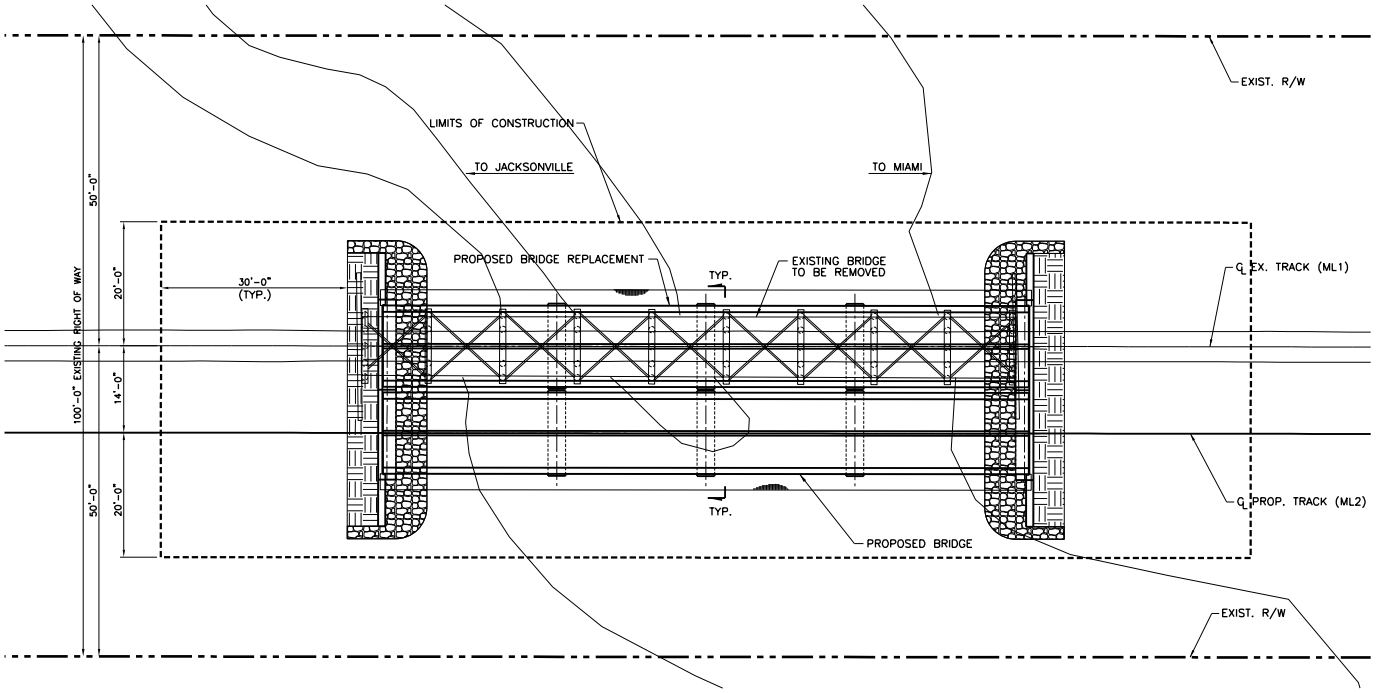
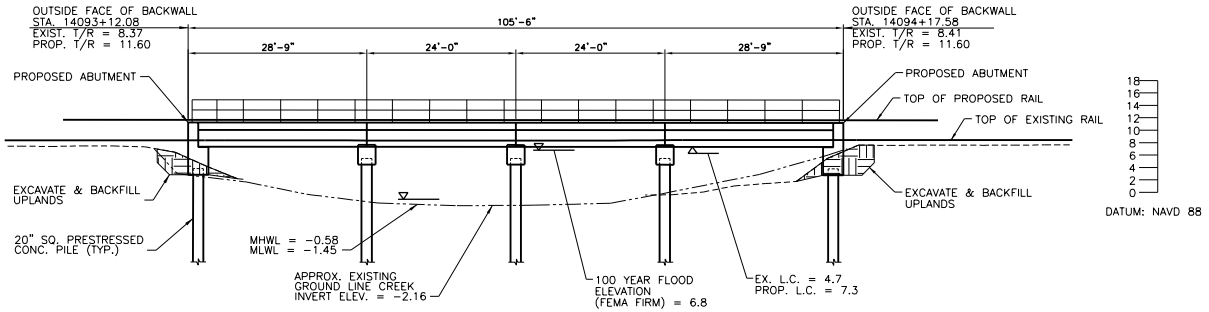


PLAN

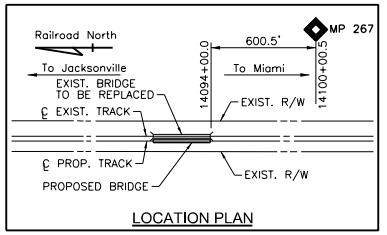
SCALE 0 10 20 30 FEET



ELEVATION

SCALE 0 10 20 30 FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 266.86 (1)	GENERAL PLAN
MP 266.86 (2)	ENVIRONMENTAL PLAN
MP 266.86 (3)	TYPICAL SECTION

NOT FOR CONSTRUCTION PERMITTING PURPOSES ONLY

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
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AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_064
SCALE: AS NOTED
DATE: 2/9/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
UNNAMED TRIB. BRIDGE 266.86 GENERAL PLAN AND ELEVATION

SHEET NO.
MP 266.86 (1)

SHEET 1 OF 4

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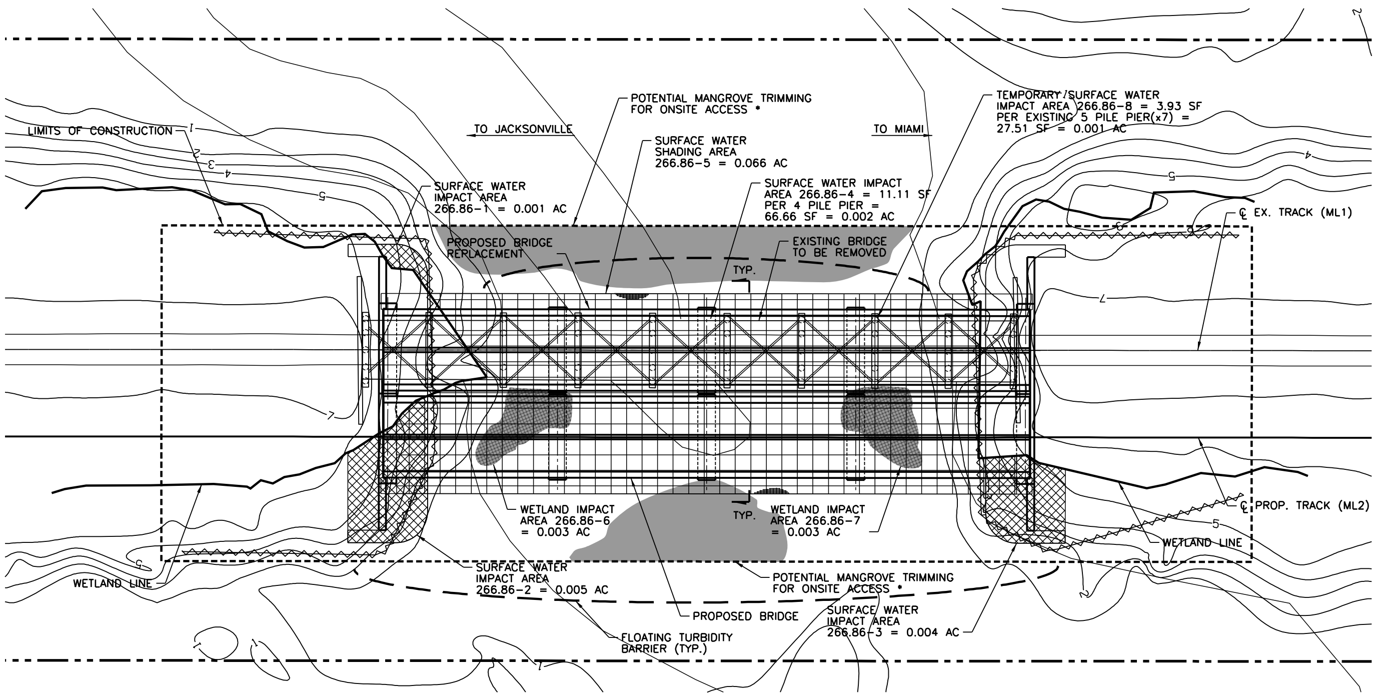
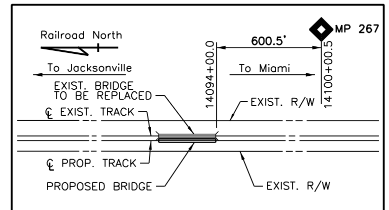

LIMITS OF CONSTRUCTION
TO JACKSONVILLE
TO MIAMI
POTENTIAL MANGROVE TRIMMING FOR ONSITE ACCESS *
SURFACE WATER SHADING AREA 266.86-5 = 0.066 AC
TEMPORARY/SURFACE WATER IMPACT AREA 266.86-8 = 3.93 SF PER EXISTING 5 PILE PIER(x7) = 27.51 SF = 0.001 AC
SURFACE WATER IMPACT AREA 266.86-1 = 0.001 AC
SURFACE WATER IMPACT AREA 266.86-4 = 11.11 SF PER 4 PILE PIER = 66.66 SF = 0.002 AC
PROPOSED BRIDGE REPLACEMENT
EXISTING BRIDGE TO BE REMOVED
TYP.
℄ EX. TRACK (ML1)
WETLAND IMPACT AREA 266.86-6 = 0.003 AC
WETLAND IMPACT AREA 266.86-7 = 0.003 AC
℄ PROP. TRACK (ML2)
WETLAND LINE
SURFACE WATER IMPACT AREA 266.86-2 = 0.005 AC
POTENTIAL MANGROVE TRIMMING FOR ONSITE ACCESS *
PROPOSED BRIDGE
SURFACE WATER IMPACT AREA 266.86-3 = 0.004 AC
FLOATING TURBIDITY BARRIER (TYP.)

PLAN



LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (570.98 SF)
- BEDDING STONE (570.98 SF)
- FILL BELOW MHWL (000.00 SF)
- POTENTIAL MANGROVE TRIMMING*
- WETLAND IMPACTS
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

* THESE AREAS MAY REQUIRE MANGROVE TRIMMING FOR SITE ACCESS AS NEEDED. ALL TRIMMING WILL BE PERFORMED IN ACCORDANCE WITH FDEP GUIDELINES FOR MANGROVE TRIMMING, THEREFORE THESE ARE CONSIDERED TEMPORARY IMPACTS.

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
MANGROVE TRIMMING	LATERAL BRANCHES	0.021	933.02
WETLAND IMPACTS	REMOVAL/FILL–RIPRAP INSTALL	0.005	226.81
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER IMPACTS (UNVEGETATED)	SHADING – NEW TRACK	0.066	2886.93
	FILL / RIPRAP INSTALL	0.011	496.05
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	EXISTING PILE REMOVAL	0.001	27.51

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	127.39
SURFACE WATER / WETLAND	0.141	6130.10	000.00

TRANSYSTEMS CORPORATION
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FL PE 42463

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

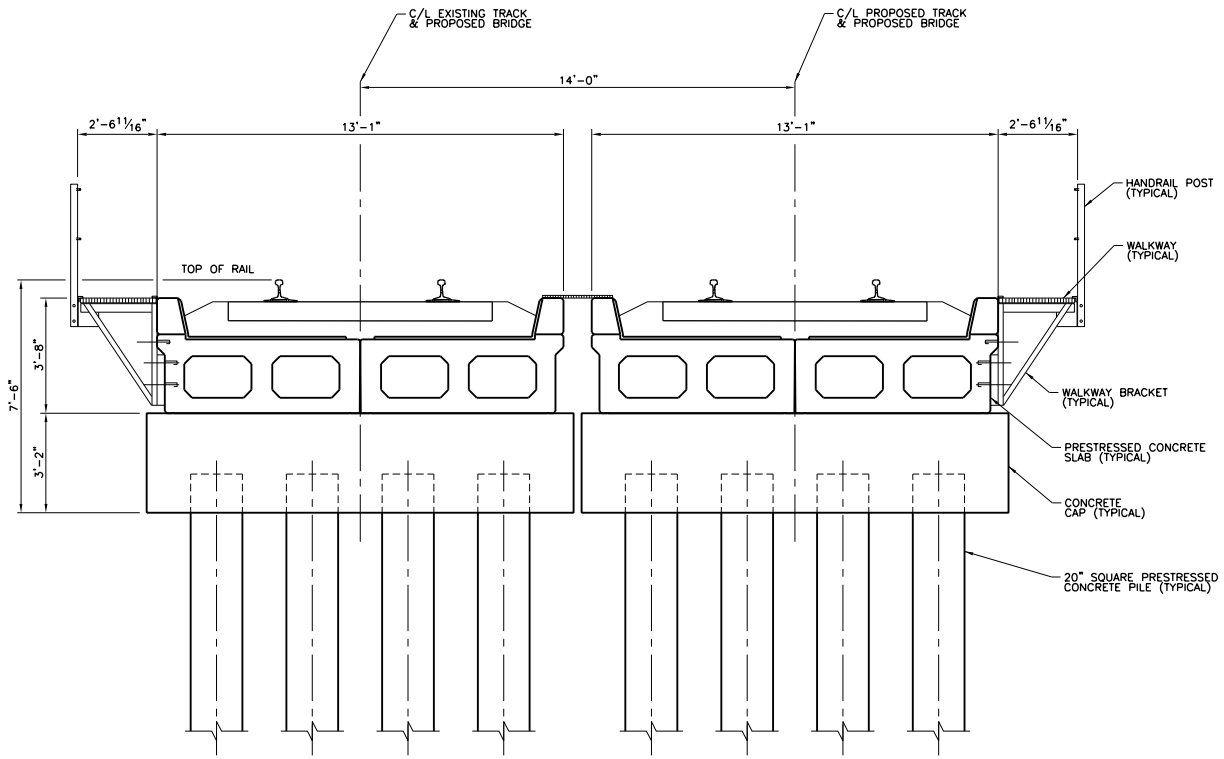
MARK	DATE	DESCRIPTION

PROJ NO: 304120040_064
SCALE: AS NOTED
DATE: 2/9/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
UNNAMED TRIB. BRIDGE 266.86 ENVIRONMENTAL PLAN

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

SHEET NO.
MP 266.86 (2)
SHEET 2 OF 3



TYPICAL SECTION BRIDGE 266.86

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
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PHONE: 904-245-8500
C.A. 7503

DANIEL F. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO
PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_064
SCALE: AS NOTED
DATE: 2/9/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
UNNAMED
TRIBUTARY
BRIDGE 266.86
TYPICAL SECTION

SHEET NO.
MP266.86 (3)

SHEET 3 OF 3

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PERMITTING PURPOSES ONLY

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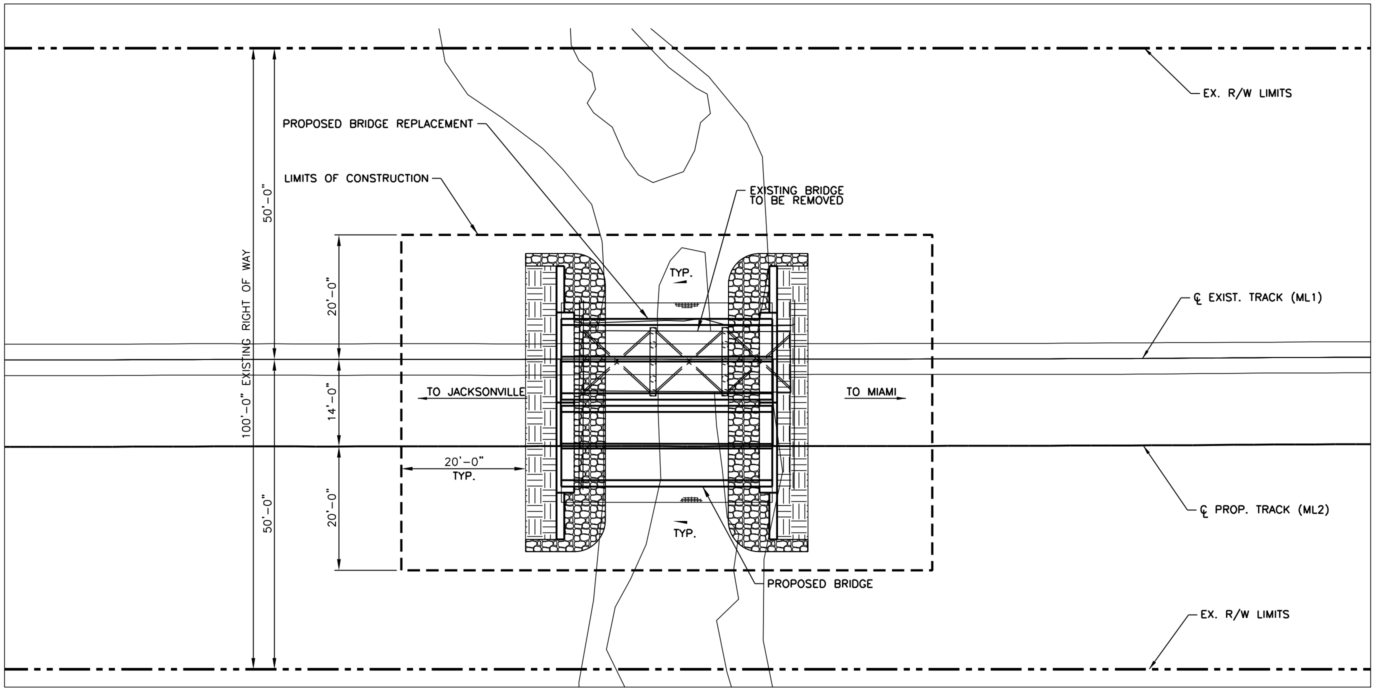
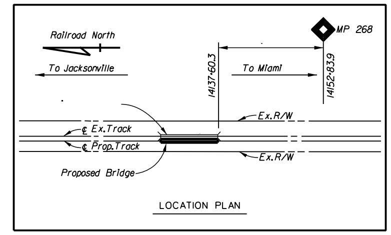


PLAN

0 10 20 30
SCALE FEET



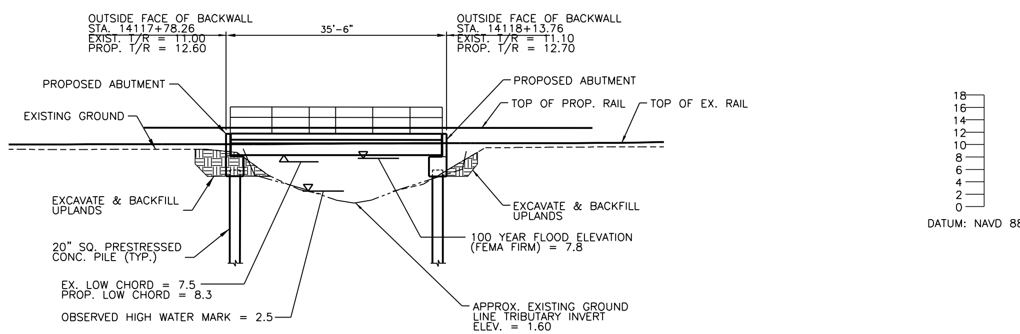
LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. *Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.*
2. *Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 - Concrete Structures.*
3. *All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.*

LIST OF DRAWINGS	
SHEET	DESCRIPTION
MP 267.34(1)	*General Plan*
MP 267.34(2)	*Environmental Plan*
MP 267.34(3)	*Typical Section*


OUTSIDE FACE OF BACKWALL
STA. 14117+78.26
EXIST. T/R = 11.00
PROP. T/R = 12.60
35'-6"
OUTSIDE FACE OF BACKWALL
STA. 14118+13.76
EXIST. T/R = 11.10
PROP. T/R = 12.70
PROPOSED ABUTMENT
PROPOSED ABUTMENT
EXISTING GROUND
TOP OF PROP. RAIL
TOP OF EX. RAIL
EXCAVATE & BACKFILL UPLANDS
EXCAVATE & BACKFILL UPLANDS
20" SQ. PRESTRESSED CONC. PILE (TYP.)
100 YEAR FLOOD ELEVATION (FEMA FIRM) = 7.8
EX. LOW CHORD = 7.5
PROP. LOW CHORD = 8.3
OBSERVED HIGH WATER MARK = 2.5
APPROX. EXISTING GROUND LINE TRIBUTARY INVERT ELEV. = 1.60
18
16
14
12
10
8
6
4
2
0
DATUM: NAVD 88

ELEVATION

0 10 20 30
SCALE FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

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PHONE: 904-245-6500
C.A. 7503

DANIEL E. BAKER
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FLORIDA

ALL ABOARD FLORIDA

REVISIONS:		
MARK	DATE	DESCRIPTION

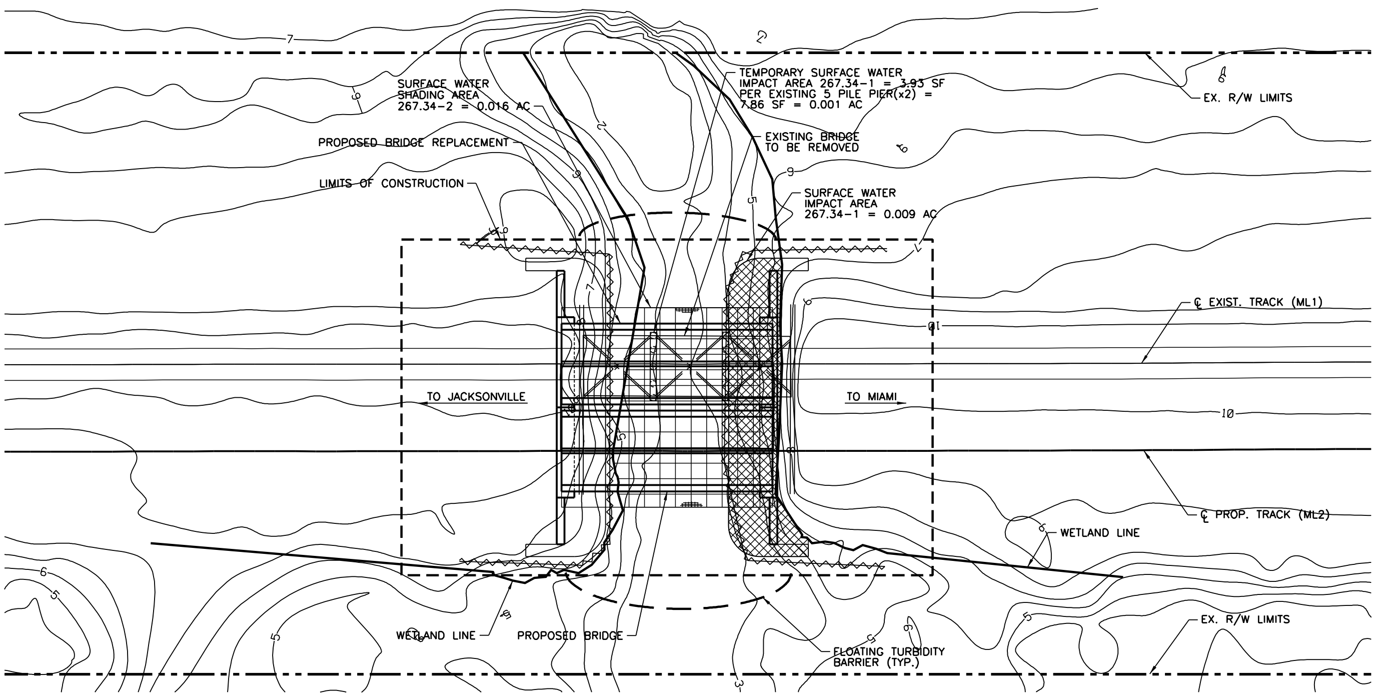
PROJ NO: P304120040_066
SCALE: AS NOTED
DATE: 2/9/2013
DESIGNED BY: MYC
DRAWN BY: PKC
CHECKED BY: DEB

SHEET TITLE:
MANATEE TRIB. BRIDGE 267.34 GENERAL PLAN AND ELEVATION

SHEET NO.
MP 267.34 (1)
SHEET 1 OF 3

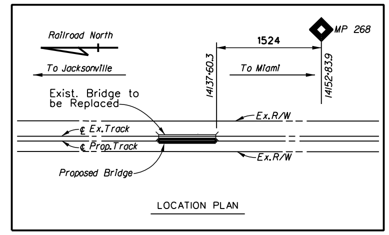
IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

