Bluffton Parkway Phase 5A Segment 2

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Overview

01 BLUFFTON PARKWAY BACKGROUND

02 DEVELOPMENT OF PHASE 5A

03 BRIDGE DESIGN

04 CONSTRUCTION

05 BLUFFTON PARKWAY CONCLUSION

01
Bluffton Parkway Background

01 Bluffton Parkway Background

01 Bluffton Parkway Background

History and Previous Phases

- Multi-phase project
- Phase 1-4 constructed prior to 2006
- Phase 5A most complex to relieve traffic congestion by 30%

Funding

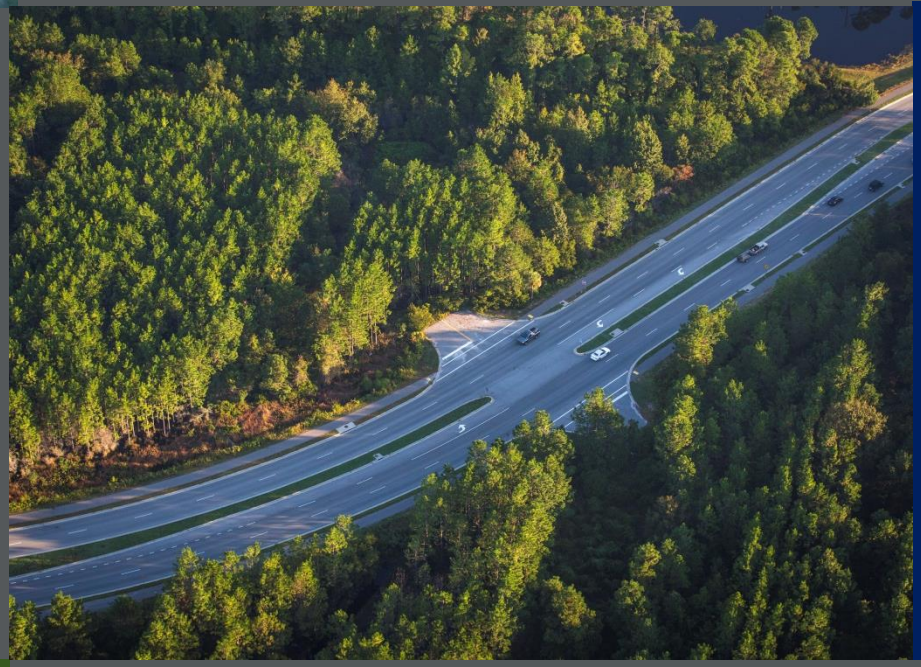
- Previous phases funded by impact fees
- Phase 5A - Primarily funded by Sales Tax Program as well as FHWA

01 Bluffton Parkway Background

Project Partners

- SCDOT
- FHWA
- Santee Cooper
- Palmetto Electric Cooperative
- Beaufort-Jasper Water & Sewer Authority

02 Development of Phase 5A



02 Development of Phase 5A

Project Planning

- Continuity with previous phases
- Corridor analysis
  - Alternative alignments
  - Interchange configurations
  - Compatibility with future widening of bridges to Hilton Head Island
- Long-term ownership / Maintenance
- National Environmental Policy Act (NEPA)

02 Development of Phase 5A

Public Involvement

- Community Outreach
  - 5 Public Meetings over 18 months
  - 1 Public Hearing

- Stakeholder Coordination
  - Home Owners Associations
  - Retail Outlets
  - Golf Courses
  - Utility Companies
  - SCDOT

02 Development of Phase 5A

Utility Coordination

- Santee Cooper
  - 150 ft. wide easement
  - Three major transmission lines - sole power to Hilton Head Island
- Beaufort-Jasper Water & Sewer Authority
  - 12” water main relocation due to conflicts with Santee Cooper pole relocations
  - 30” water transmission line approaching from Bluffton ending at vault within project limits
  - Two gravity sewer crossings 150’ easement

