BRIDGE HYDRAULICS REPORT

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EXECUTIVE SUMMARY

Describe the recommended alternate:

- *Specify survey datum and conversion.*
- *State recommended bridge alternate; include bridge category, and whether new or widened, size, etc., estimated cost*
- *Describe existing and proposed bridge crossings whether controlled canal, riverine or coastal; including bridge lengths, pier and abutment stations, abutment type and orientation, pier size and orientation. Describe whether 1D or 2D modelling was used and if 2D, why 2D modelling was needed.*
- *Describe abutment and pier protection requirements. If a bridge widening, discuss the existing abutment protection and whether or not it needs to be replaced.*
- *State whether or not there are channel excavation and/or lining requirements, and if so list what they are.*
- *State what the minimum required vertical clearances are for both FDOT and canal regulatory agency.*
- *State whether there are deck drainage requirements and what they are.*
- *If coastal, discuss wave and surge conditions.*
- *Table:*

SUMMARY OF RESULTS OF RECOMMENDED ALTERNATE		
Name of River		
Receiving Body		
Drainage Area (acres)		
Drainage Area Land Use		
Design Discharge (cfs)		
100-YR Discharge (cfs)		
500-YR Discharge (cfs)		
Clearance between low member elevation and design peak stage (ft)		
	NAVD	**NGVD**
Bridge Low Member Elevation (ft)		
Normal Water Level (ft)		
Control Elevation (ft)		
Bank Elevation (ft)		
Wave Crest Elevation (ft)		

STAGE RESULTS	**No Bridge**		**Existing Bridge**		**Proposed Bridge**	
	NAVD	**NGVD**	**NAVD**	**NGVD**	**NAVD**	**NGVD**
Design Peak Stage (ft)						
100-YR Stage (ft)						
500-YR Stage (ft)						

SCOUR RESULTS		
	NAVD	**NGVD**
100-YR Scour Depth (ft)		
500-YR Scour Depth (ft)		
Ground Elevation (ft)		
100-YR Scour Elevation (ft)		
500-YR Scour Elevation (ft)		

SECTION 1.0 – GENERAL INFORMATION

1.1 Project Location.

- *Overall project location (county, city, section/township/range, Turnpike milepost, etc.)*
- *Include maps; such as, vicinity map and USGS quadrangle map.*
- *Datum used for this project; provide conversion.*

1.2 Purpose.

- *Brief description of the intent of the report and the purpose of the project.*

1.3 Existing Drainage Information.

- *Document field review.*
- *Provide water body name and general drainage patterns of the vicinity of the project.*
- *Inventory of existing crossing structures; include lengths, spans, foundation types and sizes, low member elevations, deck and beam heights, abutment and pier stations and orientation.*
- *Describe the waterway and floodplain/floodway at the proposed crossing.*
- *Describe the contributing drainage area of the project.*
- *Discuss any pertinent information from the Bridge Inspection Reports.*

1.4 Tailwater/Backwater.

- *Document/justify tailwater used in the design. Include pertinent information; such as, previous studies, from state or local agencies, etc.*
- *Describe the land use in the area potentially affected by backwater from the crossing. Discuss nearby buildings or other structures that will potentially control the allowable backwater.*

1.5 Wetland & Floodplain Impacts and Mitigation

- *Describe if the project impacts adjacent wetland or floodplain areas. If so, describe how it is being mitigated.*
- *Include the FEMA FIRM. Is the project in a regulatory floodway? Is a No-Rise certification required?*
- *Include tables as necessary.*

1.6 Rules & Regulations/Regulatory Agency Coordination

- *Describe all permits (state, local, etc.) needed to construct this project.*
- *Summarize design criteria such as FEMA requirements, FDOT criteria and other regulatory agency requirements.*

1.7 Proposed Bridge Description

- *Describe details that affect hydraulics: Bridge length, span length, foundation types and sizes, low member elevation, deck and beam heights, abutment and pier stations and orientation, etc.*

SECTION 2.0 – HYDROLOGIC ANALYSIS

Section 2.1 – Drainage Basin
Section 2.2 – Peak Flow Analysis/Design Frequency
Section 2.3 – Document History of Flooding (contact Turnpike Maintenance)

- *Narrative. Freshwater or tidal flow.*
- *Methodology used to determine and check the flow rates used in the analysis.*
- *Studies reviewed.*
- *Discuss results.*

SECTION 3.0 – HYDRAULICS ANALYSIS

Section 3.1 – Manning's Roughness Coefficients.
Section 3.2 – Model Calibration.
Section 3.3 – Cross Section Development.