DJSmith
2/9/2013



PLAN

0 10 20 30 SCALE FEET



LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (568.51 SF)
- BEDDING STONE (568.51 SF)
- FILL BELOW MHWL (000.00 SF)
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER IMPACTS (UNVEGETATED)	SHADING – NEW TRACK	0.016	707.66
	FILL / RIPRAP INSTALL	0.009	409.97
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	N/A	0.001	7.86

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	113.05
SURFACE WATER / WETLAND	0.034	1490.36	000.00

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REVISIONS: MARK	DATE	DESCRIPTION

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SCALE: AS NOTED
DATE: 2/9/2013
DESIGNED BY: MYC
DRAWN BY: PKC
CHECKED BY: DEB

SHEET TITLE:
MANATEE TRIB. BRIDGE 267.34 ENVIRONMENTAL PLAN

SHEET NO.
MP 267.34 (2)
SHEET 2 OF 3

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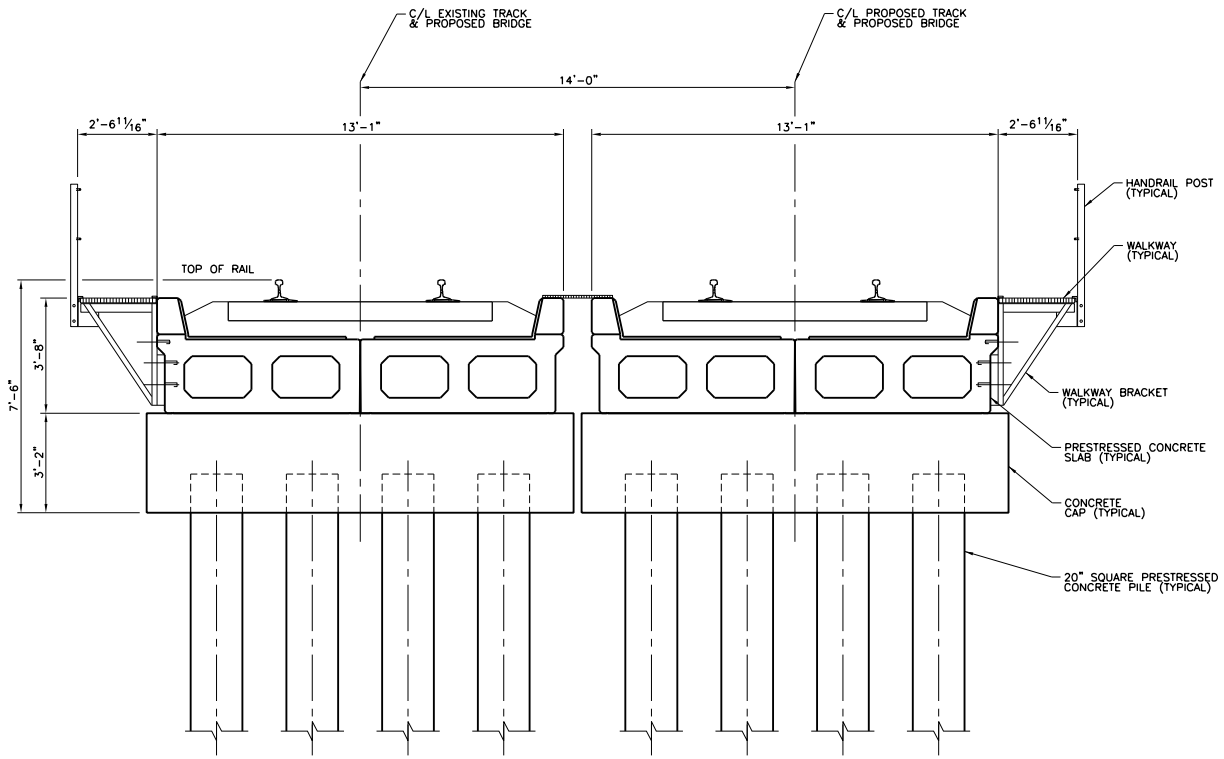
DJSmith 2/9/2013



TYPICAL SECTION BRIDGE 267.34

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REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_066
SCALE: AS NOTED
DATE: 2/9/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
MANATEE
TRIBUTARY
BRIDGE 267.34
TYPICAL SECTION

SHEET NO.
MP267.34 (3)
SHEET 3 OF 3

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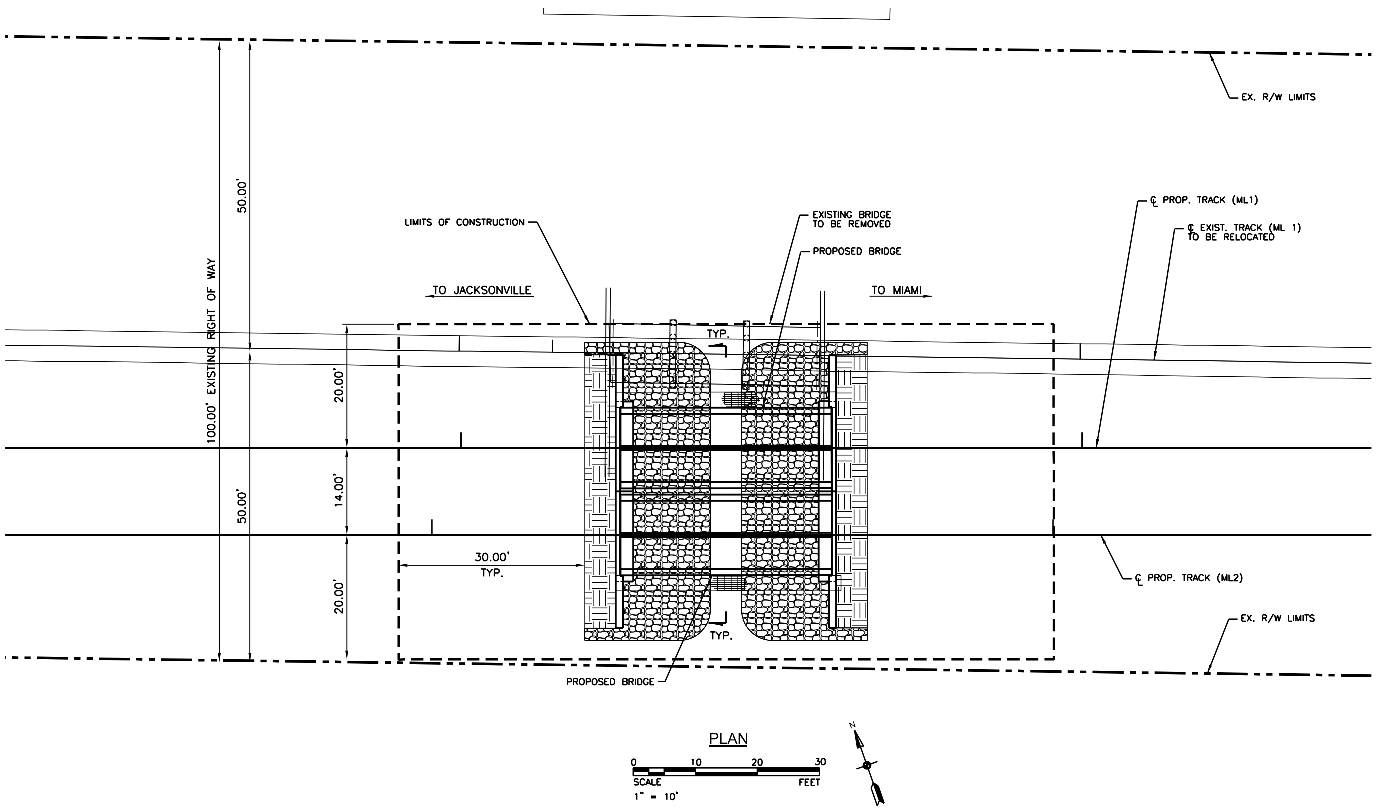
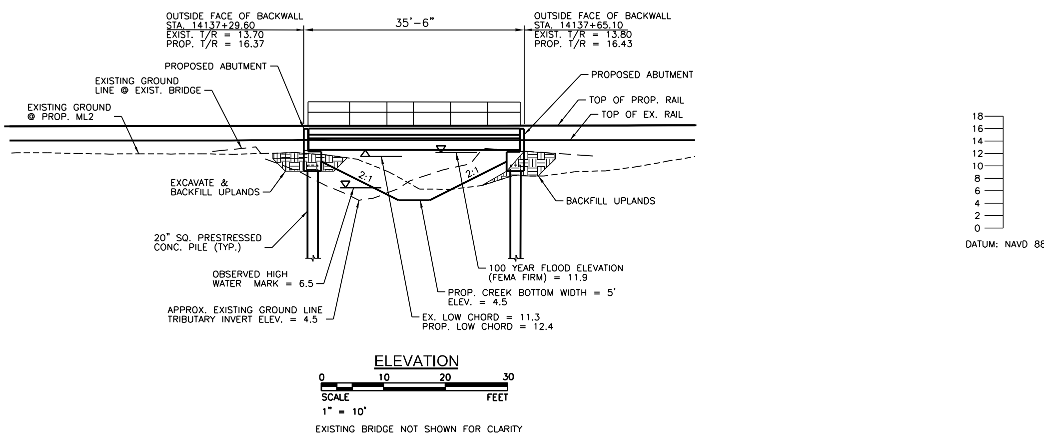
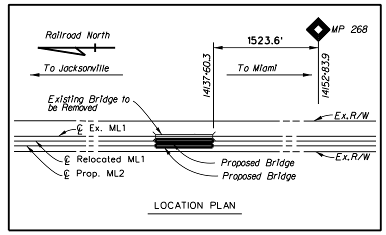


EX. R/W LIMITS
LIMITS OF CONSTRUCTION
EXISTING BRIDGE TO BE REMOVED
PROPOSED BRIDGE
℄ PROP. TRACK (ML1)
℄ EXIST. TRACK (ML 1) TO BE RELOCATED
TO JACKSONVILLE
TO MIAMI
TYP.
50.00'
100.00' EXISTING RIGHT OF WAY
20.00'
14.00'
50.00'
30.00' TYP.
20.00'
℄ PROP. TRACK (ML2)
EX. R/W LIMITS
TYP.
PROPOSED BRIDGE
PLAN
0 10 20 30
SCALE FEET
1" = 10'
N



OUTSIDE FACE OF BACKWALL
STA. 14137+29.60
EXIST. T/R = 13.70
PROP. T/R = 16.37
35'-6"
OUTSIDE FACE OF BACKWALL
STA. 14137+65.10
EXIST. T/R = 13.80
PROP. T/R = 16.43
PROPOSED ABUTMENT
EXISTING GROUND LINE @ EXIST. BRIDGE
EXISTING GROUND @ PROP. ML2
PROPOSED ABUTMENT
TOP OF PROP. RAIL
TOP OF EX. RAIL
2:1
2:1
EXCAVATE & BACKFILL UPLANDS
BACKFILL UPLANDS
20" SQ. PRESTRESSED CONC. PILE (TYP.)
OBSERVED HIGH WATER MARK = 6.5
100 YEAR FLOOD ELEVATION (FEMA FIRM) = 11.9
PROP. CREEK BOTTOM WIDTH = 5' ELEV. = 4.5
APPROX. EXISTING GROUND LINE TRIBUTARY INVERT ELEV. = 4.5
EX. LOW CHORD = 11.3
PROP. LOW CHORD = 12.4
18
16
14
12
10
8
6
4
2
0
DATUM: NAVD 88
ELEVATION
0 10 20 30
SCALE FEET
1" = 10'
EXISTING BRIDGE NOT SHOWN FOR CLARITY



LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. *Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.*
2. *Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012; Chapter 8 - Concrete Structures.*
3. *All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.*

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP267.70 (1)	General Plan
MP267.70 (2)	Environmental Plan
MP267.70 (3)	Typical Section

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FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_067
SCALE: AS NOTED
DATE: 8/9/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
MANATEE TRIB. BRIDGE 267.70 GENERAL PLAN AND ELEVATION

SHEET NO.
MP 267.70 (1)
SHEET 1 OF 3

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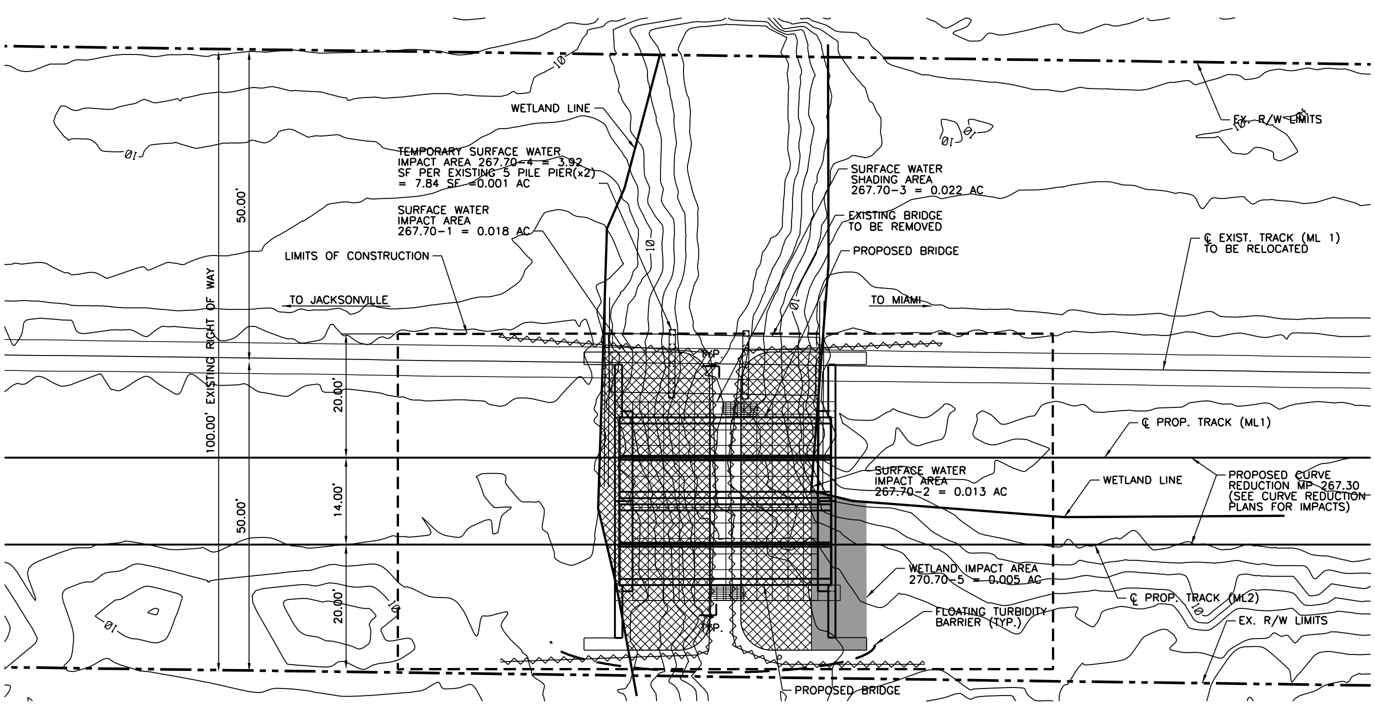
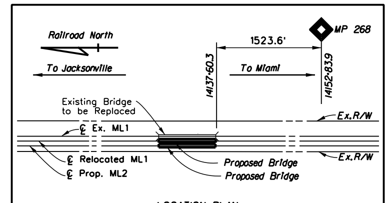

WETLAND LINE
TEMPORARY SURFACE WATER IMPACT AREA 267.70-4 = 3.92 SF PER EXISTING 5 PILE PIER(x2) = 7.84 SF =0.001 AC
SURFACE WATER IMPACT AREA 267.70-1 = 0.018 AC
LIMITS OF CONSTRUCTION
TO JACKSONVILLE
SURFACE WATER SHADING AREA 267.70-3 = 0.022 AC
EXISTING BRIDGE TO BE REMOVED
PROPOSED BRIDGE
TO MIAMI
EX. R/W LIMITS
℄ EXIST. TRACK (ML 1) TO BE RELOCATED
100.00' EXISTING RIGHT OF WAY
50.00'
20.00'
14.00'
℄ PROP. TRACK (ML1)
SURFACE WATER IMPACT AREA 267.70-2 = 0.013 AC
WETLAND LINE
PROPOSED CURVE REDUCTION MP 267.30 (SEE CURVE REDUCTION PLANS FOR IMPACTS)
WETLAND IMPACT AREA 270.70-5 = 0.005 AC
FLOATING TURBIDITY BARRIER (TYP.)
℄ PROP. TRACK (ML2)
EX. R/W LIMITS
TYP.
PROPOSED BRIDGE

PLAN

SCALE 0 10 20 30 FEET



LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES MAY VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (498.78 SF)
- BEDDING STONE (498.78 SF)
- FILL BELOW MHWL (000.00 SF)
- WETLAND IMPACTS
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
WETLAND IMPACTS	REMOVAL/FILL–RIPRAP INSTALL	0.005	220.33
SURFACE WATER IMPACTS (VEGETATED)	SHADING – NEW TRACK	0.022	954.99
	FILL / RIPRAP INSTALL	0.031	1337.88
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	EXISTING PILING REMOVAL	0.001	7.84

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	110.71
SURFACE WATER / WETLAND	0.065	2815.99	000.00

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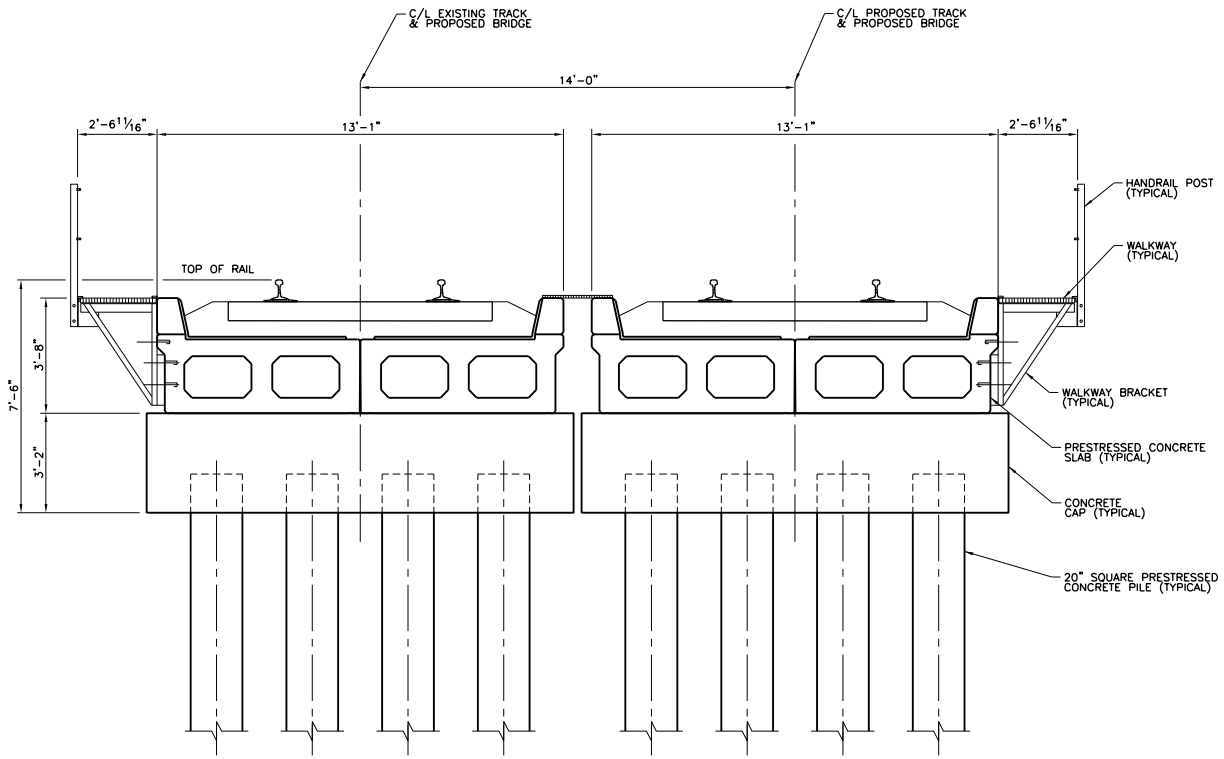
REVISIONS: MARK	DATE	DESCRIPTION

PROJ NO: 304120040_067
SCALE: AS NOTED
DATE: 8/9/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
MANATEE TRIB. BRIDGE 267.70 ENVIRONMENTAL PLAN

SHEET NO.
MP 267.70 (2)
SHEET 2 OF 3



TYPICAL SECTION BRIDGE 267.70

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MARK	DATE	DESCRIPTION

PROJ NO: 304120040_067
SCALE: AS NOTED
DATE: 8/9/2013
DESIGNED BY: MYC
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CHECKED BY: DEB

SHEET TITLE:
MANATEE
TRIBUTARY
BRIDGE 267.70
TYPICAL SECTION

SHEET NO.
MP267.70 (3)

SHEET 3 OF 3

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mwolfson
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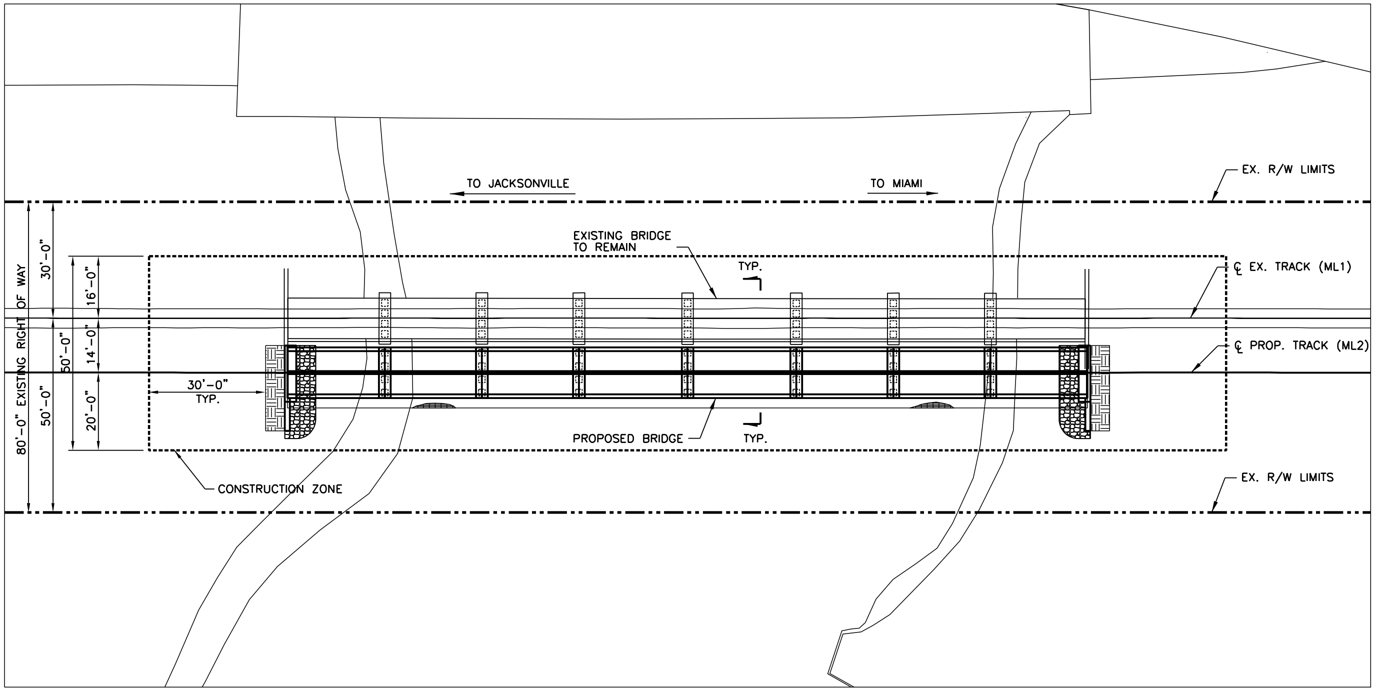
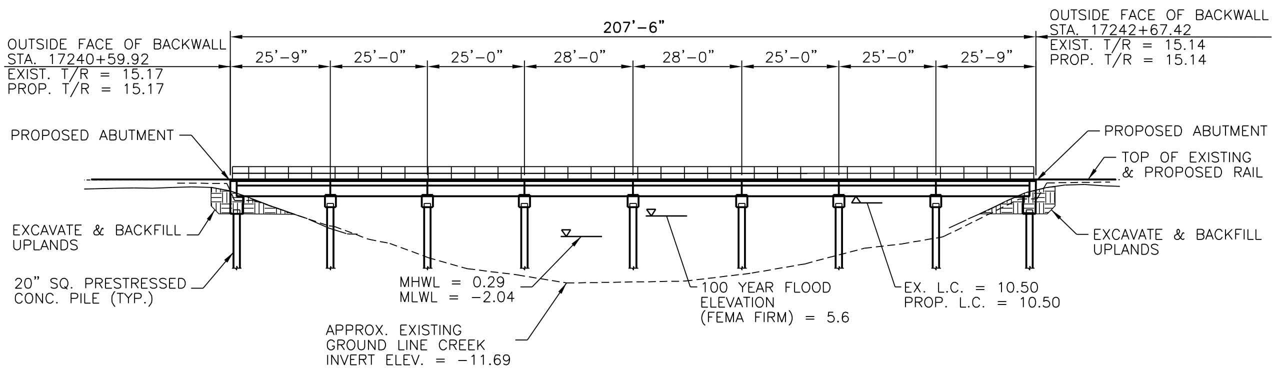