02 Development of Phase 5A

Utility Coordination

- Hilton Head Public Service District
  - 24” Water transmission line relocation from water vault to bridges to HHI
- Palmetto Electric Cooperative
  - Buried 3 phase power line conflicts within 150’ easement (new Santee Cooper poles).
  - Overhead 3-phase line Fording Island Road
- SCE&G Gas
  - 2” gas line Fording Island Road Extension
- Hargray Communications
- Time Warner Cable

02 Development of Phase 5A

Environmental Coordination

- NEPA Documentation
  - EA for Phase 5A
  - Extensive Public and Stakeholder Coordination
- Environmental Permitting
  - USACE Individual Permit
    - Wetland Mitigation – SCDOT acted as co-applicant - Huspa Creek Mitigation
    - Essential Fish Habitat Mitigation – Extensive coordination with National Marine Fishery Service (NMFS)
  - SCHDEC-OCRM – Critical Area Permit
    - Resulted in water quality treatment devices along bridge

02 Development of Phase 5A

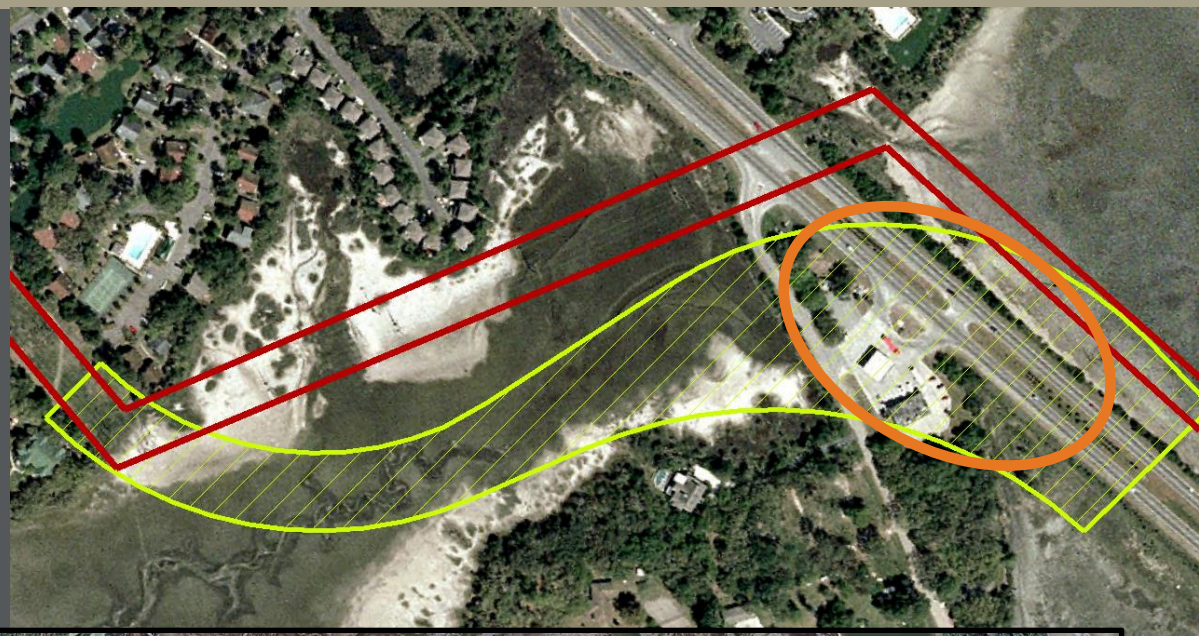
Right-of-Way Issues

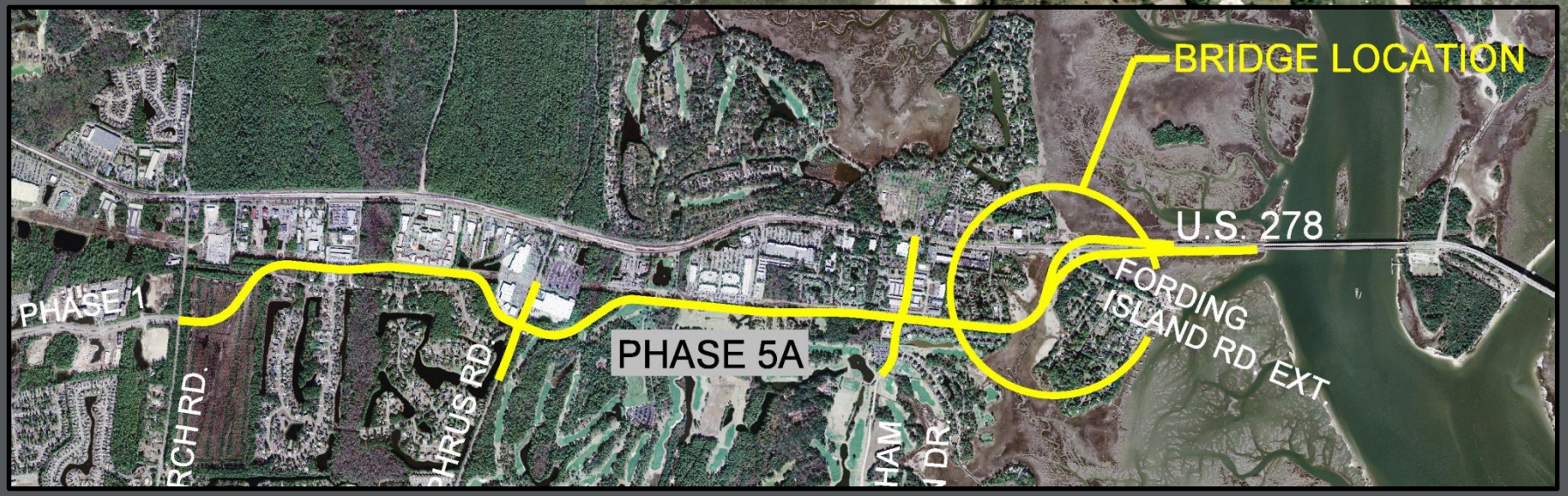
- Existing 150 ft. power line easement acquired as right-of-way
- Marsh (Budget & Control Board)
- Gas Station
- Noise Walls / Aesthetic Walls
- Followed Federal Uniform Act
- New ROW acquired for Santee Cooper pole relocations