- *Narrative.*
- *Methodology used such as 1D or 2D, computer program used, how cross sections were determined and located, how starting water elevation was determined, selection of Manning's coefficients, etc.*
- *Studies reviewed.*
- *Discuss results.*

SECTION 4.0 – SCOUR ANALYSIS

Section 4.1 – Description of Soils and D_{50}.
Section 4.2 – Scour Predictions for design 100YR and 500YR.
Section 4.3 – Pier, Abutment and Channel Scour Protection.

- *Narrative including stream geomorphology, scour history and long-term aggradation or degradation.*
- *Methodology used.*
- *Studies reviewed.*
- *Discuss results including proposed abutment/pier protection, channel migration, aggradation/degradation, contraction scour, local scour, etc.*

SECTION 5.0 – BRIDGE DECK DRAINAGE ANALYSIS

- *Narrative discussing spread calculation results and type of deck drainage to be used, if any.*

SECTION 6.0 – MOT DRAINAGE

As necessary:

- *Narrative.*
- *Spread calculations.*
- *Shoulder capacity calculations.*

SECTION 7.0 – CONCLUSIONS AND RECOMMENDATIONS

- *Recommended minimum bridge length and low member elevation.*
- *Recommended scour protection*

SECTION 8.0 – REFERENCES

- *List all references used to prepare this report.*

CROSS SECTIONS SUMMARY

CROSS SECTIONS	NO-BRIDGE				EXISTING BRIDGE				PROPOSED BRIDGE			
	CHANNEL LENGTH	DESIGN Stage (ft)	100YR Stage (ft)	500YR Stage (ft)	CHANNEL LENGTH	DESIGN Stage (ft)	100YR Stage (ft)	500YR Stage (ft)	CHANNEL LENGTH	DESIGN Stage (ft)	100YR Stage (ft)	500YR Stage (ft)
XS-1												
XS-2												
XS-3												
XS-4												
XS-5												
XS-6												
XS-7												
XS-8												
XS-9												
XS-n												
TOTAL LENGTH												

SUMMARY FOR NO BRIDGE

FREQUENCY (years)	DISCHARGE (cfs)	AVERAGE VELOCITY		STAGE		*** LOW CHORD VERTICAL CLERANCE (ft)	**** FLOW TYPE	***** VELOCITY MEETS DESIGN CRITERIA
		** UPSTREAM (fps)	BRIDGE (fps)	* DOWNSTREAM (ft)	** UPSTREAM (ft)			
DESIGN								
100								
500								

SUMMARY FOR EXISTING BRIDGE

FREQUENCY (years)	DISCHARGE (cfs)	AVERAGE VELOCITY		STAGE		*** LOW CHORD VERTICAL CLERANCE (ft)	**** FLOW TYPE	***** VELOCITY MEETS DESIGN CRITERIA
		** UPSTREAM (fps)	BRIDGE (fps)	* DOWNSTREAM (ft)	** UPSTREAM (ft)			
DESIGN								
100								
500								

SUMMARY FOR PROPOSED BRIDGE

FREQUENCY (years)	DISCHARGE (cfs)	AVERAGE VELOCITY		STAGE		*** LOW CHORD VERTICAL CLERANCE (ft)	**** FLOW TYPE	***** VELOCITY MEETS DESIGN CRITERIA
		** UPSTREAM (fps)	BRIDGE (fps)	* DOWNSTREAM (ft)	** UPSTREAM (ft)			
DESIGN								
100								
500								

* @ cross section 1

** @ cross section 4

*** Low Chord Elevation (Existing Bridge) =
Crown of Box Elevation (Bridge Culvert Alternate) =
Low Chord Elevation (Single Span Bridge) =

**** Roadway Overtopping Elevation

***** Design Criteria:
Bridges = Avg. Velocity 2 fps
Bridge Culverts = Avg. Velocity 4 fps