PLAN

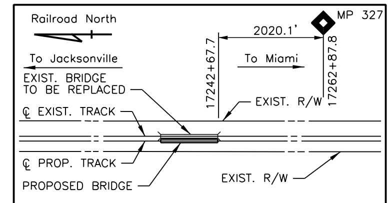
SCALE 0 10 20 30 FEET


207'-6"
OUTSIDE FACE OF BACKWALL
STA. 17240+59.92
EXIST. T/R = 15.17
PROP. T/R = 15.17
25'-9"
25'-0"
25'-0"
28'-0"
28'-0"
25'-0"
25'-0"
25'-9"
OUTSIDE FACE OF BACKWALL
STA. 17242+67.42
EXIST. T/R = 15.14
PROP. T/R = 15.14
PROPOSED ABUTMENT
PROPOSED ABUTMENT
TOP OF EXISTING
& PROPOSED RAIL
EXCAVATE & BACKFILL
UPLANDS
EXCAVATE & BACKFILL
UPLANDS
20" SQ. PRESTRESSED
CONC. PILE (TYP.)
MHWL = 0.29
MLWL = -2.04
100 YEAR FLOOD
ELEVATION
(FEMA FIRM) = 5.6
EX. L.C. = 10.50
PROP. L.C. = 10.50
APPROX. EXISTING
GROUND LINE CREEK
INVERT ELEV. = -11.69
20
15
10
5
0
-5
-10
DATUM: NAVD 88

ELEVATION

SCALE 0 10 20 30 FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 326.58 (1)	GENERAL PLAN AND ELEVATION
MP 326.58 (2)	ENVIRONMENTAL PLAN
MP 326.58 (3)	TYPICAL SECTION
MP 326.58 (4)	EXISTING PLAN

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REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_087
SCALE: 3/32" = 1'
DATE: 3/28/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
HILLSBORO RIVER BRIDGE 326.58 GENERAL PLAN AND ELEVATION

SHEET NO.
MP 326.58 (1)
SHEET 1 OF 4

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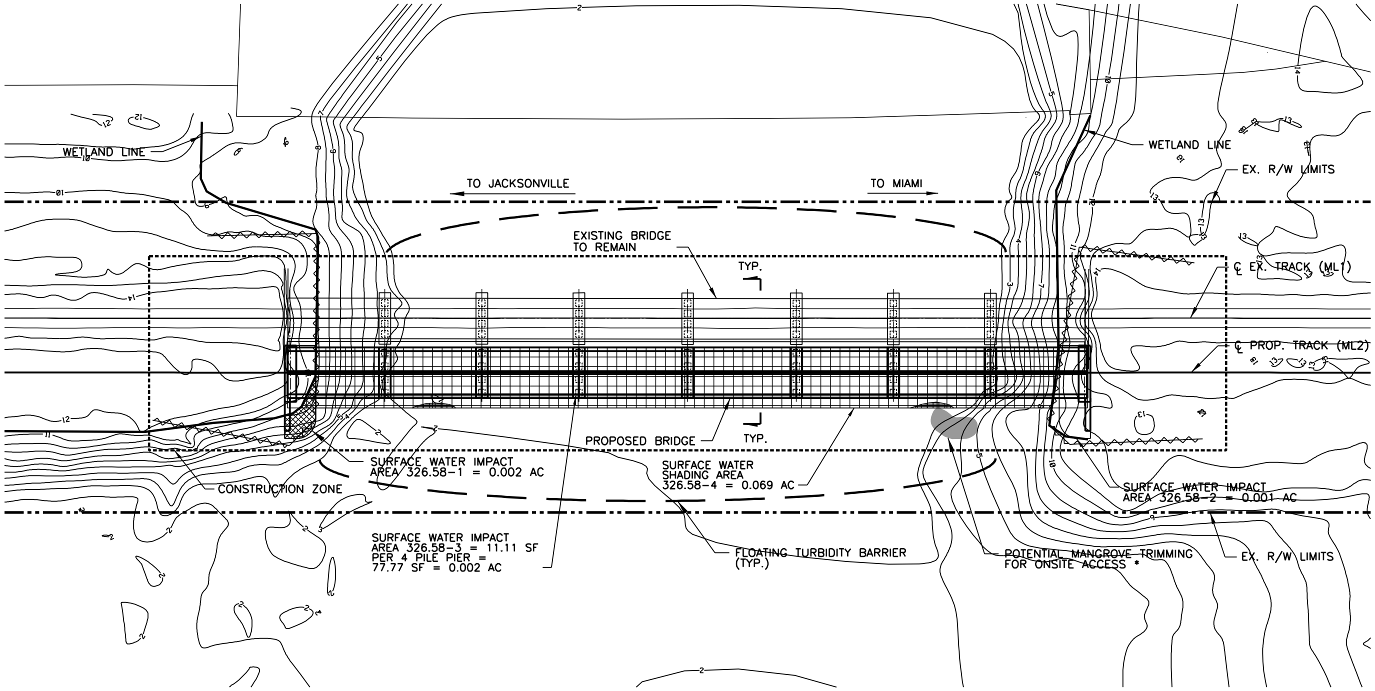
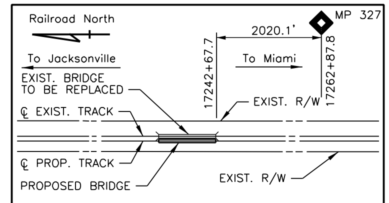


PLAN

SCALE 0 10 20 30 FEET



LOCATION PLAN

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (266.61 SF)
- BEDDING STONE (266.61 SF)
- FILL BELOW MHWL (000.00 SF)
- POTENTIAL MANGROVE TRIMMING*
- MANGROVE IMPACTS
- SURFACE WATER IMPACTS - SHADING
- SURFACE WATER IMPACTS - FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

* THESE AREAS MAY REQUIRE MANGROVE TRIMMING FOR SITE ACCESS AS NEEDED. ALL TRIMMING WILL BE PERFORMED IN ACCORDANCE WITH FDEP GUIDELINES FOR MANGROVE TRIMMING. THEREFORE THESE ARE CONSIDERED TEMPORARY IMPACTS.

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
MANGROVE TRIMMING	LATERAL BRANCHES	0.003	66.29
MANGROVE IMPACTS	REMOVAL/FILL-RIPRAP INSTALL	0.000	000.00
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER	SHADING - NEW TRACK	0.069	2995.81
IMPACTS (UNVEGETATED)	FILL / RIPRAP INSTALL	0.003	146.67
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	N/A	0.000	000.00

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	100.97
SURFACE WATER / WETLAND	0.227	9899.92	000.00

PROJECT AREA QUANTITIES

DESCRIPTION	CUBIC YDS
RIPRAP	19.75
FILL	49.37
DREDGE	6.00

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FLORIDA

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REVISIONS: MARK DATE DESCRIPTION

PROJ NO: 304120040_087
SCALE: 3/32" = 1'
DATE: 3/28/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
HILLSBORO RIVER BRIDGE 326.58 ENVIRONMENTAL PLAN

NOT FOR CONSTRUCTION
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SHEET NO.
MP 326.58 (2)
SHEET 1 OF 4

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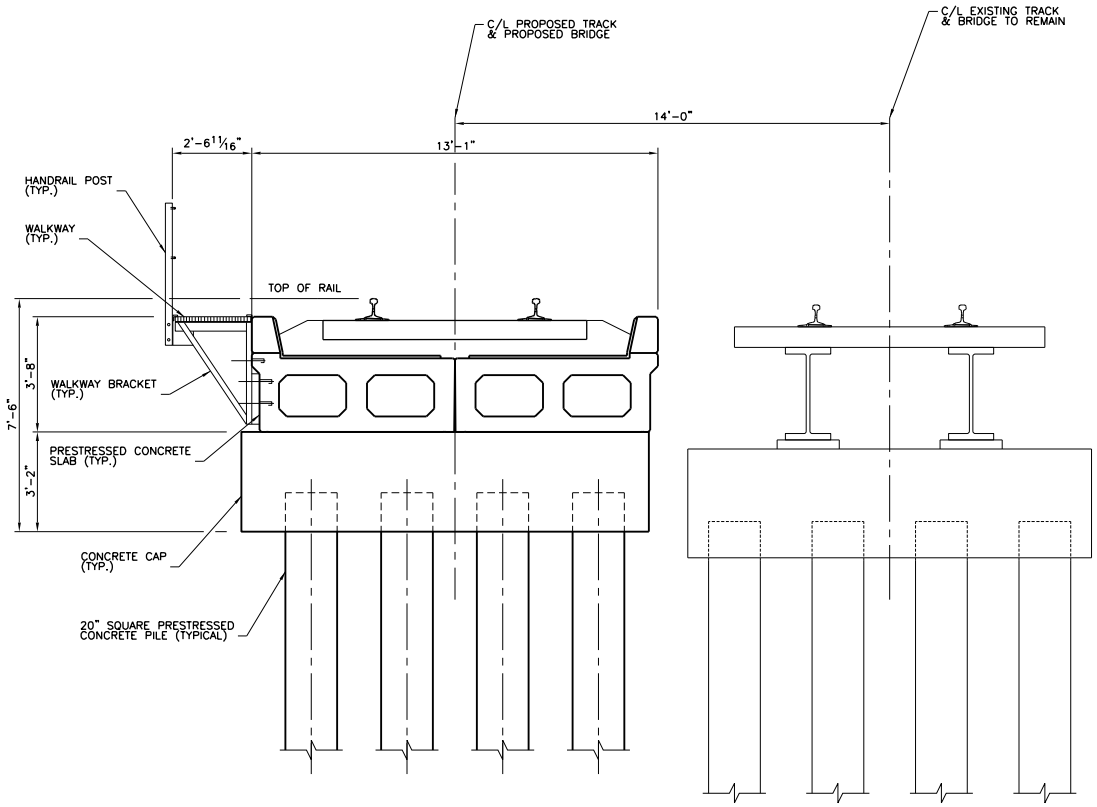

TYPICAL SECTION BRIDGE 326.58

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FLORIDA

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REVISIONS:			
MARK	DATE	DESCRIPTION	

PROJ NO:	304120040_087
SCALE:	AS NOTED
DATE:	3/28/2013
DESIGNED BY:	MYC
DRAWN BY:	DJS
CHECKED BY:	DEB

SHEET TITLE:
HILLSBORO RIVER
BRIDGE 326.58
TYPICAL
SECTION

SHEET NO.
MP 326.58 (3)

SHEET 3 OF 4

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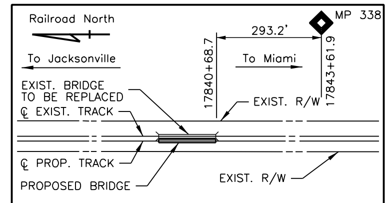


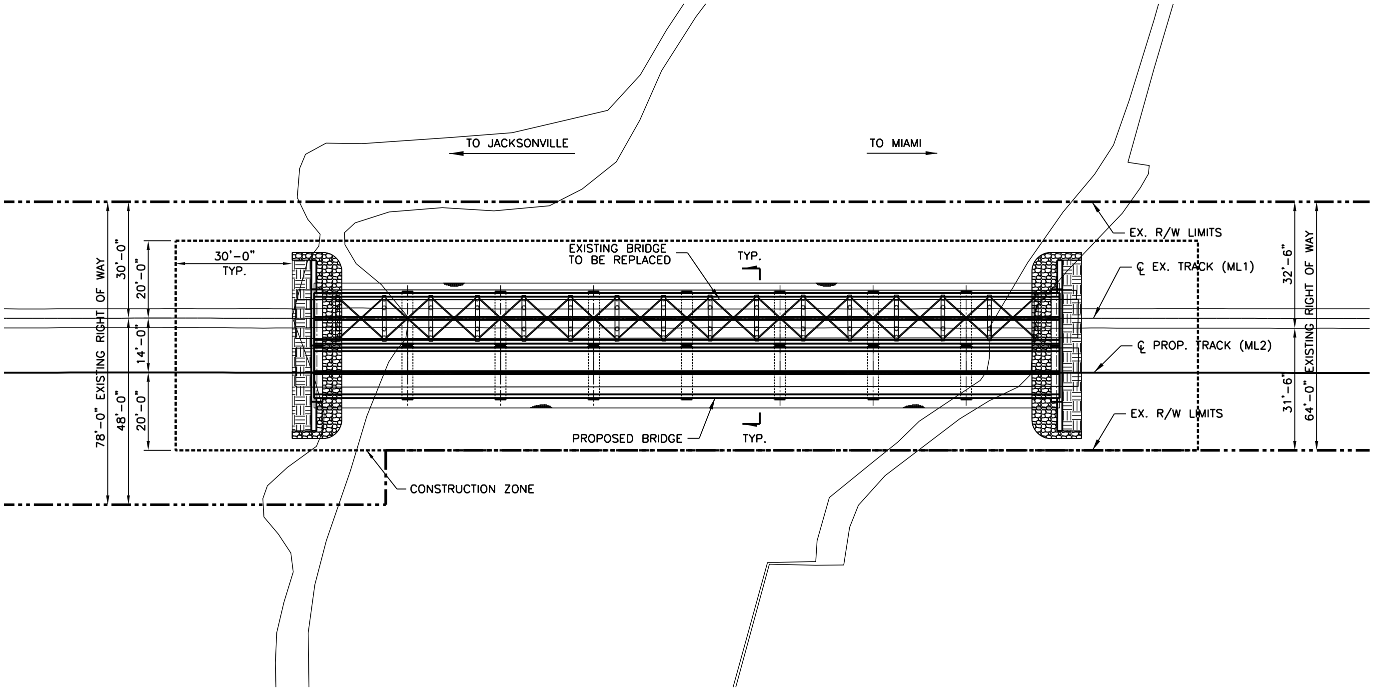
LOCATION PLAN

LEGEND

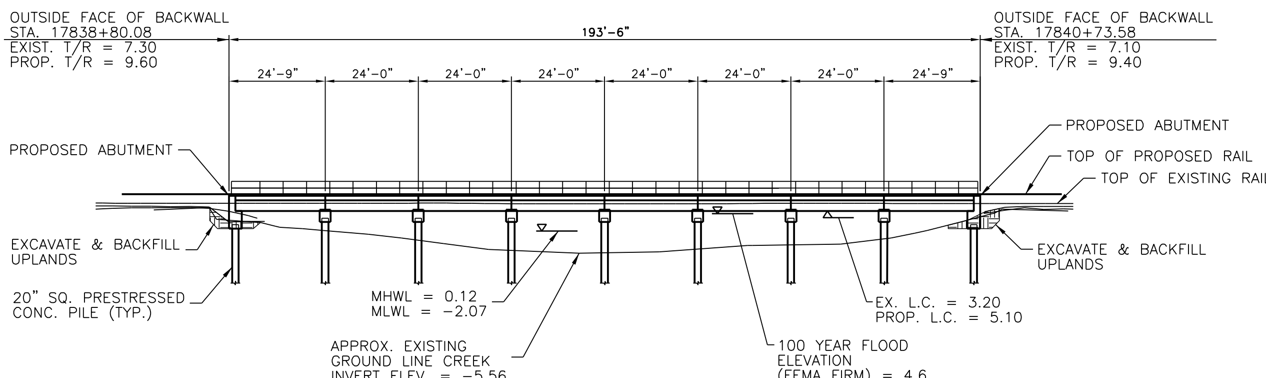
- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

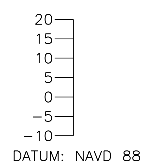
NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.



PLAN


OUTSIDE FACE OF BACKWALL
STA. 17838+80.08
EXIST. T/R = 7.30
PROP. T/R = 9.60
193'-6"
OUTSIDE FACE OF BACKWALL
STA. 17840+73.58
EXIST. T/R = 7.10
PROP. T/R = 9.40
24'-9"
24'-0"
24'-0"
24'-0"
24'-0"
24'-0"
24'-0"
24'-9"
PROPOSED ABUTMENT
PROPOSED ABUTMENT
TOP OF PROPOSED RAIL
TOP OF EXISTING RAIL
EXCAVATE & BACKFILL UPLANDS
EXCAVATE & BACKFILL UPLANDS
20" SQ. PRESTRESSED CONC. PILE (TYP.)
MHWL = 0.12
MLWL = -2.07
EX. L.C. = 3.20
PROP. L.C. = 5.10
APPROX. EXISTING GROUND LINE CREEK INVERT ELEV. = -5.56
100 YEAR FLOOD ELEVATION (FEMA FIRM) = 4.6



ELEVATION

SCALE 0 10 20 30 FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY

LIST OF DRAWINGS	
SHEET	DESCRIPTION
MP 337.91 (1)	GENERAL PLAN AND ELEVATION
MP 337.91 (2)	ENVIRONMENTAL PLAN
MP 337.91 (3)	TYPICAL SECTION

TranSystems
TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-6500
C.A. 7503

DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS: MARK | DATE | DESCRIPTION

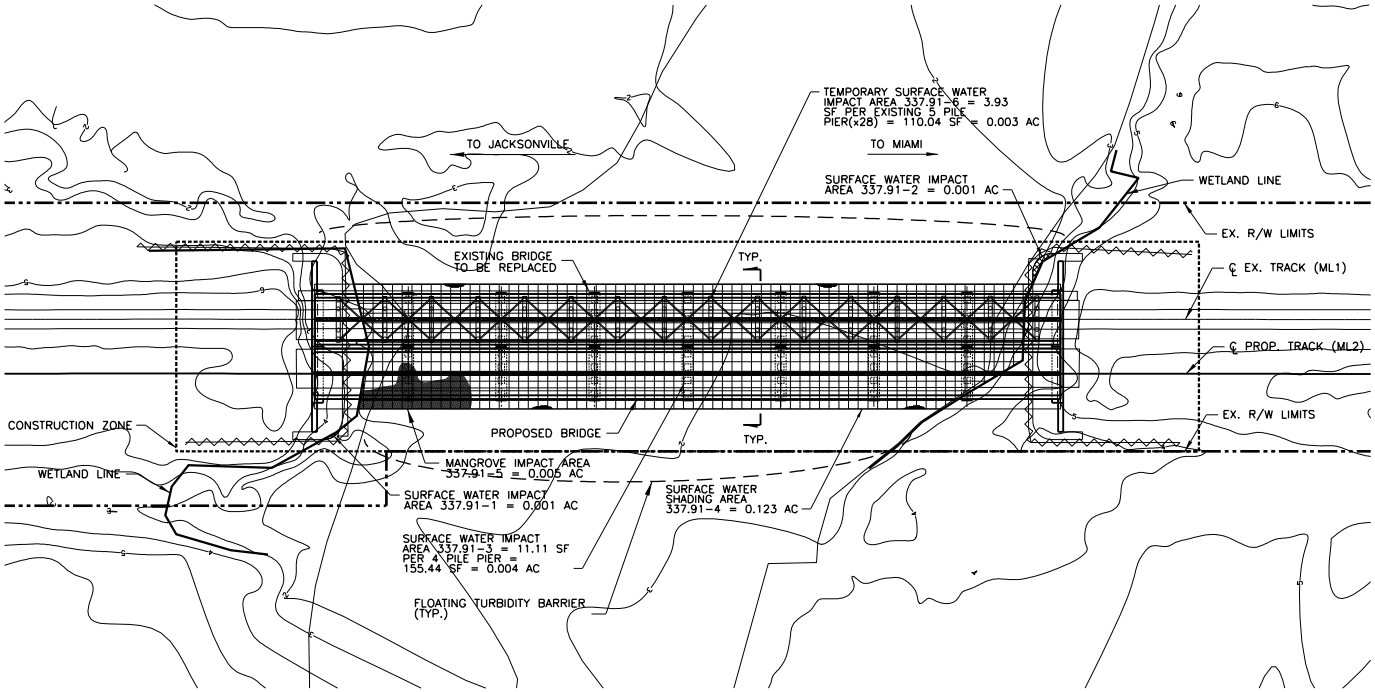
PROJ NO: 304120040_093
SCALE: 1/16"=1'
DATE: 3/28/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
NORTH FORK OF MIDDLE RIVER BRIDGE 337.91 GENERAL PLAN

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

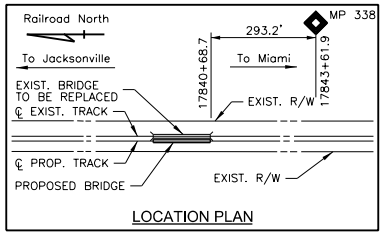
SHEET NO.
MP 337.91 (1)
SHEET 1 OF 3

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



PLAN

SCALE 0 10 20 30 FEET



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- 5 TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (568.56 SF)
- BEDDING STONE (568.56 SF)
- FILL BELOW MHWL (000.00 SF)
- POTENTIAL MANGROVE TRIMMING*
- MANGROVE IMPACTS
- SURFACE WATER IMPACTS - SHADING
- SURFACE WATER IMPACTS - FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

* THESE AREAS MAY REQUIRE MANGROVE TRIMMING FOR SITE ACCESS AS NEEDED. ALL TRIMMING WILL BE PERFORMED IN ACCORDANCE WITH FDEP GUIDELINES FOR MANGROVE TRIMMING. THEREFORE THESE ARE CONSIDERED TEMPORARY IMPACTS.