03
Bridge Design

03 Bridge Design

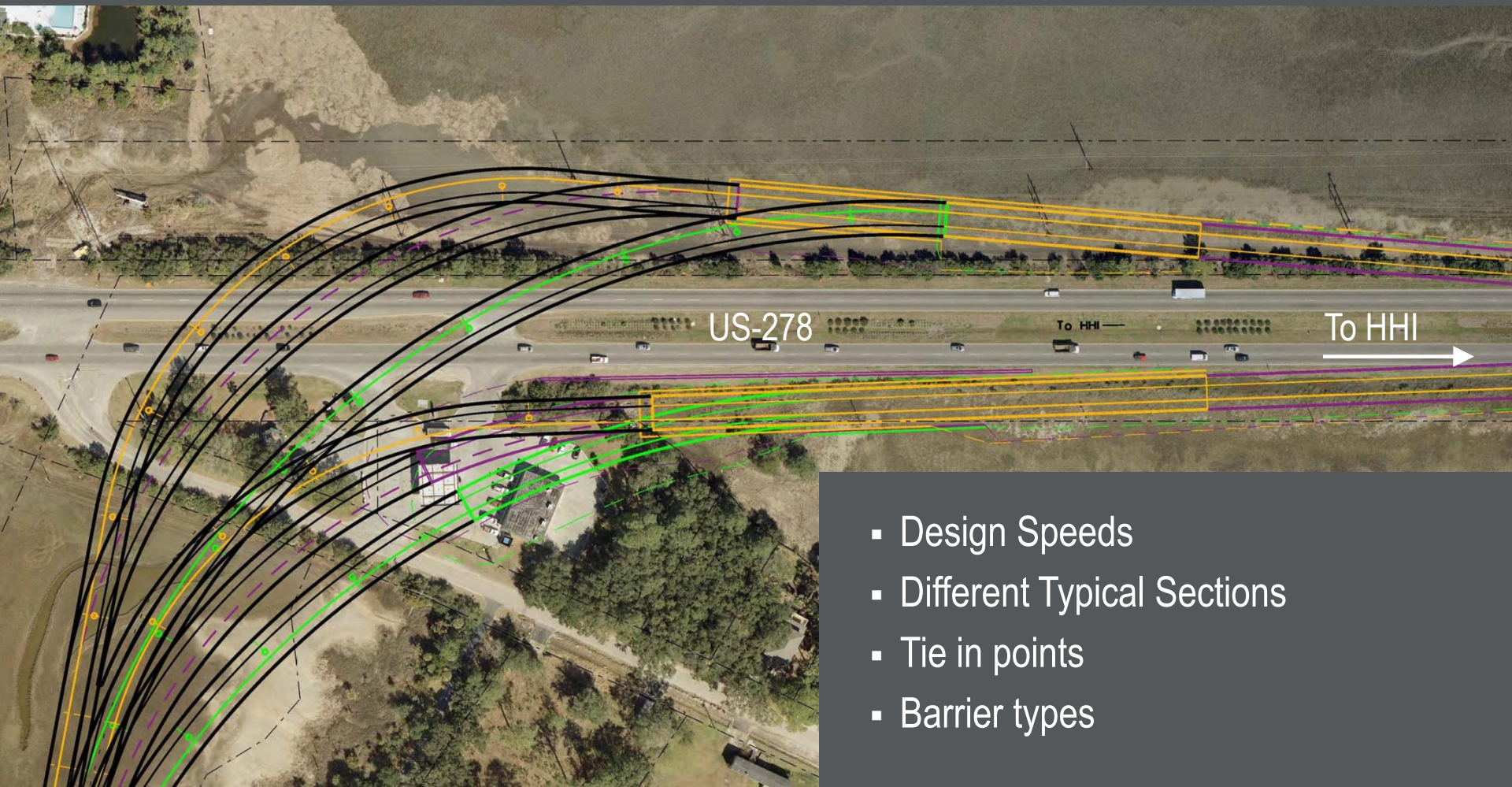
Project and Bridge Corridor





03 Bridge Design

Bridge / Alignment and Alternative Studies



- Design Speeds
- Different Typical Sections
- Tie in points
- Barrier types

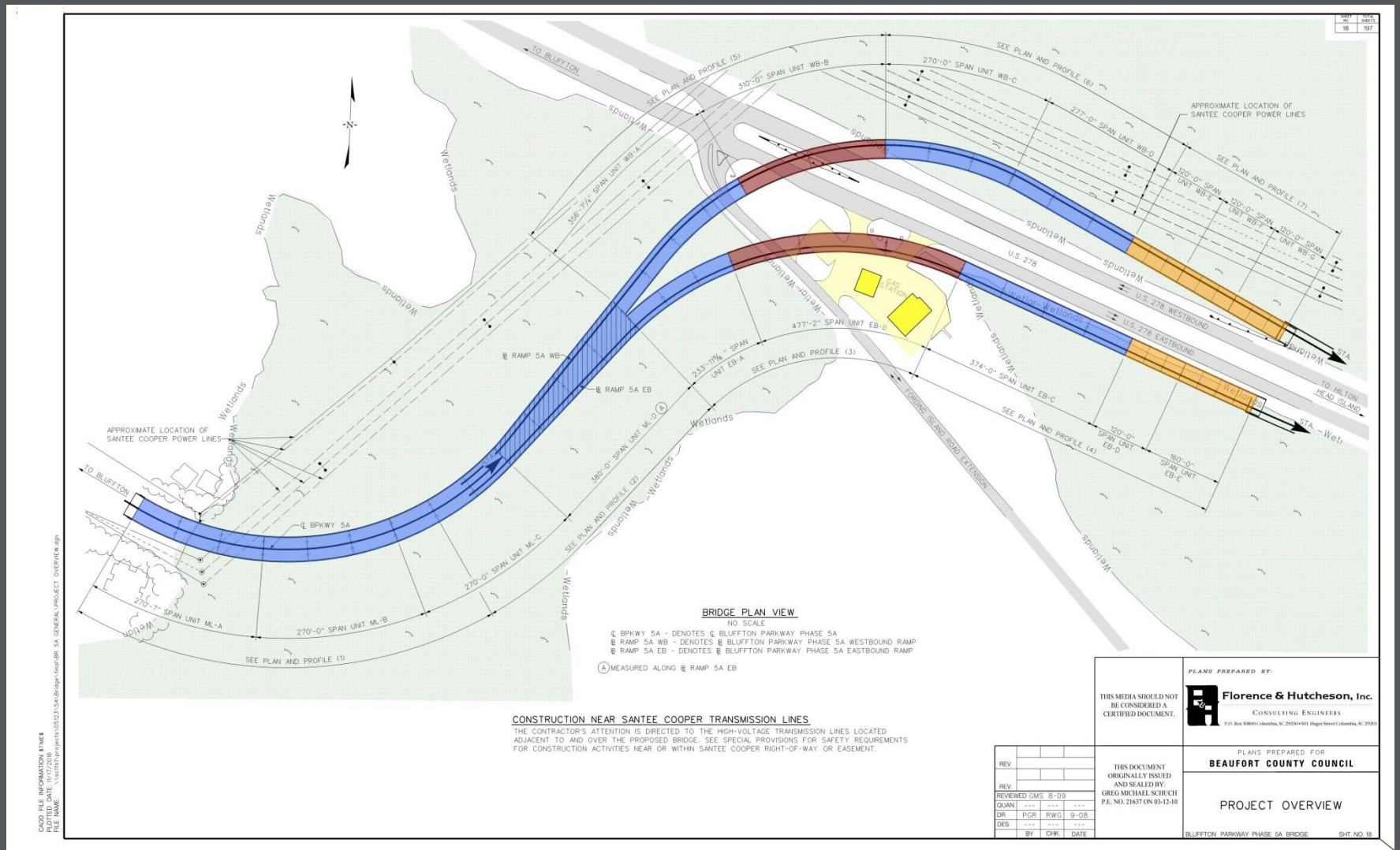
03 Bridge Design

Superstructure Types

- Prestressed Concrete Beams
- Curved Structural Steel Plate Girders
- CIP Concrete Flat Slabs

03 Bridge Design

Superstructure Types



03 Bridge Design

Superstructure

Prestressed Concrete Beams

- AASHTO Type IV
- Mainline Portion and Ramps
- Curved and Straight Spans
- Variable Deck Width/Flared Beams
- Span Lengths from 78 to 95 feet

03 Bridge Design

Superstructure

Structural Steel Plate Girders

- 75-inch deep webs
- Span Lengths from 146 to 175 feet
- Curved Portion of WB Ramp over US-278
- Curved Portion of EB Ramp over Gas Station Parking Lot
- Post Tensioned Integral Interior Bent Caps

03 Bridge Design

Superstructure

Flat Slab Spans

- Cast-in-Place Solid Slabs
- 20 inches thick
- 40-foot long spans
- Used in low areas near the tie-in to US-278