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
MANGROVE TRIMMING	LATERAL BRANCHES	0.000	000.00
MANGROVE IMPACTS	REMOVAL/FILL-RIPRAP INSTALL	0.005	218.53
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER IMPACTS (UNVEGETATED)	SHADING - NEW TRACK	0.123	5358.72
	FILL / RIPRAP INSTALL	0.004	168.80
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	EXISTING PILE REMOVAL	0.003	110.04

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	133.84
SURFACE WATER / WETLAND	0.207	9035.87	000.00

PROJECT AREA QUANTITIES

DESCRIPTION	CUBIC YDS
RIPRAP	42.12
FILL	59.49
DREDGE	0.75

NOT FOR CONSTRUCTION PERMITTING PURPOSES ONLY

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
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PHONE: 904-245-8500
C.A. 7503

DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

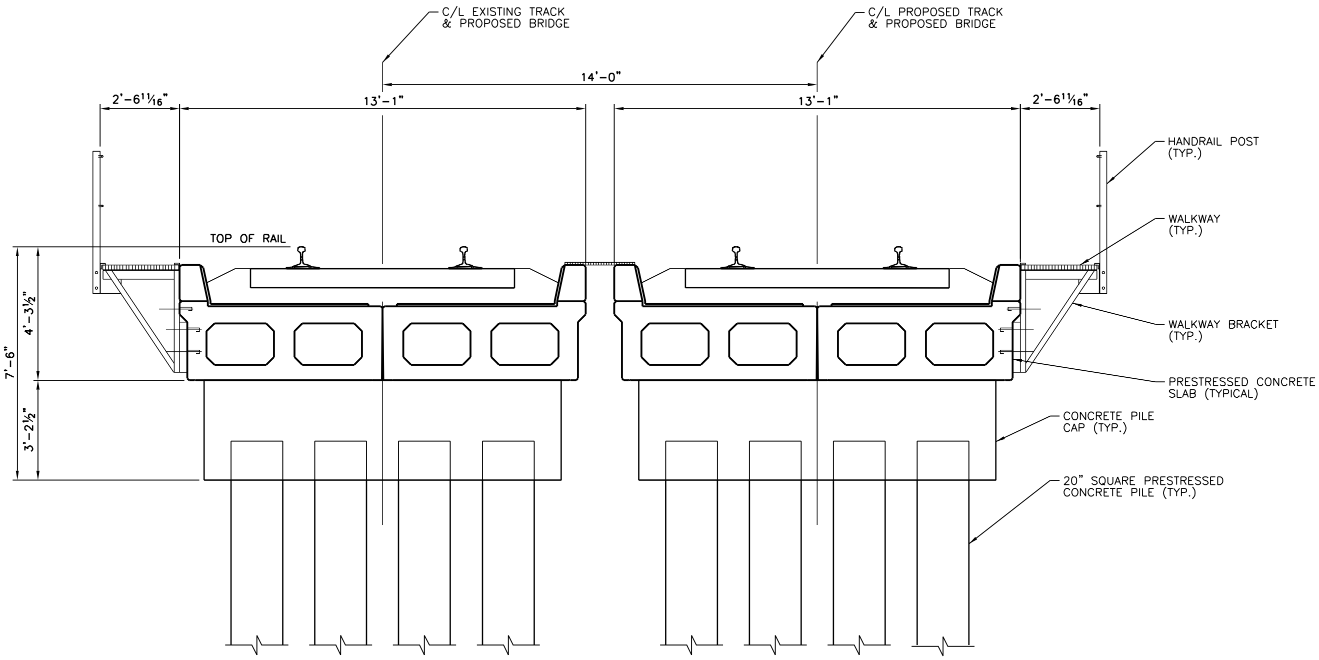
MARK	DATE	DESCRIPTION

PROJ NO: 304120040_093
SCALE: 1/16"=1'
DATE: 4/1/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
NORTH FORK OF MIDDLE RIVER BRIDGE 337.91 ENVIRONMENTAL

SHEET NO.
MP 337.91 (2)
SHEET 2 OF 3

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



TYPICAL SECTION BRIDGE 337.91

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-6500
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DANIEL E. BAKER
FL PE 42463

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PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:		
MARK	DATE	DESCRIPTION

PROJ NO: 304120040_093
SCALE: AS NOTED
DATE: 3/28/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

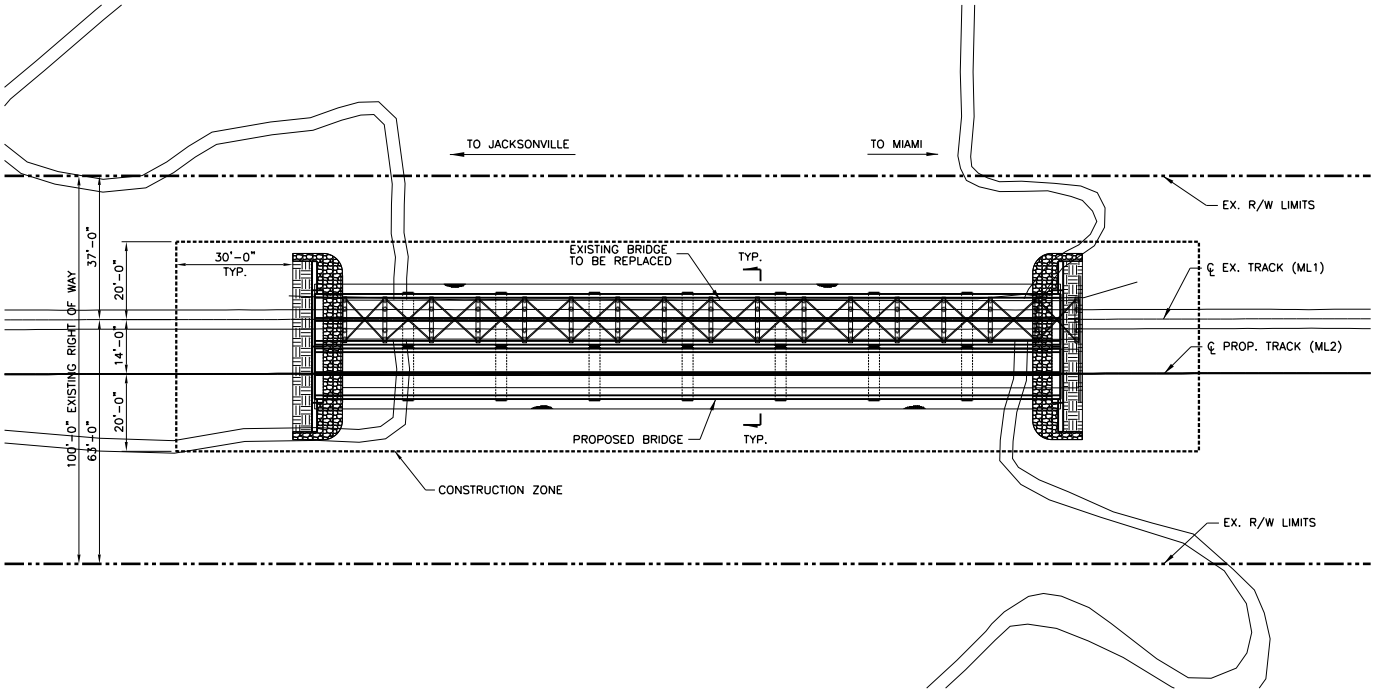
SHEET TITLE:
NORTH FORK OF
MIDDLE RIVER
BRIDGE 337.91
TYPICAL SECTION

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

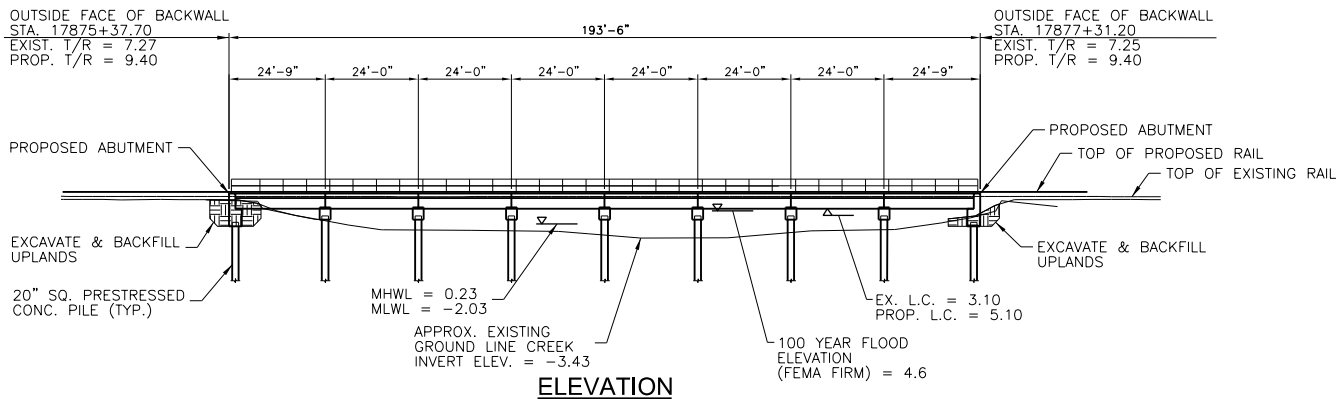
SHEET NO.
MP 337.91 (3)
SHEET 3 OF 4

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

mwellon
3/28/2013 • 2:44:37 PM • G:\JA120040\Bridge\093\093-C-TS01.dgn



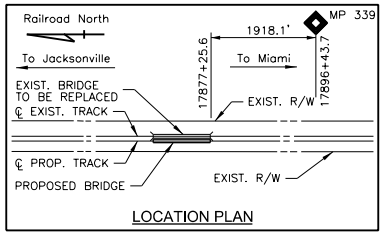
PLAN



ELEVATION

SCALE 0 10 20 30 FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 338.52 (1)	GENERAL PLAN AND ELEVATION
MP 338.52 (2)	ENVIRONMENTAL PLAN
MP 338.52 (3)	TYPICAL SECTION
MP 338.52 (4)	EXISTING PLAN

NOT FOR CONSTRUCTION PERMITTING PURPOSES ONLY

TRANSYSTEMS CORPORATION
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DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

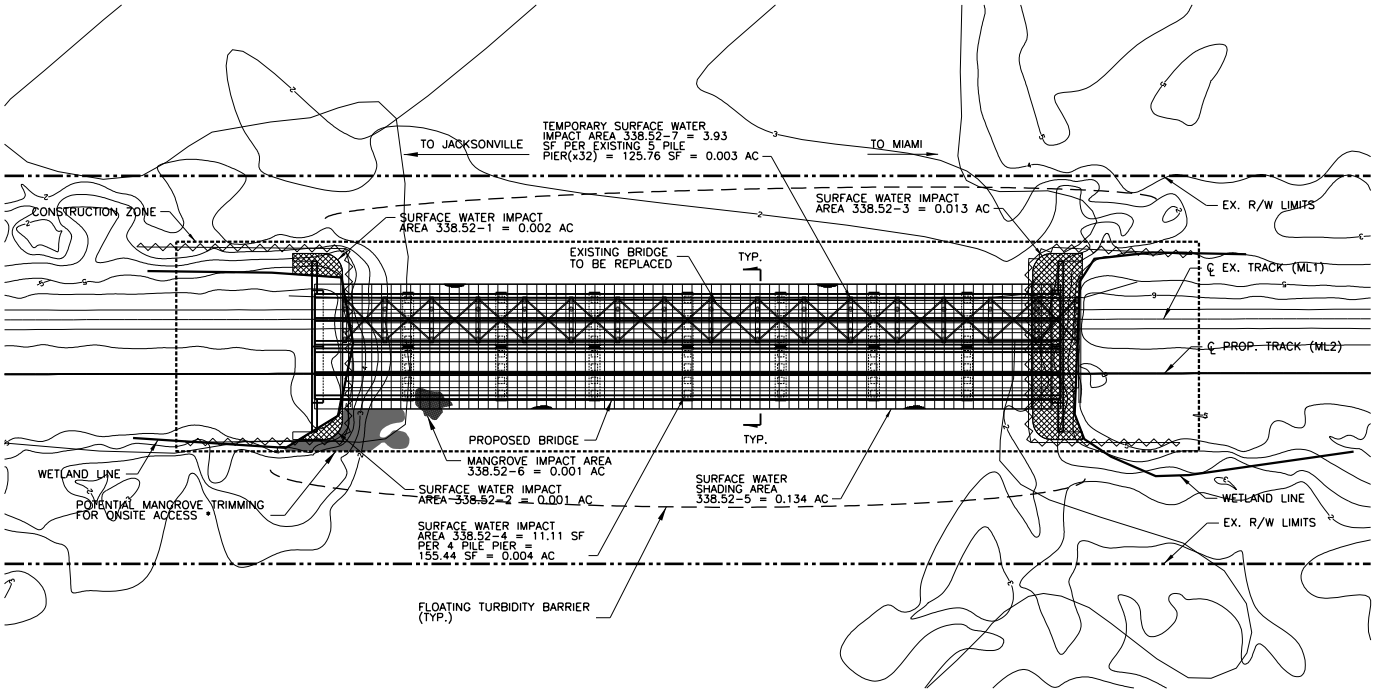
PROJ NO: 304120040_094
SCALE: 1/16" = 1'
DATE: 3/28/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
SOUTH FORK OF MIDDLE RIVER BRIDGE 338.52 GENERAL PLAN

SHEET NO.
MP 338.52 (1)

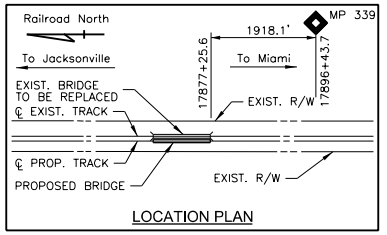
SHEET 1 OF 4

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



PLAN

SCALE 0 10 20 30 FEET



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- 5 TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (568.51 SF)
- BEDDING STONE (568.51 SF)
- FILL BELOW MHWL (000.00 SF)
- POTENTIAL MANGROVE TRIMMING*
- MANGROVE IMPACTS
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

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PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
MANGROVE TRIMMING	LATERAL BRANCHES	0.005	199.99
MANGROVE IMPACTS	REMOVAL/FILL-RIPRAP INSTALL	0.001	48.34
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER IMPACTS (UNVEGETATED)	SHADING - NEW TRACK	0.134	5847.81
	FILL / RIPRAP INSTALL	0.019	813.80
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	EXISTING PILE REMOVAL	0.003	125.76

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	129.33
SURFACE WATER / WETLAND	0.248	10804.63	000.00

PROJECT AREA QUANTITIES

DESCRIPTION	CUBIC YDS
RIPRAP	42.11
FILL	86.53
DREDGE	63.28

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AAF MIAMI TO ORLANDO
PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS: MARK | DATE | DESCRIPTION

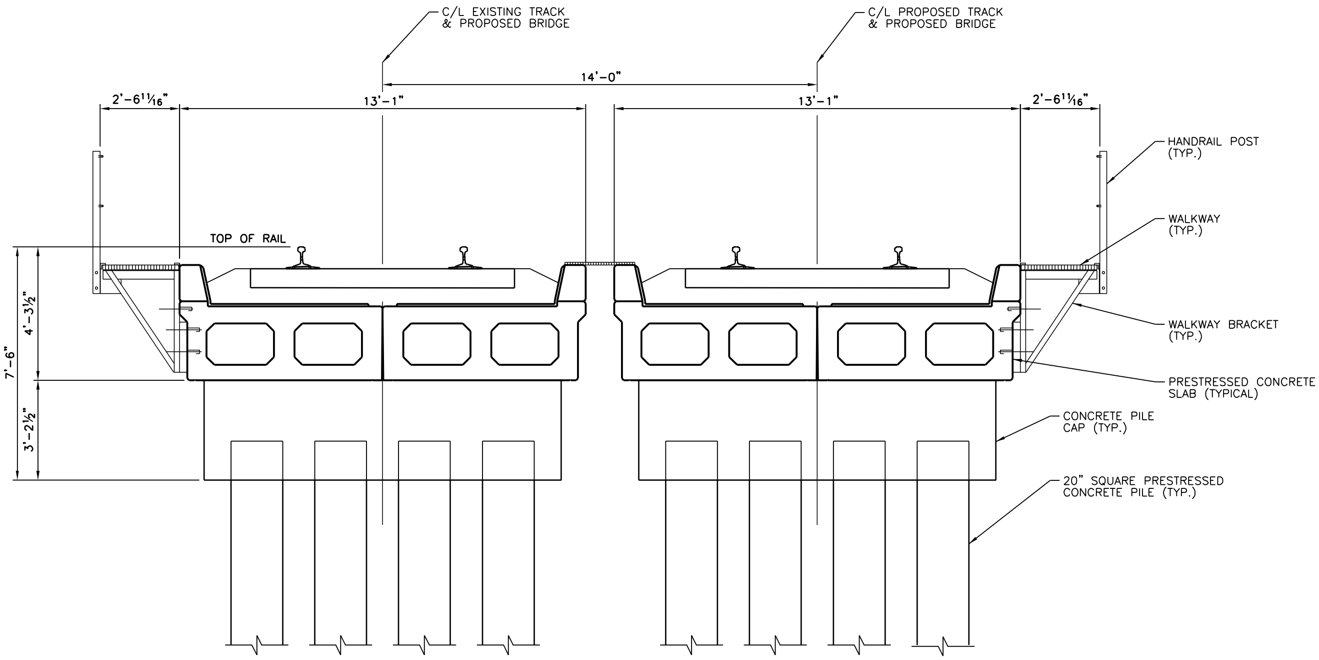
PROJ NO: 304120040_094
SCALE: 1/16"= 1'
DATE: 3/28/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
SOUTH FORK OF MIDDLE RIVER BRIDGE 338.52 ENVIRONMENTAL

SHEET NO.
MP 338.52 (2)

SHEET 2 OF 4

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



TYPICAL SECTION BRIDGE 338.52

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-6500
C.A. 7503

DANIEL E. BAKER
FL PE 42463

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FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

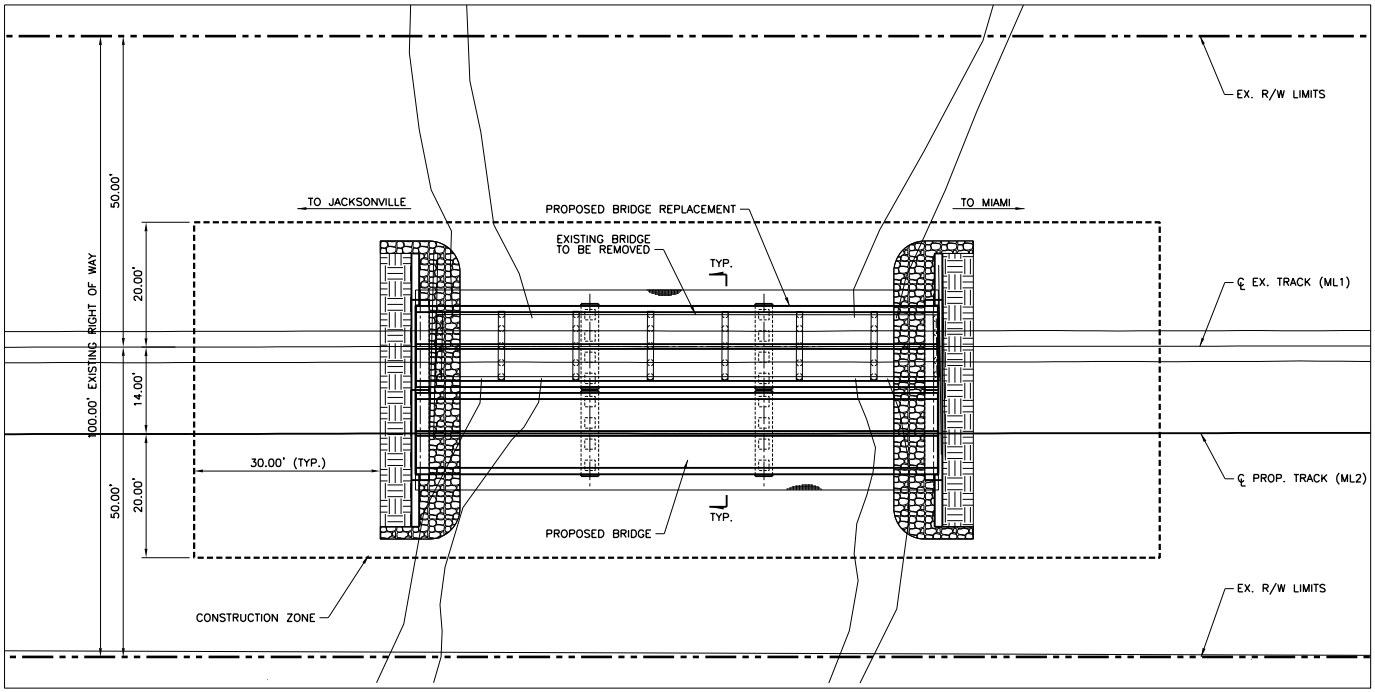
PROJ NO: 304120040_094
SCALE: AS NOTED
DATE: 3/28/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
SOUTH FORK OF MIDDLE RIVER BRIDGE 338.52 TYPICAL SECTION

SHEET NO.
MP 338.52 (3)
SHEET 3 OF 4

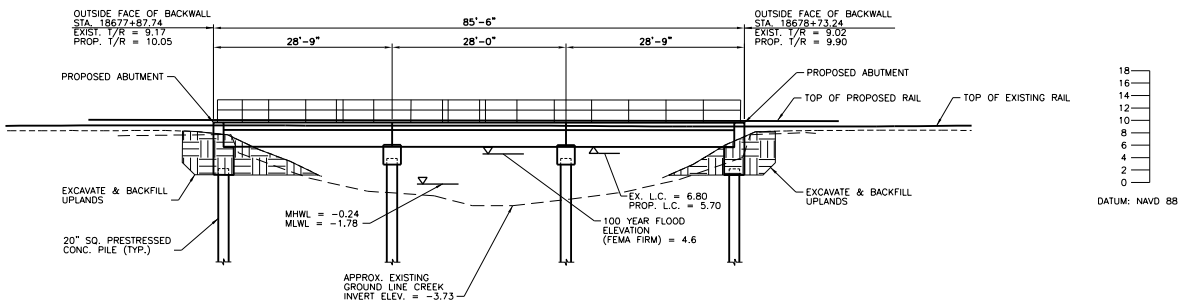
NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING



PLAN

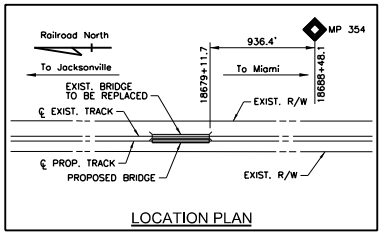
0 10 20 30
SCALE FEET



ELEVATION

0 10 20 30
SCALE FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 353.74 (1)	GENERAL PLAN
MP 353.74 (2)	ENVIRONMENTAL PLAN
MP 353.74 (3)	TYPICAL SECTION
MP 353.74 (4)	EXISTING PLAN

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
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PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:	MARK	DATE	DESCRIPTION

PROJ NO:	304120040_099
SCALE:	AS NOTED
DATE:	2/9/2013
DESIGNED BY:	MYC
DRAWN BY:	DJS
CHECKED BY:	DEB

SHEET TITLE:

OLETA RIVER
BRIDGE 353.74
GENERAL PLAN
AND ELEVATION

SHEET NO.
MP 353.74 (1)

SHEET 1 OF 4

DJSmith
2/9/2013 - 12:08:43 PM - G:\ATX\DWG\Bridge\190\190C-GP01.dgn

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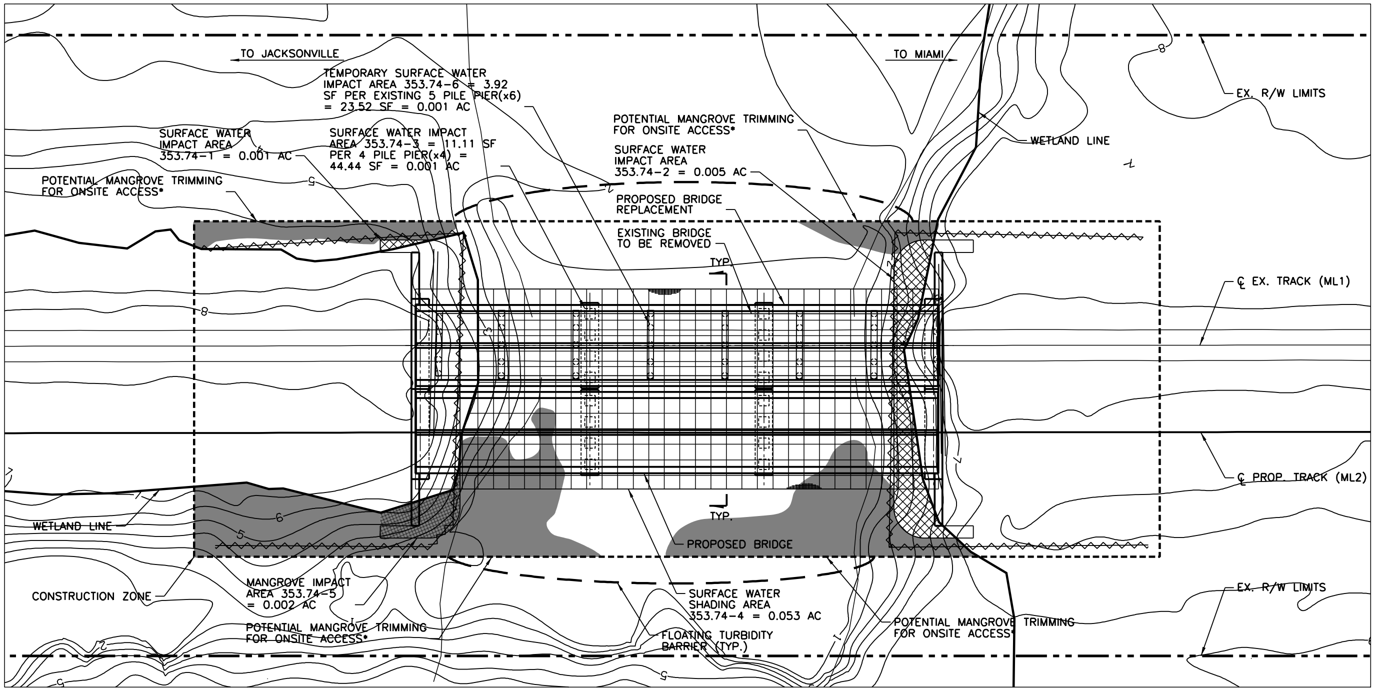
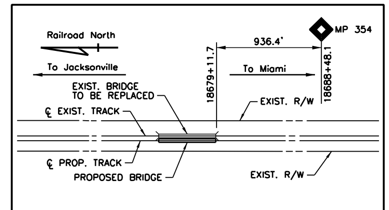


TO JACKSONVILLE
TO MIAMI
TEMPORARY SURFACE WATER IMPACT AREA 353.74-6 = 3.92 SF PER EXISTING 5 PILE PIER(x6) = 23.52 SF = 0.001 AC
EX. R/W LIMITS
POTENTIAL MANGROVE TRIMMING FOR ONSITE ACCESS*
SURFACE WATER IMPACT AREA 353.74-1 = 0.001 AC
SURFACE WATER IMPACT AREA 353.74-3 = 11.11 SF PER 4 PILE PIER(x4) = 44.44 SF = 0.001 AC
SURFACE WATER IMPACT AREA 353.74-2 = 0.005 AC
WETLAND LINE
POTENTIAL MANGROVE TRIMMING FOR ONSITE ACCESS*
PROPOSED BRIDGE REPLACEMENT
EXISTING BRIDGE TO BE REMOVED
TYP.
℄ EX. TRACK (ML1)
℄ PROP. TRACK (ML2)
WETLAND LINE
PROPOSED BRIDGE
CONSTRUCTION ZONE
MANGROVE IMPACT AREA 353.74-5 = 0.002 AC
POTENTIAL MANGROVE TRIMMING FOR ONSITE ACCESS*
SURFACE WATER SHADING AREA 353.74-4 = 0.053 AC
FLOATING TURBIDITY BARRIER (TYP.)
POTENTIAL MANGROVE TRIMMING FOR ONSITE ACCESS*
EX. R/W LIMITS

PLAN

0 10 20 30
SCALE FEET



LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS.
2. BEDDING STONE SHALL BE BALLAST.
3. INDIVIDUAL RIPRAP STONES SHALL VARY IN WEIGHT FROM 25 TO 100 LBS.

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (568.59 SF)
- BEDDING STONE (568.59 SF)
- FILL BELOW MHWL (000.00 SF)
- POTENTIAL MANGROVE TRIMMING*
- MANGROVE IMPACTS
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

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PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
MANGROVE TRIMMING	LATERAL BRANCHES	0.028	1275.67
MANGROVE IMPACTS	REMOVAL/FILL–RIPRAP INSTALL	0.002	75.37
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER IMPACTS (UNVEGETATED)	SHADING – NEW TRACK	0.053	2302.50
	FILL / RIPRAP INSTALL	0.006	250.36
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	EXISTING PILE REMOVAL	0.001	23.52

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	121.42
SURFACE WATER / WETLAND	0.105	4585.02	000.00

TranSystems
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FL PE 42463

AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS: MARK	DATE	DESCRIPTION

PROJ NO: 304120040_099
SCALE: AS NOTED
DATE: 2/9/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
OLETA RIVER BRIDGE 353.74 ENVIRONMENTAL PLAN

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

SHEET NO.
MP 353.74 (2)
SHEET 2 OF 4

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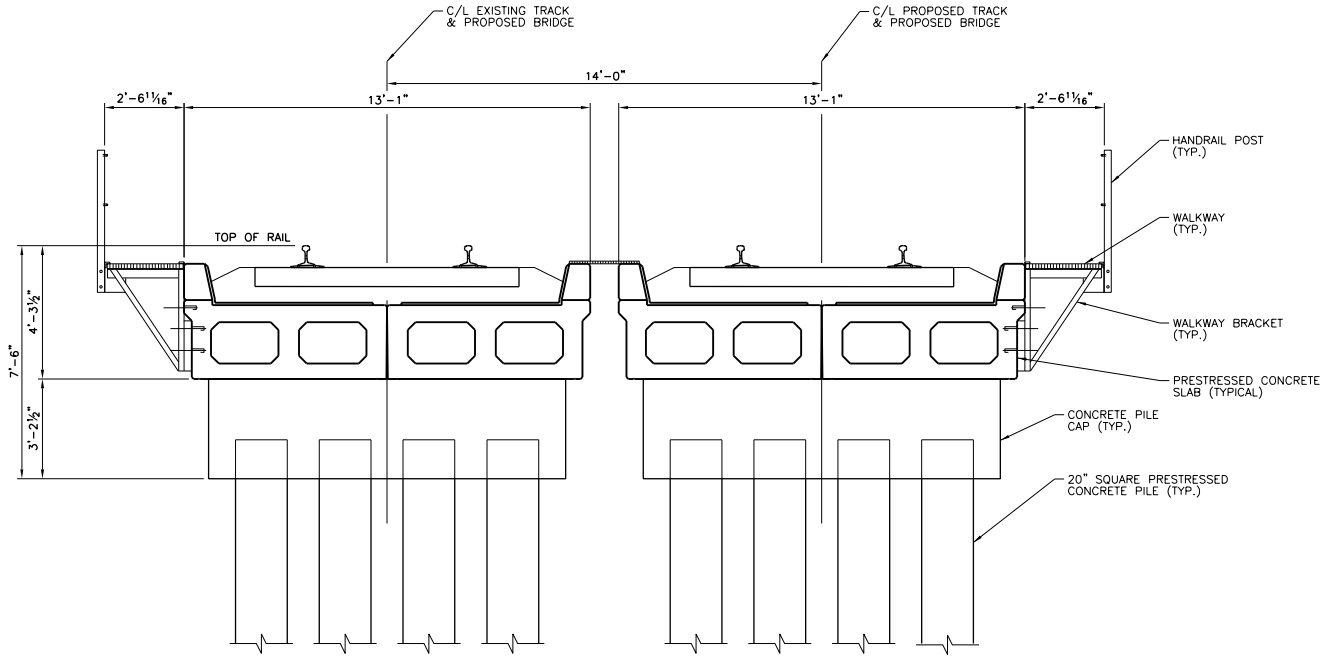
DJSmith 2/9/2013 12:06:49 PM G:\JA\120040\Bridges\099\099-C-PP02.dgn



TYPICAL SECTION BRIDGE 353.74

TranSystems
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PHONE: 904-245-8500
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DANIEL F. BAKER
FL PE 42463

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PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_099
SCALE: AS NOTED
DATE: 2/9/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
OLETA RIVER
BRIDGE 353.74
TYPICAL
SECTION

SHEET NO.
MP 353.74 (3)
SHEET 3 OF 4

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PERMITTING PURPOSES ONLY

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

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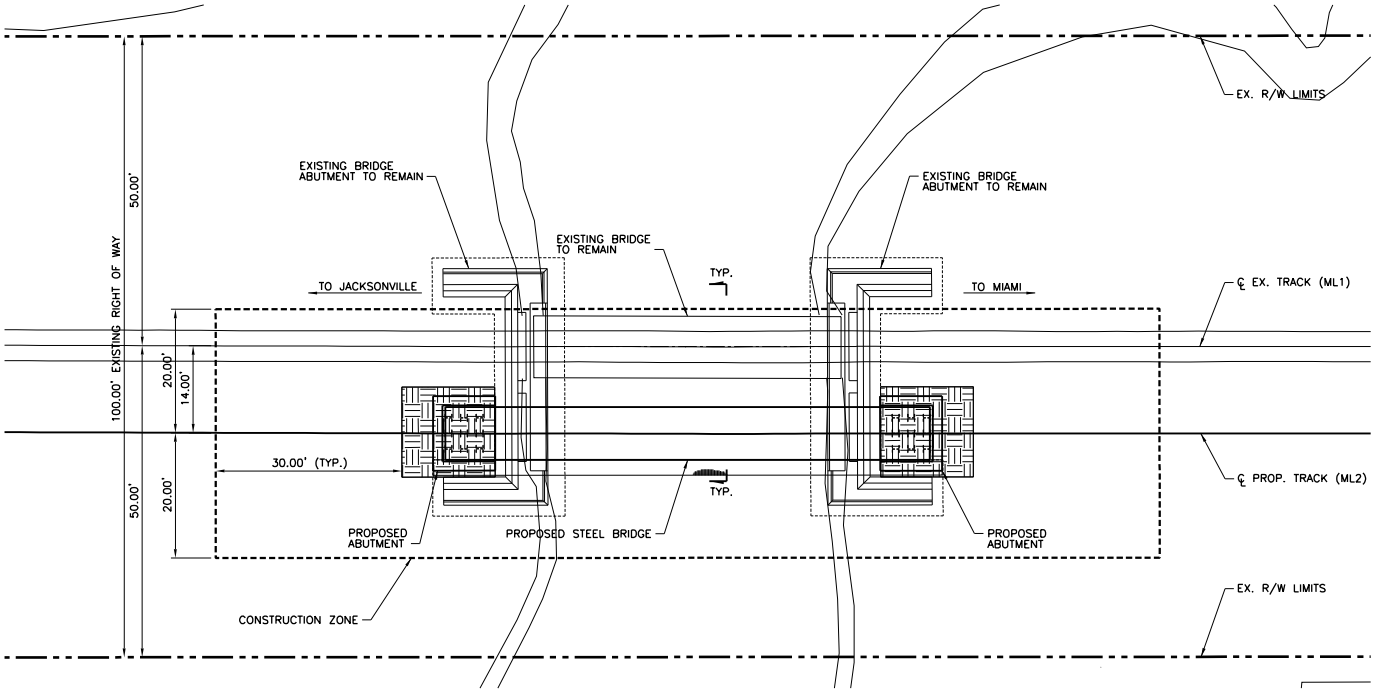
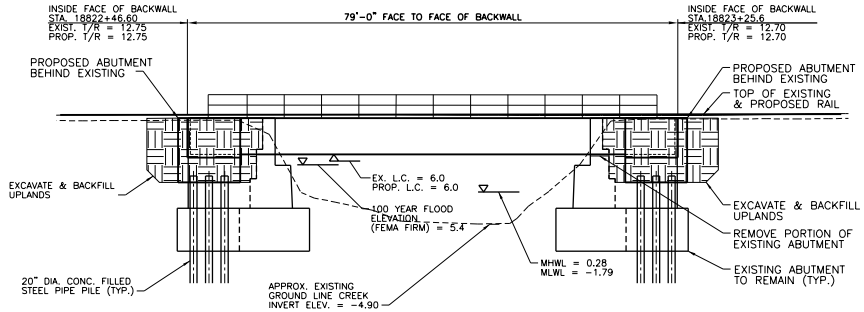


PLAN

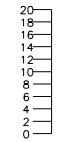
SCALE 0 10 20 30 FEET



ELEVATION

SCALE 0 10 20 30 FEET

EXISTING BRIDGE NOT SHOWN FOR CLARITY



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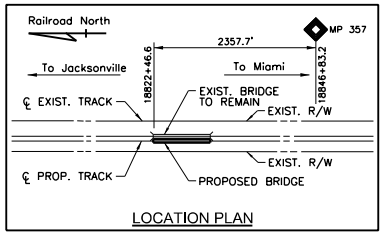

LOCATION PLAN

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. Design Live Load: Cooper E80, Plus 6" Future Additional Ballast.
2. Specifications: A.R.E.M.A. Manual for Railway Engineering, dated 2012: Chapter 8 – Concrete Structures.
3. All Existing Timber Piles Shall be Cut Off 2'-0" Below Mudline.

LIST OF DRAWINGS

SHEET	DESCRIPTION
MP 356.53 (1)	GENERAL PLAN
MP 356.53 (2)	ENVIRONMENTAL PLAN
MP 356.53 (3)	TYPICAL SECTION
MP 356.53 (4)	EXISTING PLAN

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TRANSYSTEMS CORPORATION
4500 SALISBURY ROAD
SUITE 440
JACKSONVILLE, FL 32216
PHONE: 904-245-6500
C.A. 7503

DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO
PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_101
SCALE: AS NOTED
DATE: 2/6/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
ARCH CREEK BRIDGE 356.53 GENERAL PLAN AND ELEVATION

SHEET NO.
MP 356.53 (1)

SHEET 1 OF 4

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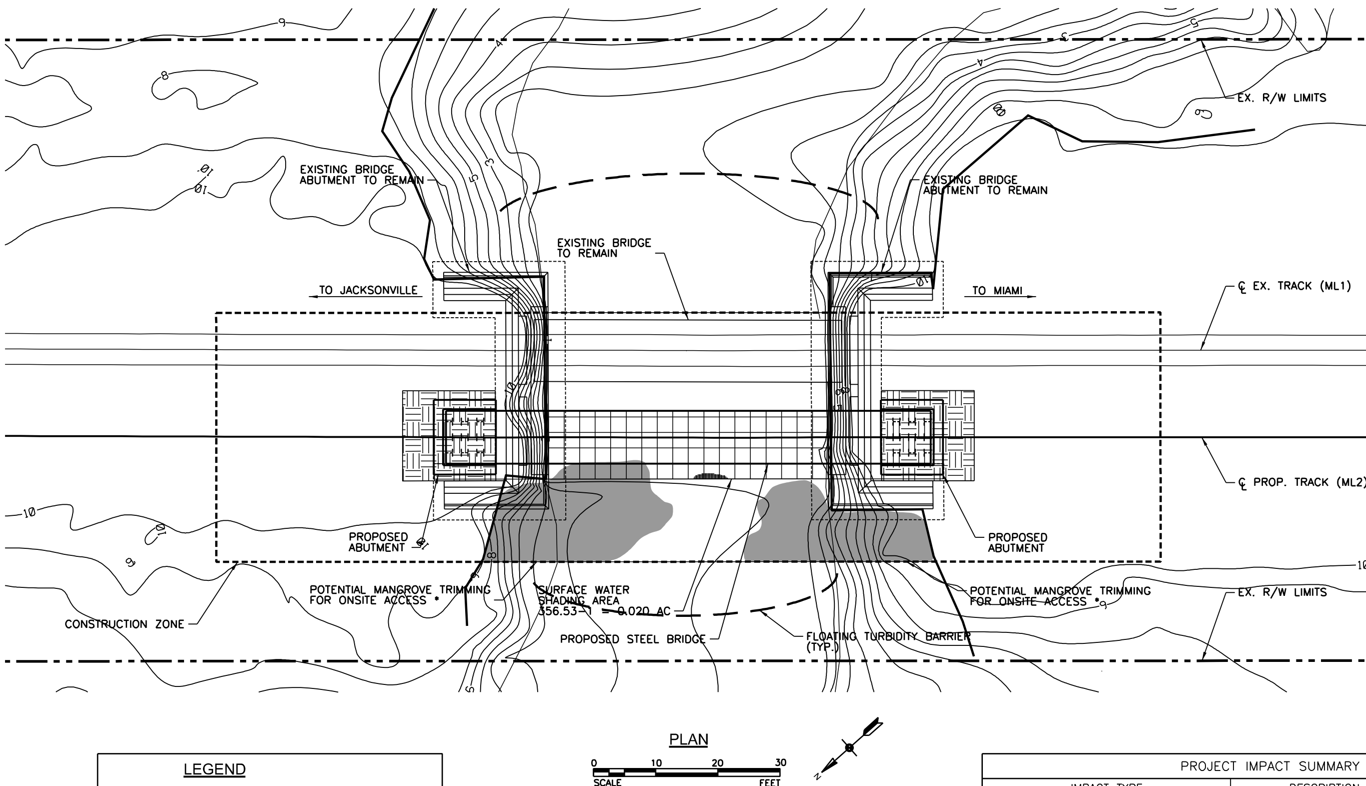

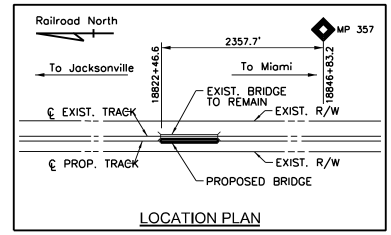

LEGEND

- RIGHT OF WAY LINE
- PROJECT LIMITS BOUNDARY LINE
- PROPOSED RIP RAP AREA
- UPLAND EXCAVATION & BACKFILL

NOTES

1. FLOATING TURBIDITY BARRIER PLACED UPSTREAM AND DOWNSTREAM OF CONSTRUCTION LIMITS

LEGEND

- WETLAND AREA DELINEATION
- CONSTRUCTION ZONE
- EXISTING R/W
- TOPO LINE
- FLOATING TURBIDITY BARRIER
- SILT FENCE
- RIP RAP (000.00 SF)
- BEDDING STONE (000.00 SF)
- FILL BELOW MHWL (000.00 SF)
- POTENTIAL MANGROVE TRIMMING*
- MANGROVE IMPACTS
- SURFACE WATER IMPACTS – SHADING
- SURFACE WATER IMPACTS – FILL / RIPRAP
- TEMPORARY SURFACE WATER IMPACTS
- TEMPORARY WETLAND IMPACTS

* THESE AREAS MAY REQUIRE MANGROVE TRIMMING FOR SITE ACCESS AS NEEDED. ALL TRIMMING WILL BE PERFORMED IN ACCORDANCE WITH FDEP GUIDELINES FOR MANGROVE TRIMMING, THEREFORE THESE ARE CONSIDERED TEMPORARY IMPACTS.

PROJECT IMPACT SUMMARY TABLE

IMPACT TYPE	DESCRIPTION	ACRES	SQ. FEET
MANGROVE TRIMMING	LATERAL BRANCHES	0.015	642.86
MANGROVE IMPACTS	REMOVAL/FILL–RIPRAP INSTALL	0.000	000.00
SUBMERGED AQUATIC VEGETATION IMPACTS	N/A	*	*
SURFACE WATER	SHADING – NEW TRACK	0.011	495.02
IMPACTS (UNVEGETATED)	FILL / RIPRAP INSTALL	0.000	000.00
TEMPORARY WETLAND IMPACTS	N/A	0.000	000.00
TEMPORARY SURFACE WATER IMPACTS	N/A	0.000	000.00

* NO SUBMERGED AQUATIC VEGETATION OBSERVED

PROJECT AREA TOTALS

DESCRIPTION	ACRES	SQ. FEET	LINEAR FEET
SHORELINE	----	-----	112.68
SURFACE WATER / WETLAND	0.048	2086.88	000.00

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TranSystems
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AAF MIAMI TO ORLANDO PASSENGER SERVICE
FLORIDA

ALL ABOARD FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_101
SCALE: AS NOTED
DATE: 2/6/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
ARCH CREEK BRIDGE 356.53 ENVIRONMENTAL PLAN

SHEET NO.
MP 356.53 (2)
SHEET 2 OF 4

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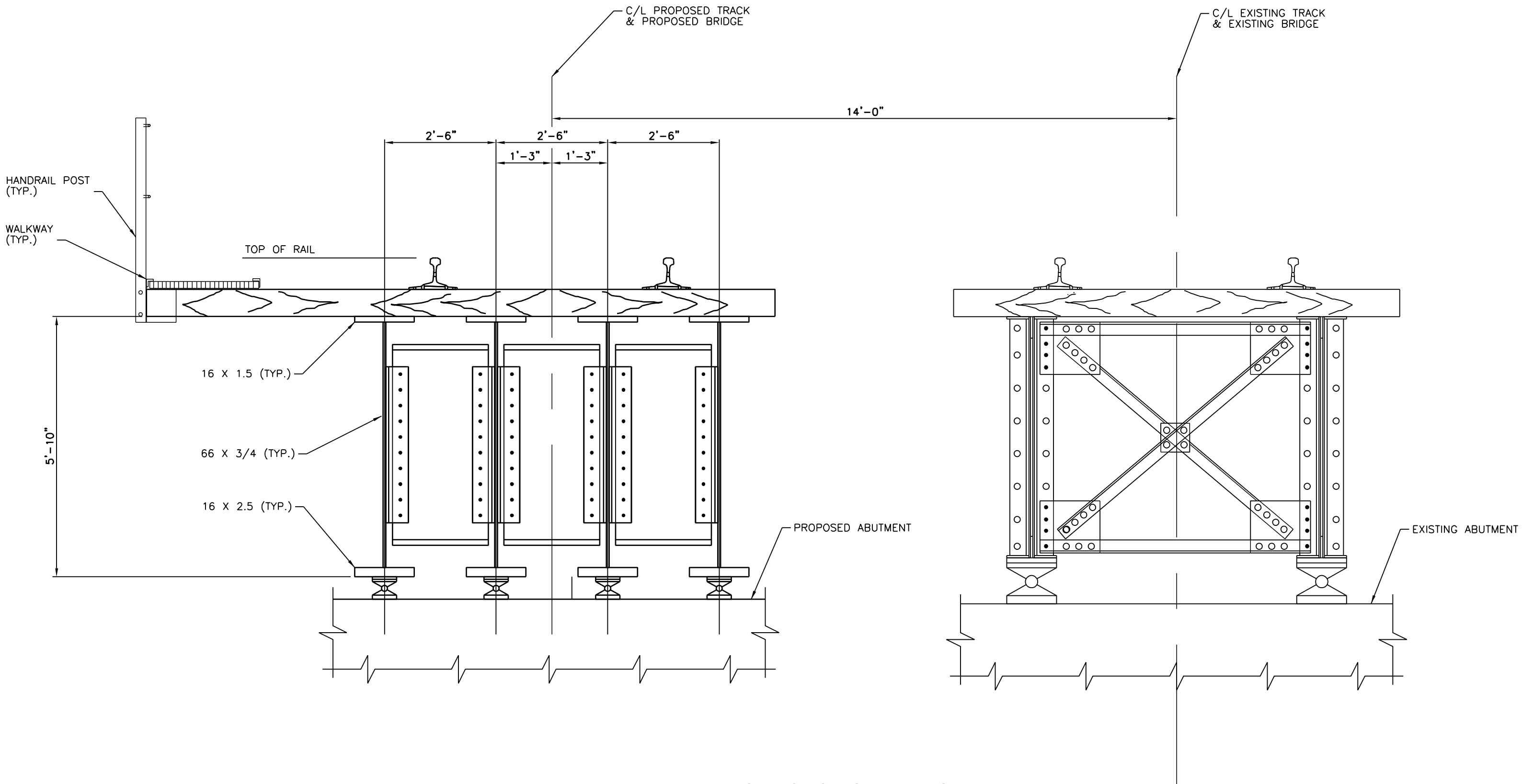

TYPICAL SECTION BRIDGE 356.53

TRANSYSTEMS CORPORATION
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SUITE 440
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PHONE: 904-245-6500
C.A. 7503

DANIEL E. BAKER
FL PE 42463

AAF MIAMI TO ORLANDO
PASSENGER SERVICE
FLORIDA

REVISIONS:

MARK	DATE	DESCRIPTION

PROJ NO: 304120040_101
SCALE: AS NOTED
DATE: 2/6/2013
DESIGNED BY: MYC
DRAWN BY: DJS
CHECKED BY: DEB

SHEET TITLE:
ARCH CREEK
BRIDGE 356.53
TYPICAL
SECTION

SHEET NO.
MP 356.53 (3)
SHEET 3 OF 4

NOT FOR CONSTRUCTION
PERMITTING PURPOSES ONLY

IF THIS DRAWING IS LESS THAN 22" X 34" IT IS A REDUCED SIZE DRAWING

Appendix D
Wetland Assessment Forms

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Goat Creek at Mile Post 202.59		Goat Creek Project Site

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
812 (Transportation)	612 (Mangroves); 642 (Coastal Marsh)	Impact	0.001

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Northern Indian River Lagoon/21	Class III	None

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The assessment area includes Goat Creek , located in Malabar, FL. Goat Creek drains intoIndian River Lagoon. Goat Creek is connected to the surrounding landscape primarily through the surface water. Areas of mangrove wetlands still exist in the assessment area.