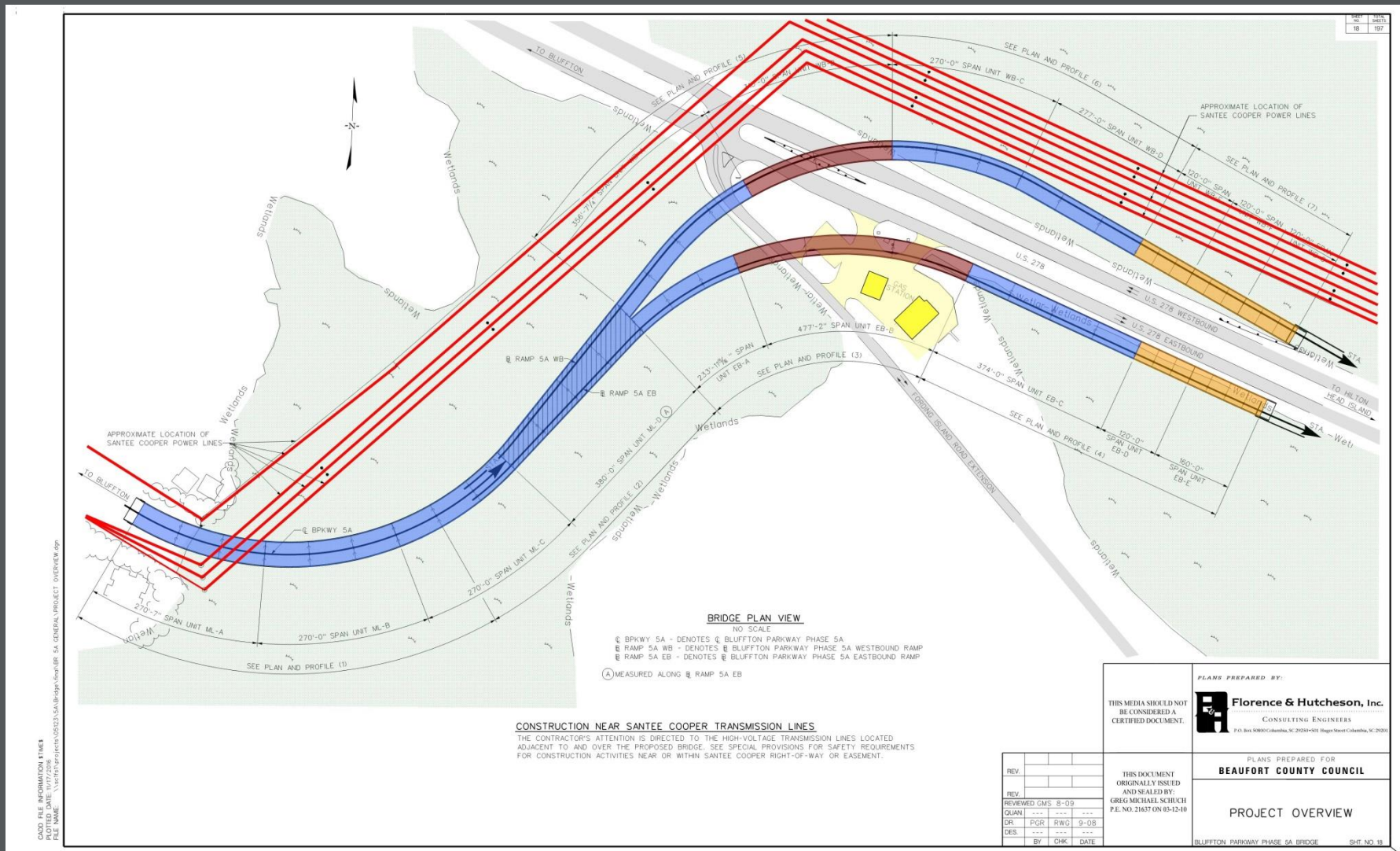
03 Bridge Design

Substructure / Foundations

- Single & multi-column bents with drilled shafts
- Single-column / hammerhead bents with pipe pile footings
- Prestressed concrete pile bents
- Drilled shaft end bents
- Steel pipe pile end bents

03 Bridge Design

Transmission Line Proximity



03 Bridge Design

Substructure / Foundations

Typical CIP Interior Bents

- Aesthetic Tapered Caps
- Column sizes
  - 4’ -6” Diameter (multi-column bents)
  - 6’-0” and 6’-6” Diameter (single column bents)
- Drilled shaft sizes
  - 7’-0” (multi-column)
  - 8’-6” and 9’-0” (single column)

03 Bridge Design

Substructure / Foundations

Interior Supports of Steel Spans

- Post-tensioned integral concrete caps
- Single column bents with footings
  - 22’ x 22’ x 6’-6” footings
  - 16 – 24” steel pipe piles per footing

Interior Pile Bents

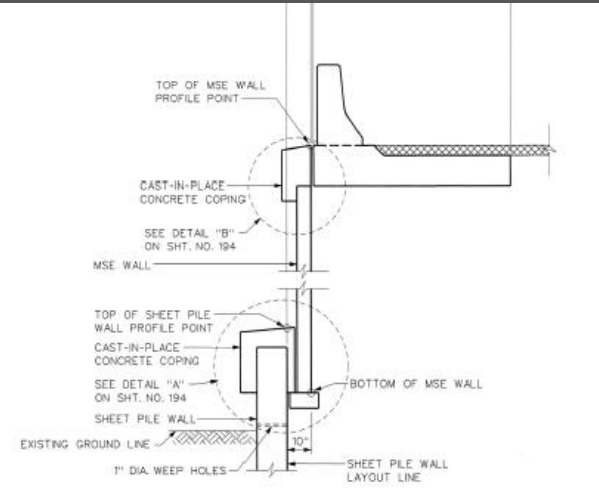
- Reinforced concrete caps
- 24-inch square PSC piles
- Steel H-pile stingers

03 Bridge Design

Substructure / Foundations

End Bents

- Drilled shafts on Mainline end
- Steel pipe piles at Ramp ends
- Ground modification
- Sea-wall style retaining walls along ramps