Assessment area description

The assessment area is classified as "Other surface water". The creek bottom substrate was generally muddy sand overlain by rail ballast. At the time of inspection the water in the creek was fresh. One mature white mangrove is located on the southwest shore immediately adjacent to the bridge and three red mangroves are present approximately 50-75 meters downstream from the bridge.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Indian River Lagoon	Many of the tidally influence tribuatry within Brevard county are surrounded by residential development and have been channelized. Goat Creek is not surrounded by residential land us and is fairly sinuos.

Functions	Mitigation for previous permit/other historic use
The assessment area functions as habitat for marine and avian fauna and marine and terrestrial flora. The mangroves may serve as a buffer against tidal erosion.	Not present

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Various wading birds (such as egrets, herons, rails, and sandpipers), american alligator, mud turtle, diamondaback terrapin, marine turtles, mangrove water snake, sheepshead, mosquito fish, snook, marsh killifish, and various crabs	Manatee (federally E; resting, foraging; no manatees observed; habitat appeared marginal for the manatee) and sea turtle species (federally E and T (Loggerhead); foraging; no Sea turtles observed; habitat appeared marginal for sea turtles)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Wildlife observed during the September site visit included: small crabs and mullet.

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Kevin Shelton/Joy Ryan/Shannon McMorrow	9/18/2012 & 9/20/2012

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
AAF Goat Creek at MP 202.59		Goat Creek at MP202.59
Impact or Mitigation	Assessment conducted by:	Assessment date:
Impact	Kevin Shelton/Joy Ryan/Shannon McMorrow	9/18/2012 & 9/20/2012

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 6	with: 0	**CURRENT:** The area is currently being impacted by the existing railroad bridge and associated structures. Regarding support for wildlife from habitats outside the assessment area; there is forest surrounding the assessment area with minimal residential and transportation landuse. Upstream of the assessment area, the mangrove forest seems intact. This land use allows terrestrial wildlife access to and from the assessment area. Wading birds could access the assessment area by flight. Wildlife could potentially access the assessment area from the tributary itself (upstream and downstream). Goat Creek has the potential to be utilized by the manatee to access upstream habitats; however, the creek's size begins to decrease and would likely prevent migration of animals as large as manatee upstream. Goat Creek passes beneath US Highway 1 just east (approximately 375 feet) of the assessment area. Goat Creek is hydrologically connected to Indian River Lagoon (~1000 feet NE of assessment area). The assessment area provides moderate benefits to downstream fish and wildlife, habitats, and other hydrologically connected areas. Exotic Brazilian pepper was common within the assessment area. Impacts of land use outside the assessment area to fish and wildlife: Noise, people, domesticated animals, boats, automobiles and other vehicles, and runoff of pollutants reduce the quality of the habitat within the assessment area. **WITH IMPACT:** The proposed action will include removal and replacment of the existing single track bridge, with a double track bridge.The noise and vibration impacts associated with the existing railroad bridge, will increase with the additional traffic, potentially reducing support to wildlife and wildlife access to and from the assessment area. As a result of the avoidance and minimization practices implemented during the design of the proposed development, non-permanently impacted Landscape and Location Support resources within the assessment area will maintain their current ecological function and value.
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 5	with: 0	**CURRENT:** Standing (flowing) freshwater was observed in the assessment area during the site visit. Goat Creek, in the assessment area, has generally consistent water levels & flows, depth, and currents for a tidally influenced creek. Higher water level indicators were noted by water staining of the ballast. Due to some residential landuse upstream of the assessment area, water quality within the assessment area is moderate. The steep banks of the tributary prevents the natural movement of water into the mangrove ecosystem. **WITH IMPACTS:** The proposed bridge replacement is unlikely to permanently alter water quality within the assessment area. During the bridge construction phase, the implementation of Best Management Practices will limit or eliminate the transport of sediment and debris outside the project area. (As a result of the avoidance and minimization practices implemented during the design of the proposed development, the non permanently impacted wetland resources within the assessment area will maintain their current ecological function and value as they pertain to the water environment)
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 4	with: 0	**CURRENT**: Plant cover and species in the assessment area was limited so far as structure (vegetation primarily in shrub layer); species diversity was poor, with Brazillian pepper being the dominant species. Other wetland species (saltbush, pond apple) were observed. One mature white mangrove located southwest shore, adjacent to the bridge. Plant condition was generally moderate, due to the presence of ballast along the river bank and the existing structures. The current substrate is consolidated and light is poor. No evidence of coarse woody debris, snag, den and cavity habitat were observed. The land mgmt practices (maintaining rail bridge and rail ROW) are adversely affecting vegetation in the assessment area (presence of ballast, steep slopes). Submerged aquatic vegetation was not observed. **WITH IMPACT:** Permanent impacts associated with installation of new pilings and shading from the new bridge will result in loss of mangrove wetlands. One mature white mangrove will be removed.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres: 0.5	with: 0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 0.0005

Delta = [with-current]
-0.5

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Unnamed Creek at Mile Post 259.95		Unnamed Creek Project Site

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
812 (Transportation)	612 (Mangroves)	Impact	0.002

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
North St. Lucie/ 43	Class III	None

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The assessment area includes an unnamed creek, located in Jensen Beach, Martin County, FL, that drains into the St. Lucie River. The unnamed creek is connected to the surrounding landscape primarily through the surface water. Areas of mangrove wetlands still exist in the assessment area. The St. Lucie River flows into the Indian River Lagoon.

Assessment area description

The assessment area is classified as a tidally influenced riparian zone colonized by red mangroves. Small red mangroves were observed growing beneath the existing rail bridge. The observed water depth within the unnamed creek was approximately 1 to 2 ft deep. Based on the results of the benthic survey, the substrate within the assessment area is comprised of a mixture of sand, muck, and shells.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Rio Nature Park (a small Martin County park) is just south of the assessment area, on the east side of the unnamed creek.	Many of the tidally influence tribuatries within Martin county are surrounded by residential development, as is the unnamed tributary at MP 259.95.

Functions	Mitigation for previous permit/other historic use
The assessment area functions as habitat for marine and avian fauna and marine and terrestrial flora. The mangroves may serve as a buffer against tidal erosion.	Not present

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Various wading birds (such as egrets, herons, rails, and sandpipers), american alligator, mud turtle, diamondback terrapin, marine turtles, mangrove water snake, sheepshead, mosquito fish, snook, marsh killifish, and various crabs	Florida Wood Stork (federally E; foraging; no wood storks observed); Manatee (federally E; resting, foraging; no manatees observed; habitat appeared marginal for the manatee); the waterway is located within the federally-protected Essential Fish Habitat (EFH) for a variety of species, including the smalltooth sawfish

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Field personnel observed fiddler crabs, hermit crabs, clams, and oysters.

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Jeremy Paris/ Shannon McMorrow	9/11/2012

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Unnamed Creek at Mile Post 259.95		Unnamed Creek Project Site
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	Jeremy Paris/ Shannon McMorrow	9/11/2012

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 4 with: 0	**CURRENT**: The area is currently being impacted by the existing railroad bridge and associated structures. The assessment area is located ~100 ft NW of Rio Nature Park, and ~600 ft N of the St. Lucie River (the marina located south of the assessment area is located on a dredged opening of the unnamed creek that feeds directly into the St. Lucie River). Regarding support to the assessment area for wildlife by outside habitats; this is minimal as the assessment area is located within a small triangle of undeveloped, wooded land with barriers on all sides. Terrestrial wildlife access to and from the site is very limited: to the N is a major highway (NW Dixie Highway); to the S is a paved secondary road (NW Alice St.). A small (10-15 acre) undeveloped, wooded area, is located to the NE of the assessment area, but it is also bound by paved roadways and commercial/industrial business. Wading birds could access the assessment area by flight. Wildlife could potentially access the assessment area from the creek itself (upstream and downstream) and the creek is a source of water for wildlife within the bound triangle of land. Red mangrove prop roots observed in the assessment area typically provide necessary habitat for several juvenile fish species. The invasive, exotic species Brazilian pepper & Australian pine were observed in the vicinity of the assessment area. Impacts of land use outside the assessment area to fish and wildlife: Noise, people, domesticated animals, boats, automobiles and other vehicles, and runoff of pollutants reduce the quality of the habitat within the assessment area. **WITH IMPACT**: The proposed action will occur on the west side of the existing bridge.The noise and vibration impacts associated with the existing railroad bridge, will increase with the additional traffic, potentially reducing support to wildlife and wildlife access to and from the assessment area. As a result of the avoidance and minimization practices implemented during the design of the proposed development, non-permanently impacted Landscape and Location Support resources within the assessment area will maintain their current ecological function and value.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 5 with: 0	**CURRENT**: Standing (flowing) water was observed in the assessment area. The creek in the assessment area has generally consistent water levels & flows, depth, and currents for a tidally influenced creek. Higher water level indicators were noted on bridge pilings. The assessment area is a disturbed site; community zonation of wetland vegetation was not observed; banks of creek were steep. The steep banks of the tributary prevents the natural movement of water into the mangrove ecosystem. The creek that passes through the assessment area can potentially be used as a corridor for wetland wildlife species. **WITH IMPACT**: The proposed bridge replacement is unlikely to permanently alter water quality within the assessment area. During the bridge construction phase, the implementation of Best Management Practices will limit or eliminate the transport of sediment and debris outside the project area. (As a result of the avoidance and minimization practices implemented during the design of the proposed development, the non permanently impacted wetland resources within the assessment area will maintain their current ecological function and value as they pertain to the water environment)
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 4 with: 0	**CURRENT**: Plant cover and species in assessment area was limited so far as structure (vegetation primarily in shrub layer); species diversity was poor (primarily red mangroves, a desirable plant species and Brazilian pepper, an undesirable species). Plant condition was generally moderate, due to the presence of ballast along the river bank and the existing structures, the current substrate is consolidated and light is poor, resulting in stunted growth of some mangroves. Other plant species observed included black mangrove, maidencane, live oak, and Australian pine. Brazilian pepper and Australian pine are classified as a FLEPPC invasive exotic plant. No evidence of coarse woody debris, snag, den and cavity habitat were observed. The land mgmt practices (maintaining rail bridge and rail ROW) are adversely affecting vegetation in the assessment area (presence of ballast, steep slopes) . Submerged aquatic vegetation was not observed. **WITH IMPACT**: Permanent impacts associated with installation of the new bridge will result in the removal of 1 medium size (<4 inch DBH) red mangrove and associated propagules. Additional red mangroves may be trimmed in accordance with FDEP guidance.

Score = sum of above scores/30 (if uplands, divide by 20)	If preservation as mitigation, **Not Applicable**	For impact assessment areas
current or w/o pres: 0.43333 with: 0	Preservation adjustment factor =	FL = delta x acres = 0.0009
	Adjusted mitigation delta =	

Delta = [with-current]	If mitigation	For mitigation assessment areas
-0.43	Time lag (t-factor) =	RFG = delta/(t-factor x risk) =
	Risk factor =	

US Army Corp. of Engineers Wetland Rapid Assessment Procedure (WRAP) Score Sheet			
Category	Possible Score	Score	Notes
Wildlife Utilization Matrix			
Existing Wetland Exhibits No Evidence of Wildlife	0		The wetland area is impacted by the existing railroad. The railroadacts as a barrier to wildlife movement and the noise acts as a disturbance to wildlife. There was limited wildlife utilization observed during the site visit. The Creek itself acts as a corridor for aquatic fauna.
Existing Wetland Exhibits Minimal Evidence of Wildlife Utilization	1	1.5	
Existing Wetland Exhibits Moderate Evidence of Wildlife Utilization	2		
Existing Wetland Exhibits Strong Evidence of Wildlife Utilization	3		
Wetland overstory/shrub canopy of Desirable Species Matrix			
No Desirable Wetland Overstory/Shrub Canopy Trees Present	0		The dominant canopy/shrub species were red and black mangroves and were healthy and there was recruitment of young mangrove propagules. The invasive exotic species Brazilian Pepper was also common.
Minimal Desirable Wetland Overstory/Shrub Canopy Trees Present	1		
Moderate Desirable Wetland Overstory/Shrub Canopy Trees Present	2	1.5	
Abundant Desirable Wetland Overstory/Shrub Canopy Trees Present	3		
Wetland Vegetative Ground Cover of Desirable Species			
No Desirable Vegetative Ground Cover Is Present	0		The rail ROW is mowed and herbicided to maintain visibilty within the rail corridor, thus reducing plant diversity, thus ground cover was minimal. In addition, the invasive exotic species torpedograss was common.
Minimal Desirable Vegetative Ground Cover Is Present	1	1	
Moderate Amount of Desirable Vegetative Ground Cover is Present	2		
Moderate Amount of Desirable Vegetative Ground Cover is Present	3		
Adjacent Upland/Wetland Buffer Matrix			
No Adjacent Upland/Wetland Buffer	0		The habitat/land use to the west of the project area is primarily single family residential and commercial land use; however, there is a greater than 30 foot, less than 300 foot vegetated buffer between these land uses and the wetland; however, there is a pedestrian walkway within 50 feet of the assessment area. To the east of the wetland area, the land use is the railroad with no vegetated buffer.
Adjacent Upland/Wetland Buffer Averages 30 (ft) or less, containing desirable plant species	1		
Adjacent Upland/Wetland Buffer Averages greater than 30 (ft) but less than 300 (ft), containing predominately desirable plant species	2	1	
Adjacent Upland/Wetland Buffer Averages greater than than 300 (ft) containing predominately desirable plant species	3		

US Army Corp. of Engineers Wetland Rapid Assessment Procedure (WRAP)
Score Sheet (continue)

Field Indicators of Wetland Hydrology Matrix

Hydrologic Regime has Become Severely altered with Strong Evidence of Succession to Transitional/Uplant or Open Water Plant Community	0		Standing (flowing) water was observed in the assessment area during the site visit; the depth of the tributary was estimated as 4 feet during mid-tide. The tributary in the assessment area has generally consistent water levels & flows, depth, and currents for a tidally influenced creek. Higher water level indicators were noted by water staining of the ballast. The hydrologic regime is adequate to maintain a viable wetland system; however, is affected by external features primarily the existing railroad.
Hydrologic Regime Inadequate to Maintain a Viable Wetland System	1	2	
Hydrologic Regime Adequate to Maintain a Viable Wetland System External Features May Affect Wtland Hydrology	2		
Hydrologic Regime Adequate to Maintain a viable Wetland System	3		

Water Quality Input and Treatment Matrix

Land Use Category					
LU1 Railroad (15%) score 1.5				LU 1	0.225
LU2 Single Family Residential (70%) score 1.5				LU 2	1.05
LU3 Commercial Low (5%) score 2				LU3	0.1
LU4 Natural Undeveloped (10%) score 3				LU4	0.3
				LU Total	1.675
Pre-treatment Category					
LU1 Railroad (15%) - grass swales only (1)				LU 1	0.15
LU2 Single Family Residential (70%)- wet/dry detention (2.5)				LU 2	1.75
LU3 Commercial Low (5%) - grass swales only (1)				LU 3	0.05
LU4 Natural Undeveloped (10%) - natural land (3)				LU4	0.3
				LU Total	2.25
				WQIT	1.9625
Water Quality Input and Treatment Total	3	1.9625			
	Total Possible	Total			
	18	8.9625			
Wrap Score	0.50				

US Army Corp. of Engineers Wetland Rapid Assessment Procedure (WRAP) Score Sheet			
Category	Possible Score	Score	Notes
Wildlife Utilization Matrix			
Existing Wetland Exhibits No Evidence of Wildlife	0		The wetland area is impacted by the existing railroad. The railroadacts as a barrier to wildlife movement and the noise acts as a disturbance to wildlife. There was limited wildlife utilization observed during the site visit. The Creek itself acts as a corridor for aquatic fauna.
Existing Wetland Exhibits Minimal Evidence of Wildlife Utilization	1	1.5	
Existing Wetland Exhibits Moderate Evidence of Wildlife Utilization	2		
Existing Wetland Exhibits Strong Evidence of Wildlife Utilization	3		
Wetland overstory/shrub canopy of Desirable Species Matrix			
No Desirable Wetland Overstory/Shrub Canopy Trees Present	0		The dominant sub canopy species were red, black and white mangroves, which were healthy and recruitment of young mangrove propagules was observed. The invasive exotic species Brazilian Pepper was also common.
Minimal Desirable Wetland Overstory/Shrub Canopy Trees Present	1		
Moderate Desirable Wetland Overstory/Shrub Canopy Trees Present	2	1.5	
Abundant Desirable Wetland Overstory/Shrub Canopy Trees Present	3		
Wetland Vegetative Ground Cover of Desirable Species			
No Desirable Vegetative Ground Cover Is Present	0		The rail ROW is mowed and herbicided to maintain visibilty within the rail corridor, thus reducing plant diversity, thus ground cover was minimal. In addition, the rail ballast along the creek limited groundcover vegetation. However, swamp lily was common within the wetland assessment area.
Minimal Desirable Vegetative Ground Cover Is Present	1	2	
Moderate Amount of Desirable Vegetative Ground Cover is Present	2		
Moderate Amount of Desirable Vegetative Ground Cover is Present	3		
Adjacent Upland/Wetland Buffer Matrix			
No Adjacent Upland/Wetland Buffer	0		The habitat/land use to the west of the project area is primarily single family residential and undeveloped land use; and, to the east of the wetland area, the land use is the railroad. Despite the residential and railroad land uses there is a vegetated buffer (approximately 30 feet in width) surrounding the majority of the wetland.
Adjacent Upland/Wetland Buffer Averages 30 (ft) or less, containing desirable plant species	1		
Adjacent Upland/Wetland Buffer Averages greater than 30 (ft) but less than 300 (ft), containing predominately desirable plant species	2	1.5	
Adjacent Upland/Wetland Buffer Averages greater than than 300 (ft) containing predominately desirable plant species	3		

US Army Corp. of Engineers Wetland Rapid Assessment Procedure (WRAP)
Score Sheet (continue)

Field Indicators of Wetland Hydrology Matrix					
Hydrologic Regime has Become Severely altered with Strong Evidence of Succession to Transitional/Uplant or Open Water Plant Community	0		Standing (flowing) water was observed in the assessment area during the site visit; the depth of the tributary was estimated as 1 foot during mid-tide. The tributary in the assessment area has generally consistent water levels & flows, depth, and currents for a tidally influenced creek. Higher water level indicators were noted by water staining of the ballast. The hydrologic regime is adequate to maintain a viable wetland system; however, is affected by external features primarily the existing railroad.		
Hydrologic Regime Inadequate to Maintain a Viable Wetland System	1	2			
Hydrologic Regime Adequate to Maintain a Viable Wetland System External Features May Affect Wtland Hydrology	2				
Hydrologic Regime Adequate to Maintain a viable Wetland System	3				
Water Quality Input and Treatment Matrix					
Land Use Category					
LU1 Railroad/Transportation (40%) score 1.5				LU 1	0.6
LU2 Single Family Residential (30%) score 1.5				LU 2	0.45
LU4 Natural Undeveloped (30%) score 3				LU 3	0.9
				LU Total	1.95
Pre-treatment Category					
LU1 Railroad (40%) - grass swales only (1)				LU 1	0.4
LU2 Single Family Residential (30%)- grass swales only (1)				LU 2	0.3
LU4 Natural Undeveloped (30%) - natural land (3)				LU 3	0.9
				LU Total	1.6
				WQIT	1.775
Water Quality Input and Treatment Total	3	1.775			
	Total Possible	Total			
	18	10.275			
Wrap Score	0.57				

US Army Corp. of Engineers Wetland Rapid Assessment Procedure (WRAP) Score Sheet			
Category	Possible Score	Score	Notes
Wildlife Utilization Matrix			
Existing Wetland Exhibits No Evidence of Wildlife	0		The wetland area is impacted by the existing railroad. The railroadacts as a barrier to wildlife movement and the noise acts as a disturbance to wildlife. There was limited wildlife utilization observed during the site visit. The Creek itself acts as a corridor for aquatic fauna.
Existing Wetland Exhibits Minimal Evidence of Wildlife Utilization	1	1.5	
Existing Wetland Exhibits Moderate Evidence of Wildlife Utilization	2		
Existing Wetland Exhibits Strong Evidence of Wildlife Utilization	3		
Wetland overstory/shrub canopy of Desirable Species Matrix			
No Desirable Wetland Overstory/Shrub Canopy Trees Present	0		The dominant subcanopy species was the invasive exotic Brazilian Pepper followed by the invasive exotic primrose willow. The ROW is maintained to accomodate visibility along the rail corridor, thus reducing plant diversity.
Minimal Desirable Wetland Overstory/Shrub Canopy Trees Present	1		
Moderate Desirable Wetland Overstory/Shrub Canopy Trees Present	2	0.5	
Abundant Desirable Wetland Overstory/Shrub Canopy Trees Present	3		
Wetland Vegetative Ground Cover of Desirable Species			
No Desirable Vegetative Ground Cover Is Present	0		Ground cover within the wetland is fair, including bushy bluestem, torpedograss, and duck potato. Torpedograss is an invasive exotic species. The rail ROW is mowed and herbicided to maintain visibilty within the rail corridor, thus reducing plant diversity.
Minimal Desirable Vegetative Ground Cover Is Present	1	2	
Moderate Amount of Desirable Vegetative Ground Cover is Present	2		
Moderate Amount of Desirable Vegetative Ground Cover is Present	3		
Adjacent Upland/Wetland Buffer Matrix			
No Adjacent Upland/Wetland Buffer	0		The habitat/land use to the west of the wetland area is single family residential and undeveloped; and, to the east is the railroad. There is little to no vegetated buffer between the railroad and residential land uses and the wetland; however, the undeveloped natural area to the southwest provides a buffer greater than 30 ft, but less than 300 feet dominated by Brazilian Pepper (an undesireable species) .
Adjacent Upland/Wetland Buffer Averages 30 (ft) or less, containing desirable plant species	1		
Adjacent Upland/Wetland Buffer Averages greater than 30 (ft) but less than 300 (ft), containing predominately desirable plant species	2	1.5	
Adjacent Upland/Wetland Buffer Averages greater than than 300 (ft) containing predominately desirable plant species	3		

US Army Corp. of Engineers Wetland Rapid Assessment Procedure (WRAP)
Score Sheet (continue)

Field Indicators of Wetland Hydrology Matrix			
Hydrologic Regime has Become Severely altered with Strong Evidence of Succession to Transitional/Uplant or Open Water Plant Community	0		Standing water and hydrologic indicators including high water marks on the trees were observed in the assessment area. Soil at the edge of the wetland was muck. The assessment area is hydrologically connected to the Tributary to Manatee Creek. The hydrologic regime is adequate to maintain a viable wetland system; however, is affected by external features primarily the existing railroad.
Hydrologic Regime Inadequate to Maintain a Viable Wetland System	1	2	
Hydrologic Regime Adequate to Maintain a Viable Wetland System External Features May Affect Wtland Hydrology	2		
Hydrologic Regime Adequate to Maintain a viable Wetland System	3		

Water Quality Input and Treatment Matrix					
Land Use Category					
LU1 Railroad (15%) score 1.5				LU 1	0.225
LU2 Single Family Residential (70%) score 1.5				LU 2	1.05
LU3 Natural Undeveloped (15%) score 3				LU3	0.45
				LU Total	1.725
Pre-treatment Category					
LU1 Railroad (15%) - wetland system is part of treatment (1.5)				LU 1	0.225
LU2 Single Family Residential (70%)- wet detention/dry detention (2.5)				LU 2	1.75
LU3 Natural Undeveloped (15%) - natural land (3)				LU3	0.45
				LU Total	2.425
				WQIT	2.075
Water Quality Input and Treatment Total	3	2.075			
	Total Possible	Total			
	18	9.575			
Wrap Score	0.53				

FPL Everglades Mitigation Bank- North Fork of the Middle River

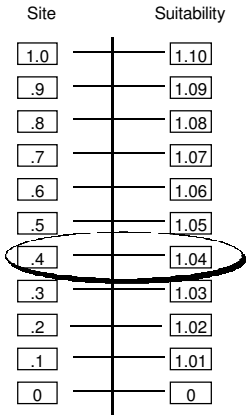
Mitigation Bank Site Suitability Evaluation (MBSE) Matrix

Parameters

Parameter	Scoring Criteria	Ratings	Score
1. Adjacent to lands or waters of regional Importance and results in identifiable ecological benefits to adjacent lands or waters.	State Park, OFW, AP, and including but not limited to Special Waters on at least 1 boundary	1	
	Adjacent lands contain no special designation or undesignated special value	0	1
2. Property is within boundary of an acknowledged state, local or regional acquisition program	Property is within boundary of an acquisition program	1	
	Property is not within boundary of an acquisition program	0	0
3. Property contains ecological or geological features consistently considered by regional Scientist, or federal and state agencies to be unusual, unique or rare in the region and is of sufficient size	Property qualifies	1	
	Property does not qualify	0	0
4. Property designated as being of critical state or federal concern and/or contains special designations,	Property contains at least 1 special designation.	1	
	Property contains no special designations.	0	1
5. Property important to acknowledged restoration efforts	Property is important.	1	
	Property is not important.	0	0
6. Ownership and control of the property.	Property is privately owned.	1	
	Property is publicly owned.	0	1
7. Threatened , Endangered & Species of Special Concern Presence of animal species (faunal) found on site	Documented Presence of Species on site	1	
	No documented Presence of species on site.	0	1
8. Threatened , Endangered & Listed Species Presence of plant species (floral) found on site	Documented Presence of Species on site	1	
	No documented Presence of species on site.	0	0
9. Threat of loss or destruction from development activities. *(Development Pressure)*	High probability of development.	1	
	Low probability of development.	0	0
10. Extent to which lands are subject to Local, State, and Federal dredge and fill/ ERP Regulations	Property is not regulated.	1	
	Property is regulated.	0	0
	Value Cumulative Score (CS)		**4**

The Mitigation Bank Site Suitability Evaluation Matrix is designed to provide a quantifiable means of determining the number of mitigation credits that should be assigned to a bank for **"value"** related parameters. Value related parameters are human values determined to be important to society; and therefore are not measurable in a purely functional analysis. Functional analysis will only measure the degree of functional ecological improvement (degree of ecological improvement) resulting from mitigation activities. The SS Evaluation measures and provides credit for societal values that separate one mitigation bank from another as required by Ch. 62-342 .470 (a) (b) (e) (f) (g) (h) (i) F.A.C.. The SS evaluation is not to be utilized in conjunction with a functional analysis methodology which also utilizes value related parameters in its analysis.