03 Bridge Design

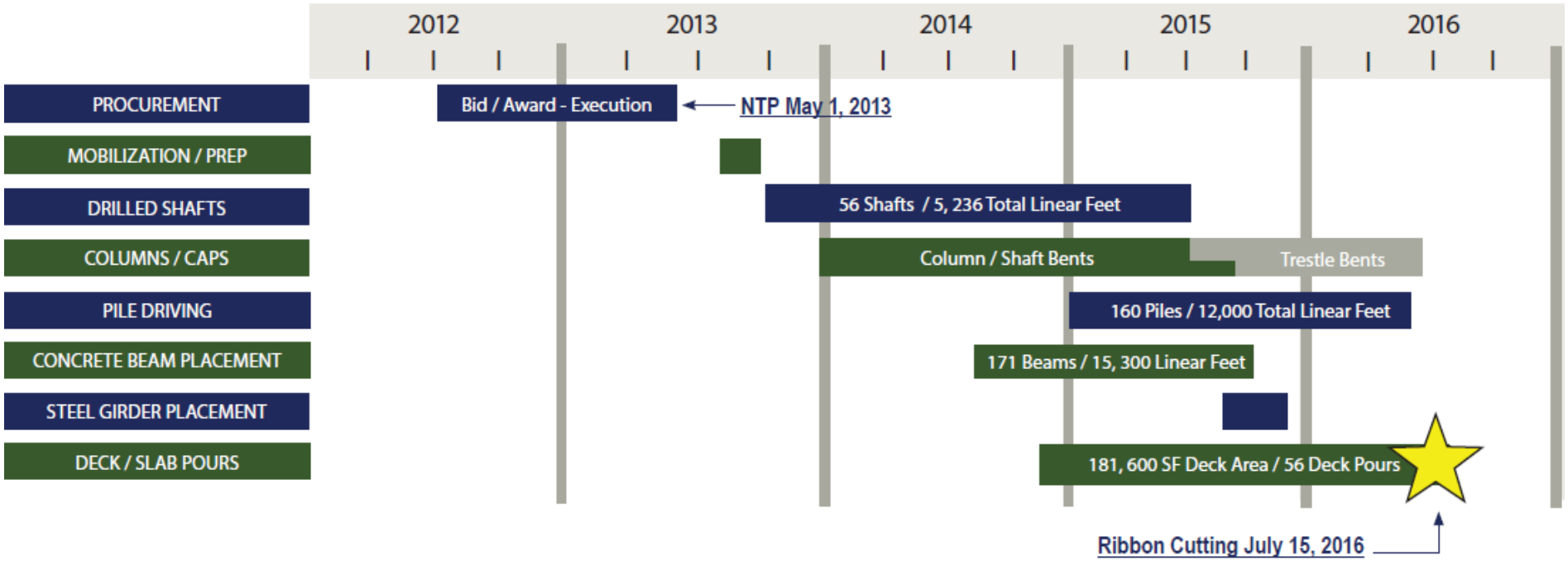
Closed Drainage System

- Grated Inlets
- Collector pipes beneath deck
- On-Bridge Drainage Filtration

04 Construction

04 Construction

Timeline



04 Construction

Construction Issues

- Drilled Shaft Construction Learning Curve
  - Overlapping Reinforcing Cages
  - Staging Concrete Placement
- Two Major Drilled Shaft Repairs

04 Construction

Challenges

- Different Structural Systems
- Construction Access
- Constructability

04 Construction

Different Structural Systems

- Four Different Foundation Systems
- Four Different Substructure Systems
- Three Different Superstructure Systems

04 Construction

Different Structural Systems

04 Construction

Construction Access

- Access via US 278/Critical area wetland/narrow right-of-way
- Shift of 278 for Construction
- Maintenance of Traffic