Evaluation Scale



Site Suitability Matrix		
Maximum Possible Score (MPS)		10
Cumulative Score (CS)		**4**
Site Suitability		**0.4**

EPA, USACOE, USF & W, FDEP, NMFS, SFWMD, Dade DERM, FPL, CH

3-Apr-96

After Calculating the Site Suitability Score determine the Site Suitability Multiplier by utilizing the Evaluation Scale to the left. The Site Suitability Multiplier is to be multiplied times the number of the Functional Mitigation Credits, resulting from the **(W.A.T.E.R.)** Functional Assessment of the Mitigation Bank, to determine the number of Site Suitability Credits to be assigned to the Mitigation Bank.

Prepared By:
Cotleur Hearing
2/12/2013

Mitigation Bank Wetland Function Evaluation Matrix

Project: North Fork

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews
Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County

Reviewer: J. Baker
Date: 2/11/2013

Parameter/ Function	Scoring Criteria	Ratings	Polygon	Polygon
1. Fish & Wildlife Functions *Apply to freshwater, saltwater, brackish and mitigation systems*				
a. Waterfowl, wading birds, wetland dependent, or aquatic birds of prey. (Mit. Bank - High specie count w/ low pop. #'s score 1	7 or more species commonly observed	3	1	
	3-6 species commonly observed	2		
	1-2 species commonly observed	1		
	0 species commonly observed	0		
b. Fish (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	7 or more species commonly observed	3	3 (based on observed species count)	
	3-6 species commonly observed	2		
	1-2 species commonly observed	1		
	0 species commonly observed	0		
c. Mammals (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	Top predator (carnivore) &/or large mammals	3	3 (based on manatee zone)	
	Medium sized mammals , (adult weight > 6 ibs.)	2		
	Small animals (rodents, etc.) , (adult weight < 6 lbs.)	1		
	0 species present	0		
d. Aquatic macroinvertebrates, amphibians (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	7 or more species commonly observed	3	2	
	3-6 species commonly observed	2		
	1-2 species commonly observed	1		
	0 species commonly observed	0		
e. Aquatic reptiles (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	Large species observed	3	1	
	Aquatic turtles	2		
	Snakes & lizards	1		
	No evidence of species present	0		
2. Vegetative Functions *Apply to freshwater, saltwater, brackish and mitigation systems*				
a. Overstory/shrub canopy	Desirable trees/shrub healthy & providing appropriate habitat (seedlings present) & no inappropriate species	3	2	
	Desirable trees/shrubs exhibit signs of stress (no seedlings) few inappropriate species present	2		
	Inappropriate trees/shrubs shading or overcoming desirable tree/shrubs	1		
	Very little or no desirable tree/shrubs present (evidence suggests there should be)	0		
b. Vegetative ground cover	Assessment area exhibits <2% inappropriate herbaceous ground cover for specific wetland systems and groundcover is present	3	2 (exotic species and rip rap present)	
	Assessment area contains >2% but <30% inappropriate herbaceous groundcover, or lack of groundcover >2% but < 30%	2		
	Assessment area contains >30% to <70% inappropriate herbaceous groundcover, or lack of ground cover >30% to <70%	1		
	Assessment area >70% inappropriate herbaceous groundcover or lack of groundcover >70%	0		
c. Periphyton mat coverage	Periphyton (Blue-green algae) present with average mat thickness >1 1/4 in. (measure active & dead layer)	3	0	
	Periphyton (Blue-green algae) present with average mat thickness between 3/4 in. to 1 1/4 in. (active & dead layer)	2		
	Periphyton (Blue-green algae) present with average mat thickness between 1/4 in. to 3/4 in. (active & dead layer)	1		
	Periphyton (Blue-green algae) not present or if pressent with average thickness of 0.0 to 1/4 in. (active & dead layer)	0		
d. Category 1 and Category 2 exotic plants or (non-native) species	< (or = to) 1 % exotic plant cover	3	2	
	>1 % to 10 % exotic plant cover	2		
	>10 % to 65 % exotic plant cover	1		
	> 65 % exotic plant cover	0		
e. Habitat diversity (vegetative) *(within assessment area)*	>3 native species communities on site within assesssment area	3	1	
	2 or 3 native specie communities on site within assessment area	2		
	1 native species community with 75 % to 90 % coverage within assessment area	1		
	1 native species community has > 90 % coverage within assessment area	0		
f. Biological diversity within 3000 feet *(approximately 1/2 mile from edge of assessment area)*	> 3 alternative habitats available (including upland)	3	3	
	2 to 3 alternative habitats	2		
	1 alternative habitat	1		
	Same habitat type, or inappropriate / impacted	0		

North Fork of the Middle River

3. Hydrologic Functions				
a. Surface water hydrology / sheet flow *Apply to freshwater, saltwater, brackish and mitigation systems*	Major connection *(Flowing water/ river or floodplain/ uniform flow through natural systems)*	3	3 (Serves as major tidal connection)	
	Moderate connection *(Natural restriction of flow or Flowing water due to hydrologic engineering)*	2		
	Minor connection *(Runoff collection point, or uneven flow due to berms, ditches, roadways etc,)*	1		
	Hydrologically isolated, no net lateral movement	0		
b. Hydroperiod (normal year) fresh systems	> 8 months inundated with no reversals & every year drydown	3		
	>5 months < 8 months or >5 years continuous inundation (look for strong water stains on persistent vegetation)	2		
	>1 month < 5 months, with possible reversals (look for soft or less distinct water stains on persistent vegetation)	1		
	< 4 weeks cumulative annual inundation or < 2 weeks continuous inundation	0		
b-1 Alternate to b. for Short Hydroperiod (normal year) fresh systems:	>10 weeks of continuous inundation including soil saturation	3		
	> 6 weeks but <10 weeks of continuous inundation including soil saturation	2		
	>2 weeks but <6 weeks of inudation, including soil saturation	1		
	<2 weeks of continuos inundation	0		
b-2 Alternate to b. for Saltwater, brackish (tidal) systems	Inundated by >90% high tides			
	Inundated by "spring" high tides (bi-monthly)	2		
	Inundated by "extreme high" tides only (biannually)	1		
	Inundated by storm surges only	0		
b-3 Alternate to b. for High Marsh (Juncus-Distichlis)	Inundated by high "spring" tides (monthly) and flushed by fresh water sheetflow every 10 days average	3		
	Inundated by high "spring" tides (monthly) and flushed by fresh water sheetflow every 30 days on the average	2		
	Inundated by high "spring" tides (monthly) and exposed to rain only	1		
	Inundated by >50% high tides and exposed to rain only	0		
b-4 Alternate to b. for Riverine systems	Inundated by high tides (daily) and/or recieves and maintains fresh water at least into first half of dry season	3	1	
	Inundated by high tides (daily) and/or recieves and maintains fresh water during rainy season only	2		
	Inundated by high tides (daily) and/or recieves fresh water but does not maintain (reversal) during rainy season	1		
	Inundated by spring tides (bi-monthly) and/or experiences frequent reversals of fresh water (flashy)	0		
3. Hydrologic Functions continued				
c. Hydropattern (fresh system)	>1 ft. water depth for at least 2.5 months and <6 in. for >1 month (measure water mark/ lichen line), or water depth ideal for specific wetland system.	3		
	>6 in to 1 ft. for at least 2.5 months (measure water mark/ lichen line) or water depth borderline over or under for specific wetland system	2		
	<6 in. for at least 2.5 months (measure water mark/ lichen line) or water depth incorrect for specific wetland system	1		
	<6 in. in association with either canals, ditches, swales, culverts, pumps, and/or wellfields, or these factors cause water depth to be too deep for specific system.	0		
c-1 Alternate to c. for Saltwater, brackish (tidal) systems	>1 ft. water depth <2 ft. on 90% high tides	3		
	> 6 in. water depth <1 ft. on >50% high tides	2		
	< 6 in. water depth , but > than saturated	1		
	Saturated by saline water table only	0		
c-2 Alternate to c. for High Marsh (Juncus-Distichlis)	>10 in. water depth <2 ft. on regular basis during growing season	3		
	>5 in. to 10in. water depth on regular basis during growing season	2		
	>1 in. to 5 in. water depth on regular basis during growing season	1		
	>0.0 in. to 1 in. water depth sporadically during growing season	0		
c-3 Alternate to c. for Riverine systems	>2 ft. water depth (main channel) <6 ft. for 8 months	3	3	
	>2 ft. water depth (main channel) <4 ft. for 6 months	2		
	>1 ft. water depth (main channel) <2.5 ft. for 4 months	1		
	<1 ft. water depth, but dry for >4 weeks (dry season)	0		

North Fork of the Middle River

3. Hydrologic Functions continued				
d. Water Quality	No indication of poor water quality (lab testing required, all values within acceptable range)	3	2 (based on visual observation)	
	No visual indicators of poor water quality observed (1 value just over or under acceptable range)	2		
	Visual indicators of poor water quality questionable (2 values over or under acceptable range)	1		
	Visual indicators of poor water quailty observed or lab verified (values are out of acceptable range)	0		
e. Intactness of historic topography (soil disturbance)	Unaltered	3	0	
	Slightly altered soil disturbance, < 10% of assessment area	2		
	Moderately altered soil disturbance, < 25% of assessment area	1		
	Extremely altered soil disturbance, may exceed 50% of assessment area	0		
f. Soils, organic (fresh systems)	Organic soil classified hydric soil >12 in. or any thickness over bedrock/caprock with perched water table and either condition covering >90% of surface area	3		
	Organic soil classified hydric soil >6 in. but <12 in. and covering >90% of surface area	2		
	Organic soil classified hydric soil >1 in. but <6 in. and covering >50% but <90% of surface area	1		
	Organic soil classified non-hydric soil <1 in. for >50% of surface area	0		
f-1 Alternate to f. for *Freshwater, saltwater systems*	Sandy soil classified hydric soil with distinct mottling and concretions present in greater than 40% of horizon.	3		
	Sandy soil classified hydric soil with mottling and concretions present in > 20% but < 40% of horizon.	2		
	Sandy soil classified hydric soil with light or sparse mottling and concretions < 2 mm diameter or < 20% of horizon.	1		
	Sandy soil exhibits strong evidence of disturbance or mechanical manipulations or is fill material.	0		
f-2 Alternate to f. for *Freshwater, saltwater, brackish (tidal) systems*	Calcareous loam >12 in. and >90 % of surface area	3	0	
	Calcareous loam >6 in. to <12 in. and >90% of surface area	2		
	Calcareous loam >1 in. to <6 in. and covering >50% but <90% of surface area	1		
	Calcareous loam <1 in. for >50% of surface area	0		
4. Salinity Parameters *Apply to freshwater, saltwater, brackish, hypersaline and mitigation systems -* ***Choose 1***				
a. Optimum salinity for fresh systems during growing season based on mean high salinity for a normal year. *Apply to freshwater systems within 5 miles of the coast*	<2 parts per thousand (ppt)	3		
	2 to 3 parts per thousand (ppt)	2		
	4 to 5 parts per thousand (ppt)	1		
	>5 parts per thousand (ppt)	0		
a-1. Alternate to a. Optimum salinity for brackish systems during growing season based on mean high salinity for a normal year. *Apply to brackish (tidal) systems only*	6 to 8 parts per thousand (ppt)	3		
	9 to 13 parts per thousand (ppt)	2		
	14 to 16 parts per thousand (ppt)	1		
	>16 parts per thousand (ppt)	0		
a-2. Alternate to a. Optimum salinity for saline systems during growing season based on mean high salinity for a normal year. *Apply to saline marsh (tidal) systems only*	17 to 19 parts per thousand (ppt)	3		
	20 to 22 parts per thousand (ppt)	2		
	23 to 25 parts per thousand (ppt)	1		
	>25 parts per thousand (ppt)	0		
a-3. Alternate to a. Optimum salinity for hypersaline systems during growing season based on mean high salinity for a normal year. *Apply to hypersaline (tidal) systems only*	26 to 41 parts per thousand (ppt)	3		
	42 to 46 parts per thousand (ppt)	2		
	47 to 51 parts per thousand (ppt)	1		
	>51 parts per thousand (ppt)	0		
a-4 Alternate to a. Optimum salinity for riverine/tidal creek system during growing season based on mean high slainity for a normal year. *Apply to riverine systems only*	bottom (lower) third between 12 to 25 ppt middle third between 5 to 11 ppt. upper (top) third betweem 0 to 4 ppt.	3	2 (estimated)	
	bottom (lower) third between 25 to 32 ppt middle third between 6 to 24 ppt. upper (top) third betweem 0 to 5 ppt.	2		
	bottom (lower) third between 30 to 40 ppt middle third between 8 to 29 ppt. upper (top) third betweem 0 to 7 ppt.	1		
	bottom (lower) third between 35 to 50 ppt middle third between 10 to 34 ppt. upper (top) third betweem 0 to 9 ppt.	0		

Cotleur Hearing, Inc.
W.A.T.E.R. created by: Bill L. Maus
11/1/1998

Cumulative Score (SC)	31.00
Maximum Possible Score (MPS)	54.00
W.A.T.E.R. = Cumulative Score/Maximum Possible Score	0.57

North Fork of the Middle River

W.A.T.E.R SCORE	MITIGATION ACREAGE	FUNCTIONAL MITIGATION CREDITS	SITE SUITABILITY MULTIPLIER	SITE SUITABILITY CREDITS
0.57	0.005	0.00285	1	0.0029

vegetation removal, pile installation, shading, and placement of rip rap

FPL Everglades Mitigation Bank - South Fork of the Middle River

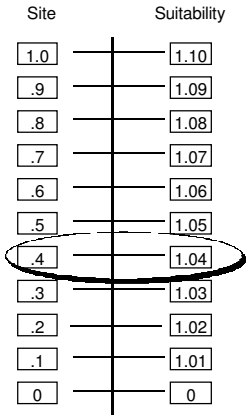
Mitigation Bank Site Suitability Evaluation (MBSE) Matrix

Parameters

Parameter	Scoring Criteria	Ratings	Score
1. Adjacent to lands or waters of regional Importance and results in identifiable ecological benefits to adjacent lands or waters.	State Park, OFW, AP, and including but not limited to Special Waters on at least 1 boundary	1	
	Adjacent lands contain no special designation or undesignated special value	0	1
2. Property is within boundary of an acknowledged state, local or regional acquisition program	Property is within boundary of an acquisition program	1	
	Property is not within boundary of an acquisition program	0	0
3. Property contains ecological or geological features consistently considered by regional Scientist, or federal and state agencies to be unusual, unique or rare in the region and is of sufficient size	Property qualifies	1	
	Property does not qualify	0	0
4. Property designated as being of critical state or federal concern and/or contains special designations,	Property contains at least 1 special designation.	1	
	Property contains no special designations.	0	1
5. Property important to acknowledged restoration efforts	Property is important.	1	
	Property is not important.	0	0
6. Ownership and control of the property.	Property is privately owned.	1	
	Property is publicly owned.	0	1
7. Threatened , Endangered & Species of Special Concern Presence of animal species (faunal) found on site	Documented Presence of Species on site	1	
	No documented Presence of species on site.	0	1
8. Threatened , Endangered & Listed Species Presence of plant species (floral) found on site	Documented Presence of Species on site	1	
	No documented Presence of species on site.	0	0
9. Threat of loss or destruction from development activities. *(Development Pressure)*	High probability of development.	1	
	Low probability of development.	0	0
10. Extent to which lands are subject to Local, State, and Federal dredge and fill/ ERP Regulations	Property is not regulated.	1	
	Property is regulated.	0	0
	Value Cumulative Score (CS)		**4**

The Mitigation Bank Site Suitability Evaluation Matrix is designed to provide a quantifiable means of determining the number of mitigation credits that should be assigned to a bank for **"value"** related parameters. Value related parameters are human values determined to be important to society; and therefore are not measurable in a purely functional analysis. Functional analysis will only measure the degree of functional ecological improvement (degree of ecological improvement) resulting from mitigation activities. The SS Evaluation measures and provides credit for societal values that separate one mitigation bank from another as required by Ch. 62-342 .470 (a) (b) (e) (f) (g) (h) (i) F.A.C.. The SS evaluation is not to be utilized in conjunction with a functional analysis methodology which also utilizes value related parameters in its analysis.

Evaluation Scale



Site Suitability Matrix		
Maximum Possible Score (MPS)		10
Cumulative Score (CS)		**4**
Site Suitability		**0.4**

EPA, USACOE, USF & W, FDEP, NMFS, SFWMD, Dade DERM, FPL, CH

3-Apr-96

After Calculating the Site Suitability Score determine the Site Suitability Multiplier by utilizing the Evaluation Scale to the left. The Site Suitability Multiplier is to be multiplied times the number of the Functional Mitigation Credits, resulting from the **(W.A.T.E.R.)** Functional Assessment of the Mitigation Bank, to determine the number of Site Suitability Credits to be assigned to the Mitigation Bank.

Prepared By:
Cotleur Hearing
2/12/2013

Mitigation Bank Wetland Function Evaluation Matrix

Project: South Fork

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews
Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County

Reviewer: J. Baker
Date: 2/11/2013

Parameter/ Function	Scoring Criteria	Ratings	Polygon	Polygon
1. Fish & Wildlife Functions *Apply to freshwater, saltwater, brackish and mitigation systems*				
a. Waterfowl, wading birds, wetland dependent, or aquatic birds of prey. (Mit. Bank - High specie count w/ low pop. #'s score 1	7 or more species commonly observed	3	1	
	3-6 species commonly observed	2		
	1-2 species commonly observed	1		
	0 species commonly observed	0		
b. Fish (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	7 or more species commonly observed	3	3 (based on observed species count)	
	3-6 species commonly observed	2		
	1-2 species commonly observed	1		
	0 species commonly observed	0		
c. Mammals (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	Top predator (carnivore) &/or large mammals	3	3 (based on manatee zone)	
	Medium sized mammals , (adult weight > 6 ibs.)	2		
	Small animals (rodents, etc.) , (adult weight < 6 lbs.)	1		
	0 species present	0		
d. Aquatic macroinvertebrates, amphibians (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	7 or more species commonly observed	3	2	
	3-6 species commonly observed	2		
	1-2 species commonly observed	1		
	0 species commonly observed	0		
e. Aquatic reptiles (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	Large species observed	3	1	
	Aquatic turtles	2		
	Snakes & lizards	1		
	No evidence of species present	0		
2. Vegetative Functions *Apply to freshwater, saltwater, brackish and mitigation systems*				
a. Overstory/shrub canopy	Desirable trees/shrub healthy & providing appropriate habitat (seedlings present) & no inappropriate species	3	2	
	Desirable trees/shrubs exhibit signs of stress (no seedlings) few inappropriate species present	2		
	Inappropriate trees/shrubs shading or overcoming desirable tree/shrubs	1		
	Very little or no desirable tree/shrubs present (evidence suggests there should be)	0		
b. Vegetative ground cover	Assessment area exhibits <2% inappropriate herbaceous ground cover for specific wetland systems and groundcover is present	3	2 (exotic species and rip rap present)	
	Assessment area contains >2% but <30% inappropriate herbaceous groundcover, or lack of groundcover >2% but < 30%	2		
	Assessment area contains >30% to <70% inappropriate herbaceous groundcover, or lack of ground cover >30% to <70%	1		
	Assessment area >70% inappropriate herbaceous groundcover or lack of groundcover >70%	0		
c. Periphyton mat coverage	Periphyton (Blue-green algae) present with average mat thickness >1 1/4 in. (measure active & dead layer)	3	0	
	Periphyton (Blue-green algae) present with average mat thickness between 3/4 in. to 1 1/4 in. (active & dead layer)	2		
	Periphyton (Blue-green algae) present with average mat thickness between 1/4 in. to 3/4 in. (active & dead layer)	1		
	Periphyton (Blue-green algae) not present or if pressent with average thickness of 0.0 to 1/4 in. (active & dead layer)	0		
d. Category 1 and Category 2 exotic plants or (non-native) species	< (or = to) 1 % exotic plant cover	3	2	
	>1 % to 10 % exotic plant cover	2		
	>10 % to 65 % exotic plant cover	1		
	> 65 % exotic plant cover	0		
e. Habitat diversity (vegetative) *(within assessment area)*	>3 native species communities on site within assesssment area	3	1	
	2 or 3 native specie communities on site within assessment area	2		
	1 native species community with 75 % to 90 % coverage within assessment area	1		
	1 native species community has > 90 % coverage within assessment area	0		
f. Biological diversity within 3000 feet *(approximately 1/2 mile from edge of assessment area)*	> 3 alternative habitats available (including upland)	3	3	
	2 to 3 alternative habitats	2		
	1 alternative habitat	1		
	Same habitat type, or inappropriate / impacted	0		

South Fork of the Middle River

3. Hydrologic Functions				
a. Surface water hydrology / sheet flow *Apply to freshwater, saltwater, brackish and mitigation systems*	Major connection *(Flowing water/ river or floodplain/ uniform flow through natural systems)*	3	3 (Serves as major tidal connection)	
	Moderate connection *(Natural restriction of flow or Flowing water due to hydrologic engineering)*	2		
	Minor connection *(Runoff collection point, or uneven flow due to berms, ditches, roadways etc,)*	1		
	Hydrologically isolated, no net lateral movement	0		
b. Hydroperiod (normal year) fresh systems	> 8 months inundated with no reversals & every year drydown	3		
	>5 months < 8 months or >5 years continuous inundation (look for strong water stains on persistent vegetation)	2		
	>1 month < 5 months, with possible reversals (look for soft or less distinct water stains on persistent vegetation)	1		
	< 4 weeks cumulative annual inundation or < 2 weeks continuous inundation	0		
b-1 Alternate to b. for Short Hydroperiod (normal year) fresh systems:	>10 weeks of continuous inundation including soil saturation	3		
	> 6 weeks but <10 weeks of continuous inundation including soil saturation	2		
	>2 weeks but <6 weeks of inudation, including soil saturation	1		
	<2 weeks of continuos inundation	0		
b-2 Alternate to b. for Saltwater, brackish (tidal) systems	Inundated by >90% high tides			
	Inundated by "spring" high tides (bi-monthly)	2		
	Inundated by "extreme high" tides only (biannually)	1		
	Inundated by storm surges only	0		
b-3 Alternate to b. for High Marsh (Juncus-Distichlis)	Inundated by high "spring" tides (monthly) and flushed by fresh water sheetflow every 10 days average	3		
	Inundated by high "spring" tides (monthly) and flushed by fresh water sheetflow every 30 days on the average	2		
	Inundated by high "spring" tides (monthly) and exposed to rain only	1		
	Inundated by >50% high tides and exposed to rain only	0		
b-4 Alternate to b. for Riverine systems	Inundated by high tides (daily) and/or recieves and maintains fresh water at least into first half of dry season	3	1	
	Inundated by high tides (daily) and/or recieves and maintains fresh water during rainy season only	2		
	Inundated by high tides (daily) and/or recieves fresh water but does not maintain (reversal) during rainy season	1		
	Inundated by spring tides (bi-monthly) and/or experiences frequent reversals of fresh water (flashy)	0		
3. Hydrologic Functions continued				
c. Hydropattern (fresh system)	>1 ft. water depth for at least 2.5 months and <6 in. for >1 month (measure water mark/ lichen line), or water depth ideal for specific wetland system.	3		
	>6 in to 1 ft. for at least 2.5 months (measure water mark/ lichen line) or water depth borderline over or under for specific wetland system	2		
	<6 in. for at least 2.5 months (measure water mark/ lichen line) or water depth incorrect for specific wetland system	1		
	<6 in. in association with either canals, ditches, swales, culverts, pumps, and/or wellfields, or these factors cause water depth to be too deep for specific system.	0		
c-1 Alternate to c. for Saltwater, brackish (tidal) systems	>1 ft. water depth <2 ft. on 90% high tides	3		
	> 6 in. water depth <1 ft. on >50% high tides	2		
	< 6 in. water depth , but > than saturated	1		
	Saturated by saline water table only	0		
c-2 Alternate to c. for High Marsh (Juncus-Distichlis)	>10 in. water depth <2 ft. on regular basis during growing season	3		
	>5 in. to 10in. water depth on regular basis during growing season	2		
	>1 in. to 5 in. water depth on regular basis during growing season	1		
	>0.0 in. to 1 in. water depth sporadically during growing season	0		
c-3 Alternate to c. for Riverine systems	>2 ft. water depth (main channel) <6 ft. for 8 months	3	3	
	>2 ft. water depth (main channel) <4 ft. for 6 months	2		
	>1 ft. water depth (main channel) <2.5 ft. for 4 months	1		
	<1 ft. water depth, but dry for >4 weeks (dry season)	0		

South Fork of the Middle River

3. Hydrologic Functions continued				
d. Water Quality	No indication of poor water quality (lab testing required, all values within acceptable range)	3	2 (based on visual observation)	
	No visual indicators of poor water quality observed (1 value just over or under acceptable range)	2		
	Visual indicators of poor water quality questionable (2 values over or under acceptable range)	1		
	Visual indicators of poor water quailty observed or lab verified (values are out of acceptable range)	0		
e. Intactness of historic topography (soil disturbance)	Unaltered	3	0	
	Slightly altered soil disturbance, < 10% of assessment area	2		
	Moderately altered soil disturbance, < 25% of assessment area	1		
	Extremely altered soil disturbance, may exceed 50% of assessment area	0		
f. Soils, organic (fresh systems)	Organic soil classified hydric soil >12 in. or any thickness over bedrock/caprock with perched water table and either condition covering >90% of surface area	3		
	Organic soil classified hydric soil >6 in. but <12 in. and covering >90% of surface area	2		
	Organic soil classified hydric soil >1 in. but <6 in. and covering >50% but <90% of surface area	1		
	Organic soil classified non-hydric soil <1 in. for >50% of surface area	0		
f-1 Alternate to f. for *Freshwater, saltwater systems*	Sandy soil classified hydric soil with distinct mottling and concretions present in greater than 40% of horizon.	3		
	Sandy soil classified hydric soil with mottling and concretions present in > 20% but < 40% of horizon.	2		
	Sandy soil classified hydric soil with light or sparse mottling and concretions < 2 mm diameter or < 20% of horizon.	1		
	Sandy soil exhibits strong evidence of disturbance or mechanical manipulations or is fill material.	0		
f-2 Alternate to f. for *Freshwater, saltwater, brackish (tidal) systems*	Calcareous loam >12 in. and >90 % of surface area	3	0	
	Calcareous loam >6 in. to <12 in. and >90% of surface area	2		
	Calcareous loam >1 in. to <6 in. and covering >50% but <90% of surface area	1		
	Calcareous loam <1 in. for >50% of surface area	0		
4. Salinity Parameters *Apply to freshwater, saltwater, brackish, hypersaline and mitigation systems -* ***Choose 1***				
a. Optimum salinity for fresh systems during growing season based on mean high salinity for a normal year. *Apply to freshwater systems within 5 miles of the coast*	<2 parts per thousand (ppt)	3		
	2 to 3 parts per thousand (ppt)	2		
	4 to 5 parts per thousand (ppt)	1		
	>5 parts per thousand (ppt)	0		
a-1. Alternate to a. Optimum salinity for brackish systems during growing season based on mean high salinity for a normal year. *Apply to brackish (tidal) systems only*	6 to 8 parts per thousand (ppt)	3		
	9 to 13 parts per thousand (ppt)	2		
	14 to 16 parts per thousand (ppt)	1		
	>16 parts per thousand (ppt)	0		
a-2. Alternate to a. Optimum salinity for saline systems during growing season based on mean high salinity for a normal year. *Apply to saline marsh (tidal) systems only*	17 to 19 parts per thousand (ppt)	3		
	20 to 22 parts per thousand (ppt)	2		
	23 to 25 parts per thousand (ppt)	1		
	>25 parts per thousand (ppt)	0		
a-3. Alternate to a. Optimum salinity for hypersaline systems during growing season based on mean high salinity for a normal year. *Apply to hypersaline (tidal) systems only*	26 to 41 parts per thousand (ppt)	3		
	42 to 46 parts per thousand (ppt)	2		
	47 to 51 parts per thousand (ppt)	1		
	>51 parts per thousand (ppt)	0		
a-4 Alternate to a. Optimum salinity for riverine/tidal creek system during growing season based on mean high slainity for a normal year. *Apply to riverine systems only*	bottom (lower) third between 12 to 25 ppt middle third between 5 to 11 ppt. upper (top) third betweem 0 to 4 ppt.	3	2 (estimated)	
	bottom (lower) third between 25 to 32 ppt middle third between 6 to 24 ppt. upper (top) third betweem 0 to 5 ppt.	2		
	bottom (lower) third between 30 to 40 ppt middle third between 8 to 29 ppt. upper (top) third betweem 0 to 7 ppt.	1		
	bottom (lower) third between 35 to 50 ppt middle third between 10 to 34 ppt. upper (top) third betweem 0 to 9 ppt.	0		

Cotleur Hearing, Inc.
W.A.T.E.R. created by: Bill L. Maus
11/1/1998

Cumulative Score (SC)	31.00
Maximum Possible Score (MPS)	54.00
W.A.T.E.R. = Cumulative Score/Maximum Possible Score	0.57

South Fork of the Middle River

W.A.T.E.R SCORE	MITIGATION ACREAGE	FUNCTIONAL MITIGATION CREDITS	SITE SUITABILITY MULTIPLIER	SITE SUITABILITY CREDITS
0.57	0.001	0.00057	1	0.0006

vegetation removal, pile installation, shading, and placement of rip rap

FPL Everglades Mitigation Bank - Oleta River

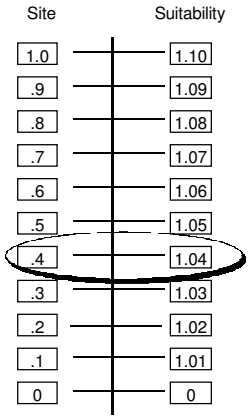
Mitigation Bank Site Suitability Evaluation (MBSE) Matrix

Parameters

Parameter	Scoring Criteria	Ratings	Score
1. Adjacent to lands or waters of regional Importance and results in identifiable	State Park, OFW, AP, and including but not limited to Special Waters on at least 1 boundary	1	
ecological benefits to adjacent lands or waters.	Adjacent lands contain no special designation or undesignated special value	0	1
2. Property is within boundary of an acknowledged state, local or regional acquisition program	Property is within boundary of an acquisition program	1	
	Property is not within boundary of an acquisition program	0	0
3. Property contains ecological or geological features consistently considered by regional Scientist, or federal and state agencies to be unusual, unique or rare in the region and is of sufficient size	Property qualifies	1	
	Property does not qualify	0	0
4. Property designated as being of critical state or federal concern and/or contains special designations,	Property contains at least 1 special designation.	1	
	Property contains no special designations.	0	1
5. Property important to acknowledged restoration efforts	Property is important.	1	
	Property is not important.	0	0
6. Ownership and control of the property.	Property is privately owned.	1	
	Property is publicly owned.	0	1
7. Threatened , Endangered & Species of Special Concern	Documented Presence of Species on site	1	
Presence of animal species (faunal) found on site	No documented Presence of species on site.	0	1
8. Threatened , Endangered & Listed Species	Documented Presence of Species on site	1	
Presence of plant species (floral) found on site	No documented Presence of species on site.	0	0
9. Threat of loss or destruction from development activities. *(Development Pressure)*	High probability of development.	1	
	Low probability of development.	0	0
10. Extent to which lands are subject to Local, State, and Federal dredge and fill/ ERP Regulations	Property is not regulated.	1	
	Property is regulated.	0	0
	Value Cumulative Score (CS)		**4**

The Mitigation Bank Site Suitability Evaluation Matrix is designed to provide a quantifiable means of determining the number of mitigation credits that should be assigned to a bank for **"value"** related parameters. Value related parameters are human values determined to be important to society; and therefore are not measurable in a purely functional analysis. Functional analysis will only measure the degree of functional ecological improvement (degree of ecological improvement) resulting from mitigation activities. The SS Evaluation measures and provides credit for societal values that separate one mitigation bank from another as required by Ch. 62-342 .470 (a) (b) (e) (f) (g) (h) (i) F.A.C.. The SS evaluation is not to be utilized in conjunction with a functional analysis methodology which also utilizes value related parameters in its analysis.

Evaluation Scale



Site Suitability Matrix		
Maximum Possible Score (MPS)		10
Cumulative Score (CS)		**4**
Site Suitability		**0.4**

EPA, USACOE, USF & W, FDEP, NMFS, SFWMD, Dade DERM, FPL, CH

3-Apr-96

After Calculating the Site Suitability Score determine the Site Suitability Multiplier by utilizing the Evaluation Scale to the left. The Site Suitability Multiplier is to be multiplied times the number of the Functional Mitigation Credits, resulting from the **(W.A.T.E.R.)** Functional Assessment of the Mitigation Bank, to determine the number of Site Suitability Credits to be assigned to the Mitigation Bank.

Prepared By:
Cotleur Hearing
2/12/2013

Mitigation Bank Wetland Function Evaluation Matrix

Project: Oleta River

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County

Reviewer: Jay Baker

Date: 2/11/2013

Parameter/ Function	Scoring Criteria	Ratings	Polygon	Polygon
1. Fish & Wildlife Functions *Apply to freshwater, saltwater, brackish and mitigation systems*				
a. Waterfowl, wading birds, wetland dependent, or aquatic birds of prey. (Mit. Bank - High specie count w/ low pop. #'s score 1	7 or more species commonly observed	3	1	
	3-6 species commonly observed	2		
	1-2 species commonly observed	1		
	0 species commonly observed	0		
b. Fish (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	7 or more species commonly observed	3	3 (based on observed species count)	
	3-6 species commonly observed	2		
	1-2 species commonly observed	1		
	0 species commonly observed	0		
c. Mammals (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	Top predator (carnivore) &/or large mammals	3	3 (based on manatee zone)	
	Medium sized mammals , (adult weight > 6 ibs.)	2		
	Small animals (rodents, etc.) , (adult weight < 6 lbs.)	1		
	0 species present	0		
d. Aquatic macroinvertebrates, amphibians (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	7 or more species commonly observed	3	2	
	3-6 species commonly observed	2		
	1-2 species commonly observed	1		
	0 species commonly observed	0		
e. Aquatic reptiles (Mit. Bank - High specie count w/ low pop. #'s score 1 Restoration that causes 12% pop. Increases-higher score)	Large species observed	3	1	
	Aquatic turtles	2		
	Snakes & lizards	1		
	No evidence of species present	0		
2. Vegetative Functions *Apply to freshwater, saltwater, brackish and mitigation systems*				
a. Overstory/shrub canopy	Desirable trees/shrub healthy & providing appropriate habitat (seedlings present) & no inappropriate species	3	2	
	Desirable trees/shrubs exhibit signs of stress (no seedlings) few inappropriate species present	2		
	Inappropriate trees/shrubs shading or overcoming desirable tree/shrubs	1		
	Very little or no desirable tree/shrubs present (evidence suggests there should be)	0		
b. Vegetative ground cover	Assessment area exhibits <2% inappropriate herbaceous ground cover for specific wetland systems and groundcover is present	3	2 (exotic species and rip rap present)	
	Assessment area contains >2% but <30% inappropriate herbaceous groundcover, or lack of groundcover >2% but < 30%	2		
	Assessment area contains >30% to <70% inappropriate herbaceous groundcover, or lack of ground cover >30% to <70%	1		
	Assessment area >70% inappropriate herbaceous groundcover or lack of groundcover >70%	0		
c. Periphyton mat coverage	Periphyton (Blue-green algae) present with average mat thickness >1 1/4 in. (measure active & dead layer)	3	0	
	Periphyton (Blue-green algae) present with average mat thickness between 3/4 in. to 1 1/4 in. (active & dead layer)	2		
	Periphyton (Blue-green algae) present with average mat thickness between 1/4 in. to 3/4 in. (active & dead layer)	1		
	Periphyton (Blue-green algae) not present or if pressent with average thickness of 0.0 to 1/4 in. (active & dead layer)	0		
d. Category 1 and Category 2 exotic plants or (non-native) species	< (or = to) 1 % exotic plant cover	3	2	
	>1 % to 10 % exotic plant cover	2		
	>10 % to 65 % exotic plant cover	1		
	> 65 % exotic plant cover	0		
e. Habitat diversity (vegetative) *(within assessment area)*	>3 native species communities on site within assesssment area	3	1	
	2 or 3 native specie communities on site within assessment area	2		
	1 native species community with 75 % to 90 % coverage within assessment area	1		
	1 native species community has > 90 % coverage within assessment area	0		
f. Biological diversity within 3000 feet *(approximately 1/2 mile from edge of assessment area)*	> 3 alternative habitats available (including upland)	3	3 (Area includes Biscayne bay and Oleta River State Park)	
	2 to 3 alternative habitats	2		
	1 alternative habitat	1		
	Same habitat type, or inappropriate / impacted	0		

Mitigation Bank Wetland Function Evaluation Matrix

Project: Oleta River

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews

Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County

Reviewer: Jay Baker

Date: 2/11/2013

Parameter/ Function	Scoring Criteria	Ratings	Polygon	Polygon
3. Hydrologic Functions				
a. Surface water hydrology / sheet flow *Apply to freshwater, saltwater, brackish and mitigation systems*	Major connection *(Flowing water/ river or floodplain/ uniform flow through natural systems)*	3	3 (Serves as major tidal connection)	
	Moderate connection *(Natural restriction of flow or Flowing water due to hydrologic engineering)*	2		
	Minor connection *(Runoff collection point, or uneven flow due to berms, ditches, roadways etc,)*	1		
	Hydrologically isolated, no net lateral movement	0		
b. Hydroperiod (normal year) fresh systems	> 8 months inundated with no reversals & every year drydown	3		
	>5 months < 8 months or >5 years continuous inundation (look for strong water stains on persistent vegetation)	2		
	>1 month < 5 months, with possible reversals (look for soft or less distinct water stains on persistent vegetation)	1		
	< 4 weeks cumulative annual inundation or < 2 weeks continuous inundation	0		
b-1 Alternate to b. for Short Hydroperiod (normal year) fresh systems:	>10 weeks of continuous inundation including soil saturation	3		
	> 6 weeks but <10 weeks of continuous inundation including soil saturation	2		
	>2 weeks but <6 weeks of inudation, including soil saturation	1		
	<2 weeks of continuos inundation	0		
b-2 Alternate to b. for Saltwater, brackish (tidal) systems	Inundated by >90% high tides			
	Inundated by "spring" high tides (bi-monthly)	2		
	Inundated by "extreme high" tides only (biannually)	1		
	Inundated by storm surges only	0		
b-3 Alternate to b. for High Marsh (Juncus-Distichlis)	Inundated by high "spring" tides (monthly) and flushed by fresh water sheetflow every 10 days average	3		
	Inundated by high "spring" tides (monthly) and flushed by fresh water sheetflow every 30 days on the average	2		
	Inundated by high "spring" tides (monthly) and exposed to rain only	1		
	Inundated by >50% high tides and exposed to rain only	0		
b-4 Alternate to b. for Riverine systems	Inundated by high tides (daily) and/or recieves and maintains fresh water at least into first half of dry season	3	1	
	Inundated by high tides (daily) and/or recieves and maintains fresh water during rainy season only	2		
	Inundated by high tides (daily) and/or recieves fresh water but does not maintain (reversal) during rainy season	1		
	Inundated by spring tides (bi-monthly) and/or experiences frequent reversals of fresh water (flashy)	0		
3. Hydrologic Functions continued				
c. Hydropattern (fresh system)	>1 ft. water depth for at least 2.5 months and <6 in. for >1 month (measure water mark/ lichen line), or water depth ideal for specific wetland system.	3		
	>6 in to 1 ft. for at least 2.5 months (measure water mark/ lichen line) or water depth borderline over or under for specific wetland system	2		
	<6 in. for at least 2.5 months (measure water mark/ lichen line) or water depth incorrect for specific wetland system	1		
	<6 in. in association with either canals, ditches, swales, culverts, pumps, and/or wellfields, or these factors cause water depth to be too deep for specific system.	0		
c-1 Alternate to c. for Saltwater, brackish (tidal) systems	>1 ft. water depth <2 ft. on 90% high tides	3		
	> 6 in. water depth <1 ft. on >50% high tides	2		
	< 6 in. water depth , but > than saturated	1		
	Saturated by saline water table only	0		
c-2 Alternate to c. for High Marsh (Juncus-Distichlis)	>10 in. water depth <2 ft. on regular basis during growing season	3		
	>5 in. to 10in. water depth on regular basis during growing season	2		
	>1 in. to 5 in. water depth on regular basis during growing season	1		
	>0.0 in. to 1 in. water depth sporadically during growing season	0		
c-3 Alternate to c. for Riverine systems	>2 ft. water depth (main channel) <6 ft. for 8 months	3	3	
	>2 ft. water depth (main channel) <4 ft. for 6 months	2		
	>1 ft. water depth (main channel) <2.5 ft. for 4 months	1		
	<1 ft. water depth, but dry for >4 weeks (dry season)	0		

Mitigation Bank Wetland Function Evaluation Matrix

Project: Oleta River

W.A.T.E.R. - Wetland Assessment Technique for Environmental Reviews
Based on WBI, WQI, WRAP, HGM and 4th Priority Project List (PPL) with technical advise from
EPA, FDEP, ACOE, NMFS, USF & W, SFWMD & Dade County

Reviewer: Jay Baker
Date: 2/11/2013

Parameter/ Function	Scoring Criteria	Ratings	Polygon	Polygon
3. Hydrologic Functions continued				
d. Water Quality	No indication of poor water quality (lab testing required, all values within acceptable range)	3	2 (based on visual observation)	
	No visual indicators of poor water quality observed (1 value just over or under acceptable range)	2		
	Visual indicators of poor water quality questionable (2 values over or under acceptable range)	1		
	Visual indicators of poor water quailty observed or lab verified (values are out of acceptable range)	0		
e. Intactness of historic topography (soil disturbance)	Unaltered	3	0	
	Slightly altered soil disturbance, < 10% of assessment area	2		
	Moderately altered soil disturbance, < 25% of assessment area	1		
	Extremely altered soil disturbance, may exceed 50% of assessment area	0		
f. Soils, organic (fresh systems)	Organic soil classified hydric soil >12 in. or any thickness over bedrock/caprock with perched water table and either condition covering >90% of surface area	3		
	Organic soil classified hydric soil >6 in. but <12 in. and covering >90% of surface area	2		
	Organic soil classified hydric soil >1 in. but <6 in. and covering >50% but <90% of surface area	1		
	Organic soil classified non-hydric soil <1 in. for >50% of surface area	0		
f-1 Alternate to f. for *Freshwater, saltwater systems*	Sandy soil classified hydric soil with distinct mottling and concretions present in greater than 40% of horizon.	3		
	Sandy soil classified hydric soil with mottling and concretions present in > 20% but < 40% of horizon.	2		
	Sandy soil classified hydric soil with light or sparse mottling and concretions < 2 mm diameter or < 20% of horizon.	1		
	Sandy soil exhibits strong evidence of disturbance or mechanical manipulations or is fill material.	0		
f-2 Alternate to f. for *Freshwater, saltwater, brackish (tidal) systems*	Calcareous loam >12 in. and >90 % of surface area	3	0	
	Calcareous loam >6 in. to <12 in. and >90% of surface area	2		
	Calcareous loam >1 in. to <6 in. and covering >50% but <90% of surface area	1		
	Calcareous loam <1 in. for >50% of surface area	0		
4. Salinity Parameters *Apply to freshwater, saltwater, brackish, hypersaline and mitigation systems -* ***Choose 1***				
a. Optimum salinity for fresh systems during growing season based on mean high salinity for a normal year. *Apply to freshwater systems within 5 miles of the coast*	<2 parts per thousand (ppt)	3		
	2 to 3 parts per thousand (ppt)	2		
	4 to 5 parts per thousand (ppt)	1		
	>5 parts per thousand (ppt)	0		
a-1. Alternate to a. Optimum salinity for brackish systems during growing season based on mean high salinity for a normal year. *Apply to brackish (tidal) systems only*	6 to 8 parts per thousand (ppt)	3		
	9 to 13 parts per thousand (ppt)	2		
	14 to 16 parts per thousand (ppt)	1		
	>16 parts per thousand (ppt)	0		
a-2. Alternate to a. Optimum salinity for saline systems during growing season based on mean high salinity for a normal year. *Apply to saline marsh (tidal) systems only*	17 to 19 parts per thousand (ppt)	3		
	20 to 22 parts per thousand (ppt)	2		
	23 to 25 parts per thousand (ppt)	1		
	>25 parts per thousand (ppt)	0		
a-3. Alternate to a. Optimum salinity for hypersaline systems during growing season based on mean high salinity for a normal year. *Apply to hypersaline (tidal) systems only*	26 to 41 parts per thousand (ppt)	3		
	42 to 46 parts per thousand (ppt)	2		
	47 to 51 parts per thousand (ppt)	1		
	>51 parts per thousand (ppt)	0		
a-4 Alternate to a. Optimum salinity for riverine/tidal creek system during growing season based on mean high slainity for a normal year. *Apply to riverine systems only*	bottom (lower) third between 12 to 25 ppt middle third between 5 to 11 ppt. upper (top) third betweem 0 to 4 ppt.	3	2 (estimated)	
	bottom (lower) third between 25 to 32 ppt middle third between 6 to 24 ppt. upper (top) third betweem 0 to 5 ppt.	2		
	bottom (lower) third between 30 to 40 ppt middle third between 8 to 29 ppt. upper (top) third betweem 0 to 7 ppt.	1		
	bottom (lower) third between 35 to 50 ppt middle third between 10 to 34 ppt. upper (top) third betweem 0 to 9 ppt.	0		

	Cumulative Score (SC)	31.00
	Maximum Possible Score (MPS)	54.00
	W.A.T.E.R. = Cumulative Score/Maximum Possible Score	0.57

Cotleur Hearing, Inc.
W.A.T.E.R. created by: Bill L. Maus
11/1/1998

Oleta River

W.A.T.E.R SCORE	MITIGATION ACREAGE	FUNCTIONAL MITIGATION CREDITS	SITE SUITABILITY MULTIPLIER	SITE SUITABILITY CREDITS
0.57	0.002	0.00114	1	0.0011

vegetation removal, pile installation, shading, and placement of rip rap