04 Construction

Constructability within Santee Cooper Easement

- Constraints due to poles/lines
- Coordination to de-energize the lower lines

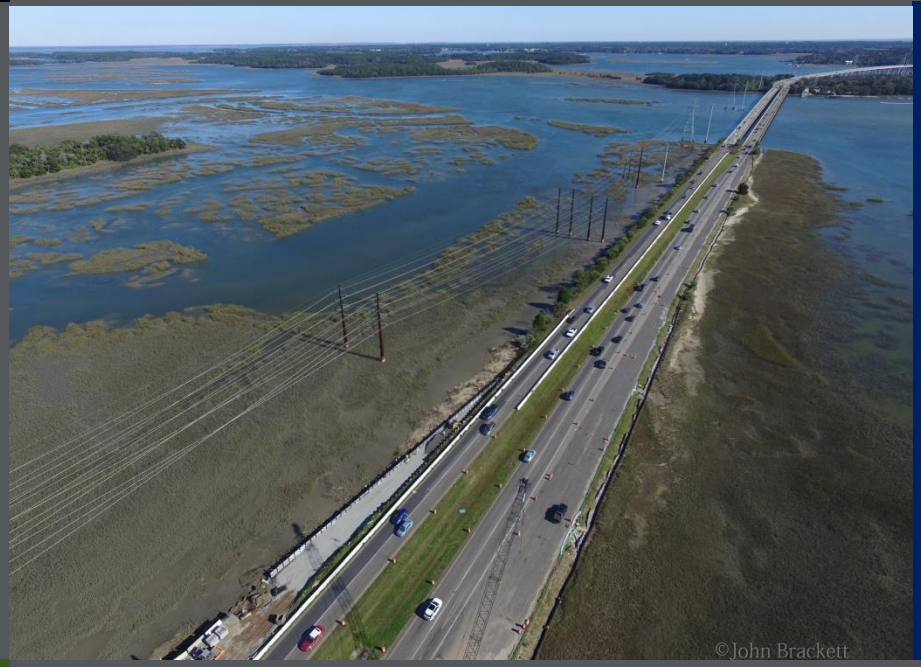
04 Construction

Environmental Compliance

- Marsh Grass Monitoring
  - Defined Transects (Reference/Impact)
  - Annually during construction
  - Two Years after Construction
- Tidal Impacts
  - 6 to 7 foot daily variance
  - 9 foot tidal variance (extreme)


Link-Belt

05
Bluffton Parkway Conclusion



05 Bluffton Parkway Conclusion

A. Ribbon Cutting

- July, 15 2016
- Opened to traffic 10 pm

05 Bluffton Parkway Conclusion

B. Project Highlights

- Up-front Planning
- Quality Design
- HDR | ICA's responsiveness to owner's and contractor's concerns
- Consistent management and political support
- Already used for emergency evacuation prior to Hurricane Matthew

Questions?